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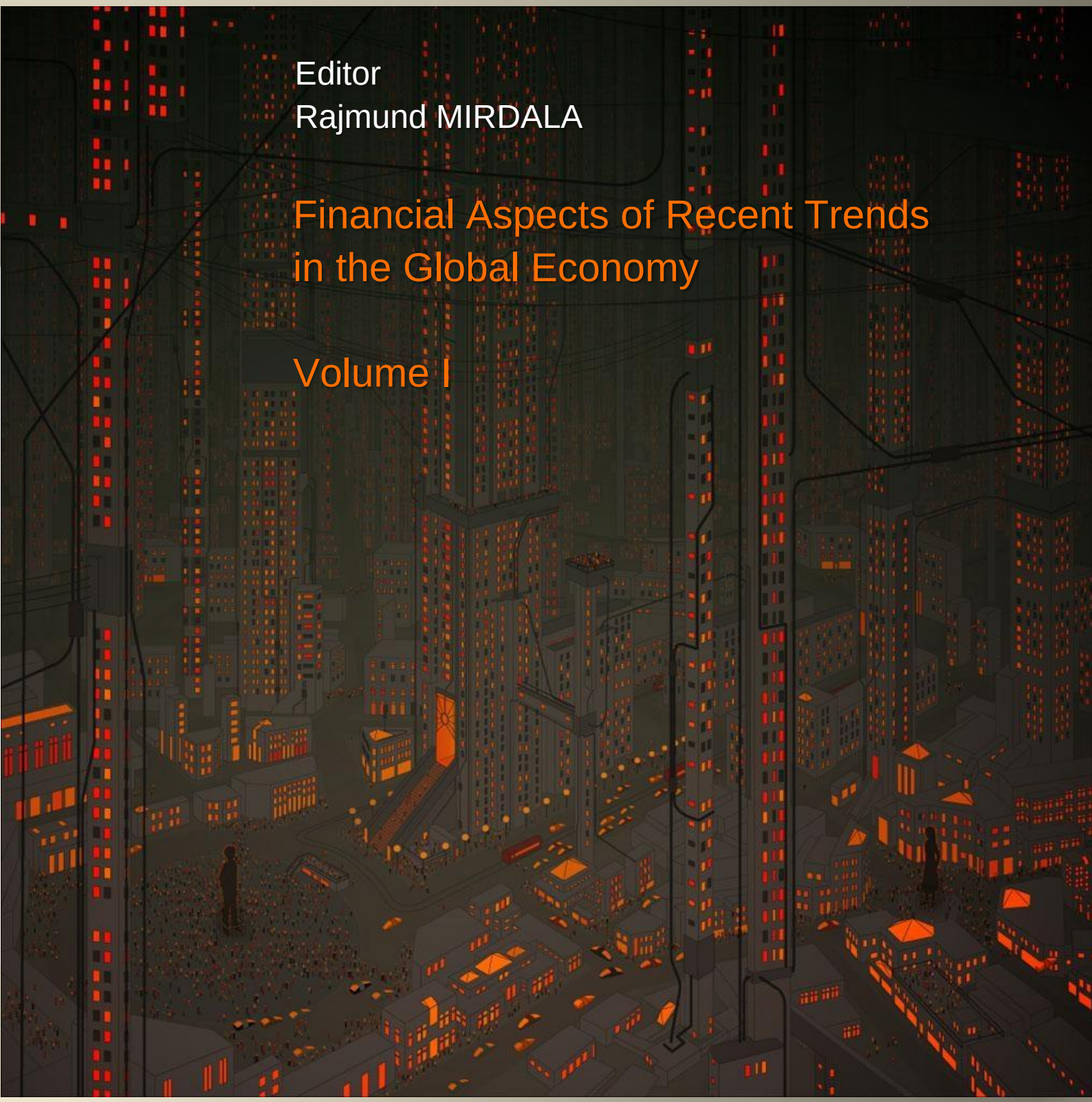

Editor
Rajmund MIRDALA

Financial Aspects of Recent Trends in the Global Economy

Volume I

ASERS Publishing

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Financial Aspects of Recent Trends in the Global Economy (FINART) Volume I

ASERS Publishing
http://www.asers.eu/asers-publishing
ISBN-L: 978-606-93129-5-7
Print ISBN: 978-606-93129-6-4
Online ISBN: 978-606-93129-9-5

Descrierea CIP a Bibliotecii Naţionale a României
Financial aspects of recent trends in the global economy /
Rajmund Mirdala (ed.). - Craiova: ASERS Publishing,
2013
2 vol.
ISBN 978-606-93129-5-7
Vol. 1 / Simplice Anutechia Asongu, Emília Spišaková,
Rustam Jamilov, ... - Bibliogr. - ISBN 978-606-93129-6-4

I. Asongu, Simplice Anutechia
II. Spišaková, Emília
III. Jamilov, Rustam
IV. Mirdala, Rajmund (ed.)

338(100)

Typeset in Arial Narrow by ASERS Publishing
Printed and bound in Romania by Universitaria Printing House,
Brestei Street, 156A, Craiova, Romania

How to order
E-mail for orders and customer service enquiries: asers@asers.eu

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Table of Contents

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Table of Contents

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From the Editor

Current global financial and economic crisis represents one of the key areas of policy makers as well as academics discussions. Together with debt crisis they may be considered as one of the most crucial challenges that official authorities are facing over the past few decades. Crisis period focused attention of economists to various areas of the financial aspects of recent trends in the world economy in the new global era.

Financial liberalization together with the process of growing financial integration among countries in global content significantly contributed to rapid increase in the financial dependence of national financial markets. Intensification and internationalization of financial transactions, financial innovations and rising strength of financial institutions accelerated growing potential of the financial sector. It is not surprising that nowadays daily turnover in financial transactions significantly exceeds daily turnover in trade all over the world. As a result overall impact of financial sector activities on the real economy markedly increased over last few decades. Finally, a rising demand for more effective regulation of national financial sectors and international financial transactions seems to be a convenient way that policymakers suggest as the appropriate solution for current global financial challenges. Within this context we also point to an increasing relevancy of voices calling for new arrangement of international monetary system.

Increased uncertainty considerably reduced allocation effectiveness of the financial markets during the crisis period. While the interest rates during the recession period generally decreased, costs of lending increased mostly for highly indebted countries. Economic crisis emphasized another crucial aspect of the current development in the world economy generally known as debt financing of economic growth and related negative trend in public debt development. Particular problems in the most indebted Eurozone countries affected not only stability of the euro exchange rate but also became the main reason for accelerating the process of fiscal unification, banking union formation and key adjustments in Eurozone stabilization mechanisms. As a result the pressures to strengthen financial discipline of the Eurozone member countries increased while the alternative scenarios of Eurozone reconstruction remained still alive (i.e. national bankruptcy, fiscal union).

Another problem partially related to the current debt crisis represents a significant growth of the corporate debt, also known as corporate funding crisis. Accumulation of corporate debt during last few decades together with slow post crisis recovery in the main world economy centers raises the risk of upcoming corporate insolvency wave as a result of the huge wall of maturing debt signalizing refinancing difficulties in credit markets in United States, Europe and Asia.

The last problem we emphasize as a direct consequence of negative aspects of the current crisis period is related to the rising indebtedness of households. In many countries an individual insolvency still deserves not sufficient attention of official authorities. Personal bankruptcy as a complex consolidation procedure is also not adequately implemented in the national legislation especially in the less developed countries considering wide aspects of this process.

In the global era soundness financial sector and financial discipline of agents (governments, investors, households) represents one of the key aspects of generally expected positive outcomes of economic and financial globalization. Sustainable economic growth of the global economy is

necessarily conditional to positive contributions of the financial sector development as well as the financial discipline of agents to the real performance of economies.

Thus, the goal of this book - **Fin**ancial **A**spects of the **R**ecent **T**rends in the Global Economy (FINART) - is to encourage the exchange of new ideas about challenges in global trends in finance in the view of wide aspects of current financial and (public, corporate, households) debt crisis. The book consists of 29 chapters that are organized in 4 blocks - *Economic and Financial Crisis (Issues and Challenges) and Global Imbalances, Debt Constrains and Exchange Rates Arrangements* are included in the Volume I of the book; *Financial Markets (Risks and Solutions) and Eurozone Perspectives* are included in the Volume II of the book.

Block I - *Economic and Financial Crisis (Issues and Challenges)* - begins with chapter *Globalization and Financial Market Contagion: Evidence from Financial Crisis and Natural Disasters* by Simplice Anutechia Asongu. His chapter assesses financial contagion from two recent trends in the world economy - the global financial crisis and the 2011 Japanese natural disasters (tsunami, earthquake and nuclear crises).

Chapter 2 - *Influence of the Economic Crisis on the Fulfillment of the Target of Strategy Europe 2020 in the Area of Research and Development* - by Emília Spišáková*,* deals with the influence of the economic crisis on the fulfillment of one of the five targets identified in new European Union strategy called Europe 2020. It points out the fact, that research, development and innovation activities are way out of the economic crisis. There is analyzed and compared the indicator expressing the share of gross domestic expenditure on research and development on GDP in selected countries and also the structure of gross domestic expenditure on research and development. Author also described expected trend of the indicator by several functions in six countries.

Chapter 3 - *Growth Design and Monetary Policy after the Crisis* - by Rustam Jamilov*,* establishes a nexus between growth design, monetary policy, and crisis resistance. The basic motivation is to see how nations operating on different economic development models respond to the same systemic financial threat, how central banks in those countries conduct monetary policy, and whether there is a factual interaction between the two. Four countries have been chosen for the purpose of a case-study analysis of economies financed by different factors of growth. Azerbaijan represents a resource-rich state, Hungary - a debt-financed economy, Singapore - an investment-driven, and Switzerland - an export-driven economic model. The author concludes that economic diversification is the driving source of crisis resistance and that every economic formula of dependence on some single key factor impedes policy making at the time of crisis.

Chapter 4 - *The Forecasts Accuracy during the Economic Crisis and Strategies to Improve It* - by Mihaela Bratu (Simionescu), tries to solve the problem of decreased forecasts accuracy during the crisis period by finding suitable strategies or ways of improving the predictions accuracy during the economic crisis. It seems that many malfunctions affect the economic environment in the crisis period. The forecasting process is also influence by the negative evolution of the macroeconomic variables. It is hard to predict the economic behavior of many indicators because of the lack of stability of the economic world. It is clear that the forecasts accuracy decreases during the crisis periods, this phenomenon being seen in the activity of international institutions specialized in providing macroeconomic forecasts for different countries or regions.

Chapter 5 - *A New Global Governance Framework for the World in Crisis* - by Miroslava Filipović, aims at evaluating a new global regulatory scheme since the 2008 Washington summit of G20, through reviewing shifts in political responses and changing agendas. The crisis spill-over has clearly demonstrated a rising level of interdependence in the world economy. Despite of a certain level of success in deliberating and direction setting on issues of global concern, the implementation of the summits' conclusions has proved uneven, pointing to significant differences of the major actors' agendas and priorities. From that aspect, the global economy still has to wait for new regulatory arrangements to emerge. Even though, the G20 through its agenda might have a unique opportunity to pool resources, confront views and opinions and press for a higher level of compliance with internationally agreed goals and principles that might induce longer term and beneficial effects for the world economy and finance.

Chapter 6 - *Challenges of Real Estate Sector Development in Central European Countries in the Post-crisis Period* - by Koloman Ivanička and Daniela Špirková, evaluates the overall impact of the crisis period to the real estate sector in Central and Eastern Europe. Authors suggest that structural reforms and substantial FDI in Central and Eastern European countries during the transition period had enabled to develop the booming real estate markets. At first it seemed that the global economic crisis will not have any impact on the region, however at the end of 2008 the situation has reversed dramatically. Since the region is not homogenous and economic fundamentals are distinct in the particular countries, the impact of crisis and the post crisis situation varies throughout the region. According to authors' opinion the future development of the real estate sector in CEE countries will depend on several external factors, such as the results of the introduction of the new banking regulation, the growing role of the private equity funds and the solution of Eurozone crisis.

Chapter 7 - *Financial Crisis and Preservation of Firms' Value* - by Pavel Marinič, provides a crisis scenario for companies that should be followed in order to preserve a value of companies. Under recession conditions however the firm, in consequence to the redefinition of the firm's expectations, should be content with the fact that there will not be a reduction of value. In company with poor efficiency without a crisis scenario, the situation results in the slump in financial parameters due to the drop in sales. For a fast growing and long prospering company with good financial performance a short-term reduction of final value levers should be a solution for overcoming the crisis. A crisis scenario presupposes the possibility of a short-term loss of business value and this fact is perceived as an investment to overcome the crisis and start expansion of the company after the crisis.

Chapter 8 - *Globalization, Firm Performance and Group Affiliation in Emerging Markets: Evidence from Turkey* - by Ece Ceylan Karadağli, aims to explore how the overall globalization level of a country as well as her economic, political and social globalization levels affect the performance of both the group affiliated and the unaffiliated firms, operating in this business environment by using pooled panel analysis. To search for the potential differences that may prevail between the firm performance effects of globalization on the group affiliated firms and on the unaffiliated firms, chapter focuses on Turkish listed companies for the period 2002-2009. The findings of the study indicate that while globalization improves the stock returns of both the group affiliated and the unaffiliated firms, it deteriorates the operational income of both groups of firms. The findings also imply that although the effects of economic and political globalization do not seem to differentiate much between the group

affiliated and the unaffiliated firms, social globalization may be argued to affect the operating incomes and the firm growth rates of group affiliated and unaffiliated firms differently. Last but not least, the findings suggest that the most influential dimension of globalization in terms of its effects on firm performance for Turkish companies seems to be the economic globalization.

Block II - *Global Imbalances, Debt Constrains and Exchange Rates Arrangements* - begins with chapter 9 - *2000s: Painful and Turbulent Decade of Debt. How Did We End Up in This Mess?* - by Taha Chaiechi, deals with growing sovereign debt issues associated with unsustainable ballooning government spending and expected recession that head towards a financial crisis unless significant policy transformations take place convincingly and before late. The recent sharp increase in advanced country sovereign debts has led to serious concerns about fiscal sustainability as well as their broader economic and financial market impacts, research on the relationship between sovereign debt and economic growth remains sparse, particularly from an empirical perspective. To avoid another chaotic catastrophe the trends of the sovereign debt and macroeconomic performance of countries needs to be watched closely. The projection of the future patterns based on the past and current trends are imperative since it will provide adequate safety net before another financial calamity arrives.

Chapter 10 - *The International Monetary System in Flux: Overview and Prospects* - by Pedro Bação, António Portugal Duarte and Mariana Simões, analyses the architecture of the International Monetary System (IMS) and the role of reserve currencies in it. Chapter begins with description of the evolution of the IMS from the Gold Standard to the Bretton Woods system and the European integration process that led to the creation of the euro. Then the role played by the euro in the IMS as an international reserve currency is discussed in the chapter. Drawing on econometric estimations, there is extrapolated the evolution of the shares in international reserves of the euro, the US dollar and the renminbi. In the discussion, there is taken into account the current sovereign debt crisis and the possibility of a currency war taking place as a result of the reportedly excessive undervaluation of the renminbi and of the expansionist monetary policies undertaken in several advanced economies, namely in the USA. The text ends with a review of proposals for reducing the likelihood of currency wars, which may disrupt the functioning of the current IMS.

Chapter 11 - *Real Output and Prices Adjustments under Different Exchange Rate Regimes* - by Rajmund Mirdala, analyzes effects of the real exchange rate volatility on real output and inflation in ten European transition economies. Impulse-response functions are computed to estimate responses of real output and inflation of negative real exchange rate shocks. Results are discussed from a prospective of the fixed versus flexible exchange rate dilemma. To provide more rigorous insight into the problem of the exchange rate regime suitability author compares the results from pre-crisis and extended periods. Despite the fact, there seems to be no real prospective alternative to euro adoption for the European transition economies, author emphasizes disputable effects of sacrificing monetary sovereignty in the view of positive effects of exchange rate volatility and exchange rate based adjustments in the country experiencing sudden shifts in the business cycle.

Chapter 12 - *Should Sub-Saharan Africa Oil Exporter Countries Borrow More in U.S Dollar or Euro to Stabilize their Balance of Payments? An Empirical Investigation* - by Yaya Sissoko and Soloman Koné, investigates the vulnerability of oil exporter countries in Sub-Saharan Africa (SSA) to commodity price, exchange rate, and interest rate uncertainty. Although there are differences among

Sub-Saharan Africa nations, they do share a number of common characteristics: heavy dependence on primary commodity exports, heavy reliance on outside aid, large debt burdens, poor infrastructure, and lows level of education. The currency composition of a country's external debt can serve as a hedging instrument against changes in exchange rate, interest rate, and commodity price changes. Commodity price and exchange rate changes affect both exports and imports. Furthermore, if a country has debt obligations in currencies other than its own, then its debt servicing ability will be affected by changes in exchange rate and interest rate. Chapter focuses on how a country can minimize its exposure to commodity price, exchange rate, and interest rate movements by structuring optimally the currency composition of its external debt relative to the costs of servicing the debt.

Chapter 13 - *The Impact of the Global Economic Crisis on the Indebtedness of the Southeast European Countries* - by Ines Kersan-Skabic, investigates the effects of the global economic crisis on the countries of the Southeast Europe, with a special emphasis on the level and sustainability of foreign debt. The level of foreign indebtedness has resulted from structural problems in the SEE's i.e. internal and external imbalances. They have been faced with: increase in domestic spending (personal and public), higher growth of import than export, uncompetitiveness of domestic production and export, unfavorable production structure that has resulted in a weak recovery after crisis. In comparison with PI(I)GS the research shows that SEE countries are less indebted and they also have a smaller share of public debt in their GDP's. Econometric analysis indicates the importance of balance of payment disequilibria as determination of foreign debt. Current account deficit, FDI inflows and occurrence of crisis have positive influence on foreign debt, while budget deficit does not have significant impact.

Chapter 14 - *Main Sources of Finance for Development: Retrospective View on the Evolution of Pre-crisis Ideas* - by Mikhail Anatolyevich Sherstnev, provides the overview of the ideas on the sources of finance for development which were widely discussed by international community before the crisis in order to achieve the Millennium Development Goals. This set of ideas remains the starting point for further discussion on the issue and political action in the post-crisis world.

Chapter 15 - *Debt and Ownership* - by Jacek Tittenbrun, provides a critical revision of views on debt and its wide socio-economic dimensions. The first section brings out what constitutes the crucial underlying mechanism of the debt, and financial crisis in general, which, it will be seen, is closely related to the content of motto to the present chapter. The next two sections illuminate the relevance of the debt problem to the economy and society at large. Whilst, as will be seen, one might point to some voices drawing attention to the presumable dramatic consequences of growing indebtedness apparent in both corporate and public sector, in one key respect those commentaries are wanting; namely, as the subsequent sections will show, those empirical processes have a deep-seated theoretical content that can be brought to light only by theoretical means. The said theoretical framework will constitute the subject of the fourth section of the chapter. All in all, an application of that framework to the topic under consideration should end up in a novel, if not an eye-opening view of not only debt as such, but also related socio-economic relations.

Rajmund Mirdala

I.

Economic and Financial Crisis (Issues and Challenges)

Chapter 1

GLOBALIZATION AND FINANCIAL MARKET CONTAGION: EVIDENCE FROM FINANCIAL CRISIS AND NATURAL DISASTERS

by Simplice Anutechia ASONGU
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GLOBALIZATION AND FINANCIAL MARKET CONTAGION: EVIDENCE FROM FINANCIAL CRISIS AND NATURAL DISASTERS

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Abstract

With financial globalization, investors can gain from diversification if returns from financial markets are stable and not correlated. However with volatility spillovers, increase in cross-market correlations exist as a real-effect and are not taken into account for asset allocation and portfolio composition. This chapter assesses financial contagion from two recent trends in the world economy: the global financial crisis and the 2011 Japanese natural disasters (tsunami, earthquake and nuclear crises).

Keywords: globalization, financial crisis, financial market contagion, natural disasters.

1.1 Introduction

Globalization has been recognized as the principal force dominating the economic universe. It upholds to illuminate the world with economic prosperity and seeks a victory of market over government and self-interest over altruism. No less imperative is the global commitment to continuing and accelerating the pace of human development, which indicate the culmination of the historical processes of cultural advances. The dilemma however is that, while the phenomenon is a lusty, ineluctable process whose march can be stopped only by endangering the prosperity of peoples and nations, it also threatens to disfigure development in the manner it is evolving. As a dynamic force for change throughout the world, it is expected to stimulate unprecedented surges in the wealth of nations by extending outwards the world production possibility frontier and redefining world markets as a "Global Village". With growing efforts toward financial liberalization, financial integration among economies has the benefit of improving allocation efficiency and diversifying risks. Despite these potential benefits, recent trends in the global economy suggest that crises in one country can easily spread to other countries through different channels as a result of financial globalization. In this chapter, we assess whether global financial markets have been vulnerable to contagion during some crises that have marked the global landscape in recent memory, notably: the 2007 global financial crisis and the 2011 Japanese tsunami, earthquake and nuclear crises. Hence, we aim to assess global evidence of financial market contagion from financial crisis and natural disasters.

Over the past decade, the concern about regional and global integration of emerging equity markets has been largely debated. The recent global financial meltdown and economic downturn has left many analysts concerned about whether emerging markets suffered from contagion (Asongu, 2012a). Most of these markets were still in their infancy before the start of the millennium, which

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rendered an examination of the transmission of financial variable movements from global crisis somewhat impractical. Hence, the effects of the US stock market crash of 1987, the Mexican peso crisis of 1994, Asian currency crisis of 1997, Russian and LTCM[2] crises of 1998, Brazilian crisis of 1999 and Turkish 2000/2001 crisis have unfortunately not been fully examined in all emerging equity markets. The recent financial crisis has provided a golden opportunity for such an investigation.

Natural disasters have inflicted serious damages on human life, property and economy (Asongu, 2012b). Though many earthquakes occur worldwide on a yearly basis and impact all walks of life in one way or the other, collateral effects resulting from such natural disasters could be quite detrimental financially and economically. The recent Japanese earthquake has resulted in collateral damages that make the disaster particularly significant. On March 11, 2011, Tohoku in Japan was hit by a 9.0 magnitude undersea mega thrust earthquake. This powerful shock triggered a tsunami that struck coastlines across the east of the country, leaving thousands dead and inflicting considerable property damages. But what has startled analysts and left them very concerned over the consequences of this earthquake is the nuclear disaster resulting there-from. Classified as a level-seven event on the International Nuclear Event Scale, the Fukushima nuclear incident has posed a risk equal to the worst nuclear power plant accident in history (Chernobyl disaster). With much uncertainty over how the crisis would have been managed, it is imperative to investigate how international financial markets reacted three months into the crises. Therefore, the second goal of this chapter is to examine whether any contagion effect occurred a few months after the Japanese earthquake, tsunami and worst nuclear crisis since Chernobyl.

There are many reasons this chapter should be dedicated to studying the extent to which financial markets have been affected by the recent financial and natural crises. Among others, results of the studies could enable analysts and policy makers evaluate the benefits of international trade and cross-border investments, and hence, the attractiveness of foreign capital inflows. The results could also provide some basis on how developing countries stand to benefit (loss) from (in) long-run investment sources and global financial booms (as a result of external financial shocks) through financial market integration. The rest of the chapter is organized as follows. Chapter 1.2 examine related literature with emphasis on the effects of financial market integration, linkages between financial market integration and crises, definitions and channels of contagion and, how to measure contagion. Chapter 1.3 provides evidence of contagion from the 2007 global financial crisis in financial markets of developing countries. In chapter 1.4, global international stock indices and exchange rates are investigated for contagion after the 2011 Japanese tsunami, earthquake and nuclear crises. We conclude with chapter 1.5.

1.2 Related literature

1.2.1 Effects of financial market integration

Financial integration between economies is believed to have two main positive impacts: the improvement of capital allocation efficiency and diversification of risks (Demyanyk and Volosovych, 2008; Coulibaly, 2009; Kose *et al*., 2011; Asongu, 2012ab). However, the recent global financial crisis

[2] Long-term Capital Management.

which is considered by many analysts and policymakers as the worst since the Great Depression has cast a dark shadow on the contagion effect of financial integration; despite its advantages. There is a broad economics and finance literature that addresses the potential benefits of financial integration.

From a theoretical perspective, financial globalization should facilitate efficient international allocation of capital and improve international risks sharing (Kose *et al*., 2011; Asongu, 2012a). Asongu (2012a) posit that, the benefits are much greater for developing countries because they are relatively scarce in capital and rich in labor sources. Accordingly, access to foreign capital should help them grow faster through new sources of investment. He has further professed that, since developing countries have more volatile output growth than advanced industrial economies, their potential welfare gains from international risk sharing are much greater. The findings of Kose *et al.* (2011) reveal that, with certain identifiable thresholds in variables such as financial depth and institutional quality, the cost-benefit trade-off from financial openness improves significantly once the threshold conditions are met. Demyanyk and Volosovych (2008) much earlier had analyzed the benefits of financial integration (resulting from international risk sharing) among 25 European Union (EU) countries and presented a case for diversification of risk across EU member states if the risks are fully shared. In a nutshell they emphasized that; the 10 new members joining the EU would have higher gains than the long standing 15 members. The most glaring indication of financial integration benefits is the case of South Africa, a country that has experienced financial autarky as a result of the embargo imposed in 1985 and removed in 1993. Consistent with Coulibaly (2009), there was a significant decrease in the rates of investment, capital and output during the embargo period in South Africa in comparison with the pre-embargo and post-embargo periods.

During the embargo South Africa might have benefited from financial isolation in event of a global financial meltdown. This implies, countries in relative financial autarky are less vulnerable to international financial shocks. Though one of the main appeals of financial integration is risk diversification, paradoxically, increased financial globalization can reduce the scope for risk diversification because integrated markets tend to be more interdependent and highly correlated. Another downside of financial integration could be linked to threshold factors pointed-out earlier by Kose *et al.* (2011). Their study has revealed that, countries with low levels of financial depth and institutional quality do not stand to benefit from financial integration. This perspective is in line with Schmukler (2004) who had stressed that: the importance of sound financial fundamentals and strong macroeconomic institutions; the presence of which should enable more effective management of crises and lower the probability of crises and contagion. Hence, financial globalization could itself be a source of crises.

1.2.2 Linkages between financial integration (globalization) and crises

We have observed that financial globalization has several potential benefits. However the recent stream of financial crises and contagion due to the growing liberalization of financial systems and integration of financial markets around the world, have led many analysts to conclude that globalization breeds financial volatility and crises (Asongu, 2012ab). Though domestic factors are

usually at the origin of crises, there are different channels through which financial globalization could be related to crises.

Firstly, as emphasized by Schmukler (2004), when a country's financial system is liberalized, it becomes an object of market discipline exercised by both foreign and domestic investors. In a closed economy, only domestic investors monitor and react to unsound economic fundamentals while, in an open one domestic and foreign investors might prompt the country to achieve sound fundamentals. As pointed-out earlier, the absence of sound macroeconomic, financial and institutional fundamentals could substantially increase the probability of crises. It logically follows that, conflicting interests and views between investors (domestic and foreign) on key fundamentals might precipitate crises and reduce the ability of governments to effectively monitor and manage them.

Secondly, even with sound domestic economic fundamentals and quality institutions, international financial market imperfections could also lead to crises. Among other things, these could lead to irrational behavior, herding behavior, speculative attacks, bubbles, and crashes. In plainer terms, regardless of market fundamentals, investors could speculate against a currency if they believe that the exchange rate is unsustainable, which could ultimately lead to self-fulfilling balance-of-payments. This thesis illustrated by Obstfeld (1986) has been purported by Schmukler (2004), amongst others.

Thirdly, even in the presence of sound fundamentals and absence of imperfections in international capital markets, crises might still arise on the grounds of external factors (Schmukler, 2004) such as determinants of capital flows (Calvo *et al.*, 1996) and foreign interest rates (Frankel and Rose, 1996). For example if a country becomes dependent on foreign capital, variations in foreign capital flows could create financial issues and economic downturns. Frankel and Rose (1996) clearly emphasize the role foreign interest rates play in determining the likelihood of financial crises in developing countries.

Fourthly, still consistent with Schmukler (2004), financial globalization could lead to financial crises by contagion, namely by shocks via real links, financial links and herding-behavior or unexplained high correlations. This chapter will focus on this fourth example[3]; the elucidation and definition of which are worthwhile.

1.2.3 Definitions and channels of contagion

A. Definitions of contagion

There is no consensus on the definition of contagion among economists. According to the World Bank, the phenomenon can be defined from three angles. Firstly, from a broad angle, contagion could be identified with the general process of stock transmission across countries. Thus, it is worthwhile understanding that this definition does encompass both negative shocks and positive spillover effects. Secondly, the phenomenon could be conceived as the propagation of shocks between two countries in excess of what should be expected, based on the fundamentals after considering co-movements triggered by common shocks. This second definition is restricted only to shocks and presupposes the mastery of what constitutes the underlying fundamentals (without which an appraisal of excess co-movements is not possible). The last and more restrictive definition

[3]That on the link between financial integration and crisis.

considers the phenomenon as the change in the transmission mechanisms (channels) that take place during a period of turmoil and is appreciated by a significant increase in cross-market correlations. Within the framework of this chapter, we shall be restricted to the third definition because: (1) our studies aim to investigate recent trends in some crises of global dimension which are negative shocks and not positive spillovers (as opposed to the first definition) and; (2) we do not master what constitutes underlying fundamentals of co-movements we are about to study (in antagonism to the second definition).

From an empirical standpoint, the third definition was first proposed by Forbes and Rigobon (2002). They assessed contagion as a significant increase in market co-movements after a shock has occurred in one country (or market). According to this definition, the condition for contagion is a significant increase in co-movements as a result of a shock in one market. Accordingly, if two markets display a high degree of co-movements during the stability period, even if they are highly correlated during a crisis, if this crisis-correlation is not significant it does not amount to contagion. In the absence of a significant correlation during the crisis-period, the term 'interdependence' is used to qualify the situation between the two markets (or countries).

B. Channels of contagion

Borrowing from Schmukler (2004), three mains channels of contagion have been documented in the literature. (1) Firstly, real links which are often associated with trading activities. For example if two countries are trading partners and compete in the same external market, a devaluation of the exchange rate of one country deteriorates the other country's competitive advantage. In order to rebalance its external sectors, the losing country would want to devaluate its own currency. The Sino-American trade relation today is an eloquent example. (2) Secondly, a financial link is a situation where two economies are connected through the international financial system. For instance, let us consider leverage institutions facing margin calls. In case the value of the collateral falls as a result of a negative shock in one country, in a bid to increase their initial stock, these institutions would sell some of their holdings in countries not yet affected by the shock. This gives rise to a mechanism that ripples the shocks to other countries. (3) Thirdly, due to herding behaviors or panics resulting from asymmetric information, financial markets might transmit shocks across markets. For obvious reasons (common sense), we shall not elaborate on the mechanics of this third type.

1.2.4 Measuring contagion

Many methods of measuring contagion have been documented in the literature to appreciate the spreading of international shocks across countries. The most widely employed are cross-market correlation coefficients procedures (King and Wadhwani, 1990; Forbes and Rigobon, 2002; Collins and Biekpe, 2003; Lee *et al.*, 2007; Asongu, 2011; Asongu, 2012ab), cross-market co-integration vectors changing techniques (Kanas, 1998), volatility analysis based on ARCH and GARCH models (King *et al.*, 1994) and direct estimation of specific transmission mechanisms (Forbes, 2000). Consistent with the restrictive definition of contagion, the chapter shall adopt Forbes and Rigobon

(2002) in the context of: (1) Collins and Biekpe (2003)[4] for the assessment of financial; (2) Lee *et al*. (2007) for the examination of natural disasters.

1.3 The 2007 financial crisis

Financial integration among economies has the benefit of improving allocation efficiency and diversifying risk. However the recent global financial crisis, considered as the worst since the Great Depression has re-ignited the fierce debate about the merits of financial globalization and its implications for growth especially in developing countries (Asongu, 2012a). This section examines whether equity markets in emerging countries were vulnerable to contagion during the recent global financial meltdown.

1.3.1 Data

The purpose of this study is to investigate correlations between the returns of the USA stock index and stock indices of emerging countries. With the Dow Jones Industrial Average as the 'base criterion', we analyze if co-movements between the 'base criterion' and financial markets of developing countries were significantly strengthened during the recent global financial crisis. In et al. (2008), MacAndrews (2008), Taylor and William (2008) and more recently Ji and In (2010) have all used the August 9th 2007 date as the start of the financial crisis[5]. The sample period is divided into two categories: a 14 month pre-crisis period also known as the tranquil or stable period and, a 15 month crisis or turmoil period. In a bid to make our findings robust, the turmoil period is further divided into three sections[6]: the short-run or four month crisis-period (August 09, 2007 to December 06, 2007); the medium-term or eight months crisis-period (August 09, 2007 to April 10, 2008) and the long-term or 15 month crisis-period (August 09, 2007 to November 13, 2008). Weekly data used in the study is obtained from Bloomberg's database. We use the local currency index return because Forbes and Rigobon (2002) have shown that using dollar or local indices will produce similar outcomes.

1.3.2 Methodology

Contagion is defined by Forbes and Rigobon as a significant increase in market co-movements after a shock has occurred in one country[7].

The correlation coefficient is defined as:

[4] The hypothesis testing in Collins and Biekpe (2003) is slightly different from that of Forbes and Rigobon (2002) in that, the test statistics to determine contagion is not calculated using estimated sample variances. Their test statistics (Collins and Biekpe, 2003) uses exact student statistics based on actual sample correlation coefficients (Asongu, 2012a). Contagion is then measured by the significant increase in adjusted correlation coefficients during the crisis period as compared with the stable period.

[5] Date at which, BNP Paribas announced the closure of its funds that held US subprime debts.

[6] From the empirical literature, the tranquil period is always longer than the turmoil period. For instance it is longer by a year, ten and a half months and nine months in Forbes & Rigobon (2002), Collins & Biekpe (2003) and Lee et al. (2007) respectively.

[7] According to this definition, the presence of high correlation between two markets during the stable period and eventually a sustained increase in the high degree of cross market co-movements at the turmoil period does not amount to contagion. Hence, contagion according to this definition is the presence of significant increase in co-movements after a shock. On the other hand, if the high correlation degree is not significant, the term 'interdependence' is used to qualify to relationship.

$$\rho = \frac{\sigma_{xy}}{\sigma_x \sigma_y} \tag{1.1}$$

where: 'x' is the base criterion while 'y' is an emerging equity market.

Consistent with Forbes and Rigobon, the correlation coefficient is adjusted in the following manner:

$$\rho^* = \frac{\rho}{\sqrt{1+\delta[1-(\rho)^2]}} \tag{1.2}$$

where:

$$\delta = \frac{\sigma_{xx}^h}{\sigma_{xx}^l} - 1$$

which measures the change in high-period volatility against low-period volatility. The crisis-period is used as the 'high volatility period' and the tranquil period as the 'low volatility period' in the calculation of the correlation coefficient adjuster. Contagion is subsequently measured as the significance of adjusted correlation coefficients in time-varying turmoil periods versus the stability period.

In the empirical literature, Collins and Biekpe (2003) and Lee *et al.* (2007) have respectively applied both the t-test and F-test for the significance of the difference in correlations. Accordingly, when only one coefficient is to be estimated, both tests have the same implications (Asongu, 2011; Asongu, 2012ab). Consistent with the t-statistics approach, the significance of increase in correlations during the turmoil period (t) with respect to the stable(s) period is defined by:

$$t = (\rho_t - \rho_s)\sqrt{\frac{n_t + n_s - 4}{1-(\rho_t - \rho_s)^2}} \tag{1.3}$$

where

$t_{(0.01, n_t + n_s - 4)}$

with, *n*t (*n*s) indicating actual observed weeks during the turmoil (stable) period.

The following hypotheses are then tested:

$H_o : \rho_1 - \rho_2 = 0$ *versus* $H_1 : \rho_1 - \rho_2 > 0$

Where H_o is the null hypothesis of no contagion while H_1 is the alternative hypothesis for the presence of contagion

Table 1.1 International Stock Indexes Returns Conditional (unadjusted) correlation coefficient s in 2007 financial crisis

Regions	Countries	Full period		Stable period		Short-term turmoil period				Medium-term turmoil period				Long-term turmoil period			
		ρ	σ	ρ	σ	ρ	σ	t-test	Co	ρ	Σ	t-test	Co	ρ	σ	t-test	Co
	Botswana	-0.040	0.015	0.024	0.014	0.573	0.010	5.641***	Y	0.197	0.008	1.675*	Y	-0.188	0.013	-2.419**	N
	Egypt	0.336	0.045	0.196	0.034	0.419	0.028	1.968*	Y	0.212	0.028	0.154	N	0.353	0.051	1.757*	Y
	Kenya	0.083	0.034	0.008	0.028	0.049	0.030	0.494	N	-0.178	0.038	-1.656	N	0.079	0.038	0.970	N
	Mauritius	0.302	0.030	0.003	0.028	0.001	0.024	0.039	N	-0.099	0.027	-0.922	N	0.382	0.031	4.636***	Y
Africa	Morocco	0.059	0.024	0.024	0.025	0.022	0.019	-0.014	N	-0.109	0.019	-1.288	N	0.051	0.021	0.294	N
	Namibia	0.376	0.037	0.417	0.024	0.558	0.034	1.219	N	0.111	0.043	-3.093***	N	0.342	0.045	-0.845	N
	Nigeria	0.027	0.038	0.095	0.032	-0.457	0.027	-5.710***	N	-0.410	0.026	-5.617***	N	-0.060	0.040	-1.743*	N
	South A	0.435	0.030	0.380	0.021	0.674	0.024	2.641**	Y	0.238	0.031	-1.378	N	0.428	0.036	0.522	N
	Tunisia	0.258	0.016	0.129	0.014	0.183	0.009	0.462	N	0.165	0.018	0.343	N	0.341	0.018	2.405**	Y
	A Dhabi	-0.069	0.030	-0.053	0.021	0.246	0.024	2.706***	Y	-0.133	0.025	-0.761	N	-0.086	0.037	-0.356	N
	Bahrain	0.017	0.015	-0.031	0.013	0.477	0.013	5.069***	Y	0.173	0.012	1.998**	Y	-0.004	0.017	0.297	N
	Dubai	-0.085	0.039	-0.027	0.027	-0.160	0.031	-1.146	N	-0.173	0.030	-1.410	N	-0.126	0.048	-1.089	N
Middle East	Israel	0.264	0.028	0.531	0.023	0.697	0.019	1.444	N	0.287	0.025	-2.411**	N	0.089	0.032	-5.462***	N
	Jordan	0.015	0.031	0.044	0.020	0.148	0.016	0.893	N	0.034	0.020	-0.105	N	0.011	0.040	-0.381	N
	Kuwait	-0.085	0.026	n.a	n.a	0.681	0.014	n.a		0.106	0.013	n.a		-0.085	0.026	n.a	
	Lebanon	0.200	0.033	0.226	0.023	0.145	0.023	-0.710	N	0.181	0.021	-0.441	N	0.213	0.040	-0.155	N
	Oman	-0.217	0.031	0.112	0.016	0.013	0.019	-0.865	N	-0.261	0.028	-3.867***	N	-0.306	0.040	-5.112***	N
	Qatar	-0.133	0.040	-0.032	0.030	0.186	0.027	1.930*	Y	-0.101	0.037	-0.653	N	-0.175	0.047	-1.595	N
	Saudi A	0.012	0.047	0.059	0.041	-0.302	0.027	-3.339***	N	-0.113	0.053	-1.681*	N	-0.002	0.052	0.522	N
	China	0.073	0.056	0.071	0.048	0.528	0.045	4.507***	Y	0.071	0.048	0.064	N	0.063	0.012	-0.582	N
	Dhaka	0.047	0.024	-0.275	0.020	-0.462	0.022	-6.698***	N	-0.275	0.020	-4.539***	N	-0.132	0.020	-3.289***	Y
	India	0.264	0.038	0.252	0.044	0.400	0.042	0.574	N	0.252	0.044	-0.778	N	0.212	0.048	-1.355	N
	Indonesia	0.057	0.040	0.394	0.054	0.773	0.055	5.268***	Y	0.394	0.054	1.389	N	-0.031	0.052	-3.263***	N
	Malaysia	0.100	0.026	0.457	0.036	0.838	0.034	6.045***	Y	0.457	0.036	1.903*	Y	0.015	0.031	-2.832***	N
Asia	Mongolia	0.062	0.046	-0.093	0.044	-0.175	0.056	0.665	N	-0.093	0.044	1.538	N	0.049	0.038	3.499***	Y
	Pakistan	0.021	0.037	0.330	0.028	0.338	0.033	2.584**	Y	0.330	0.028	2.798***	Y	-0.031	0.042	-0.898	N
	Philippines	0.361	0.040	0.621	0.045	0.855	0.053	7.127***	Y	0.621	0.045	4.229***	Y	0.373	0.048	1.749*	Y
	S. Korea	0.469	0.034	0.640	0.041	0.822	0.047	10.324***	Y	0.640	0.041	6.945***	Y	0.502	0.042	5.562***	Y
	Sri Lanka	0.204	0.027	0.380	0.019	-0.100	0.021	-0.828	N	0.380	0.019	3.997***	Y	0.288	0.027	3.390***	Y
	Taiwan	0.429	0.035	0.415	0.040	0.836	0.041	18.401***	Y	0.415	0.040	5.315***	Y	0.482	0.043	7.331***	Y
	Thailand	0.355	0.037	0.422	0.039	0.715	0.035	5.908***	Y	0.422	0.039	2.722***	Y	0.385	0.046	2.698***	Y
	Vietnam	0.204	0.060	0.319	0.056	0.524	0.032	3.842***	Y	0.319	0.056	1.985*	Y	0.195	0.068	0.876	N
	Argentina	0.543	0.041	0.644	0.026	0.752	0.045	0.934	N	0.630	0.037	-0.136	N	0.505	0.051	-1.556	N
	Brazil	0.773	0.043	0.797	0.027	0.831	0.043	0.290	N	0.720	0.042	-0.744	N	0.765	0.052	-0.358	N
	Chile	0.690	0.034	0.588	0.020	0.721	0.040	1.154	N	0.710	0.040	1.178	N	0.703	0.043	1.281	N
Latin	Columbia	0.475	0.032	0.336	0.026	0.381	0.030	0.386	N	0.616	0.034	2.802***	Y	0.504	0.036	1.896*	Y
America	Costa Rica	-0.020	0.028	-0.085	0.031	-0.088	0.019	-0.025	N	-0.203	0.023	-1.140	N	-0.083	0.021	0.023	N
	Ecuador	0.030	0.029	0.085	0.015	0.010	0.005	-0.648	N	0.040	0.049	-0.431	N	0.016	0.037	-0.773	N
	Mexico	0.774	0.037	0.721	0.026	0.814	0.037	0.800	N	0.865	0.037	1.391	N	0.784	0.044	0.692	N
	Peru	0.422	0.052	-0.066	0.029	0.907	0.063	35.962***	Y	0.693	0.059	11.16***	Y	0.478	0.065	7.185***	Y
	Venezuela	0.119	0.034	0.035	0.038	0.193	0.027	1.379	N	0.269	0.034	2.313**	Y	0.159	0.030	1.385	N

Note: The table shows the conditional (unadjusted) cross market correlation coefficients (ρ) and standard deviations for the US and other stock markets. Test statistics is obtained from t-transformations. The stable period is defined as the 14-month pre-crisis period (June 08, 2006 to August 09, 2007). The short-term turmoil period is defined as the four-month crisis period (August 09, 2007 to December 06, 2007). The medium-term turmoil period is defined as the eight months crisis period (August 09, 2007 to April 10, 2008). The long-term turmoil period is defined the fifteen months crisis period (August 09, 2007 to November 13, 2008). The full period is the stable period plus the long-term turmoil period (June 08, 2006 to November 13, 2008). Contagion (Co) occurs (Y)when the test statistics is greater than the critical values. No contagion (N) occurs when the test statistics is less than or equal to the critical value.*, **, ***: represent significance at 10%, 5% and 1% respectively. (nt+ns-4) degrees of freedom for the t-statistics are (66+61-4); (35+61-4);(17+61-4) for the long, medium and short terms respectively. σ: represents the standard deviation.

Table 1.2 International Stock Indexes Returns unconditional (adjusted) correlation coefficient in 2007 financial crisis

Regions	Countries	Full period		Stable period			Short-term turmoil period				Medium-term turmoil period				Long-term turmoil period			
		ρ	σ	ρ*stp	ρ*mtp	ρ*ltp	ρ*	δ	t-test	Co	ρ*	δ	t-test	Co	ρ*	δ	t-test	Co
Africa	Botswana	-0.040	0.015	0.030	0.034	0.026	0.647	-0.321	6.747***	Y	0.265	-0.466	2.278**	Y	-0.197	-0.090	-2.538**	N
	Egypt	0.336	0.045	0.219	0.217	0.163	0.459	-0.202	2.133**	Y	0.234	-0.189	0.168	N	0.296	0.475	1.498	N
	Kenya	0.083	0.034	-0.008	-0.007	-0.007	0.048	0.062	0.479	N	-0.155	0.339	-1.432	N	0.069	0.317	0.845	N
	Mauritius	0.302	0.030	-0.004	-0.003	-0.003	0.001	-0.163	0.043	N	-0.102	-0.057	-0.949	N	0.373	0.060	4.502***	Y
	Morocco	0.059	0.024	0.028	0.028	0.026	0.026	-0.250	-0.016	N	-0.126	-0.250	-1.489	N	0.055	-0.160	0.320	N
	Namibia	0.376	0.037	0.366	0.329	0.323	0.499	0.362	1.152	N	0.084	0.745	-2.419**	N	0.261	0.809	-0.694	N
	Nigeria	0.027	0.038	0.105	0.106	0.086	-0.492	-0.171	-6.40***	N	-0.448	-0.195	-6.38***	N	-0.054	0.225	-1.573	N
	South A	0.435	0.030	0.358	0.321	0.302	0.648	0.151	2.604**	Y	0.198	0.471	-1.188	N	0.342	0.688	0.446	N
	Tunisia	0.258	0.016	0.166	0.117	0.117	0.233	-0.399	0.582	N	0.150	0.221	0.312	N	0.311	0.228	2.198**	Y
Middle East	A Dhabi	-0.069	0.030	-0.051	-0.050	-0.041	0.235	0.107	2.566**	Y	-0.124	0.145	-0.713	N	-0.066	0.686	-0.275	N
	Bahrain	0.017	0.015	-0.032	-0.033	-0.028	0.483	-0.033	5.160***	Y	0.181	-0.089	2.095**	Y	-0.004	0.235	0.268	N
	Dubai	-0.085	0.039	-0.027	-0.166	-0.021	-0.152	0.110	-1.089	N	-0.166	0.094	-0.002	N	-0.096	0.727	-0.830	N
	Israel	0.264	0.028	0.569	0.522	0.477	0.731	-0.180	1.414	N	0.281	0.052	-2.380**	N	0.077	0.338	-4.829	Y
	Jordan	0.015	0.031	0.050	0.045	0.032	0.166	-0.204	0.998	N	0.034	-0.017	-0.106	N	0.007	1.009	-0.269	N
	Kuwait	-0.085	0.026	n.a	-0.007	n.a	n.a	n.a	n.a		n.a	n.a	n.a		n.a	n.a	n.a	
	Lebanon	0.200	0.033	0.233	0.239	0.178	0.148	-0.051	-0.727	N	0.191	-0.106	-0.463	N	0.167	0.653	-0.124	N
	Oman	-0.217	0.031	0.104	0.087	0.072	0.012	0.181	-0.796	N	-0.204	0.680	-2.92***	N	-0.201	1.453	-3.14***	N
	Qatar	-0.133	0.040	-0.035	-0.030	-0.026	0.198	-0.123	2.063**	Y	-0.092	0.196	-0.598	N	-0.142	0.540	-1.289	N
	Saudi A	0.012	0.047	0.074	0.052	0.053	-0.366	-0.351	-4.21***	N	-0.099	0.294	-1.474	N	-0.002	0.267	-0.606	N
Asia	China	0.073	0.056	0.058	0.059	0.052	0.488	0.112	4.108***	Y	0.065	0.165	0.060	N	0.009	0.533	-0.470	N
	Dhaka	0.047	0.024	0.178	0.173	0.171	-0.510	-0.121	-8.05***	N	-0.309	-0.224	-5.27***	N	-0.148	-0.210	-3.732	Y
	India	0.264	0.038	0.223	0.266	0.256	0.272	0.559	0.426	N	0.200	0.637	-0.639	N	0.161	0.773	-1.067	N
	Indonesia	0.057	0.040	0.107	0.165	0.169	0.490	1.441	3.566***	Y	0.267	1.392	0.983	N	-0.021	1.287	-2.142**	N
	Malaysia	0.100	0.026	0.152	0.195	0.208	0.679	0.780	5.338***	Y	0.352	0.872	1.521	N	0.012	0.632	2.222**	Y
	Mongolia	0.062	0.046	-0.203	-0.253	-0.270	-0.140	0.258	0.543	N	-0.094	-0.009	1.544	N	0.053	-0.138	3.782***	Y
	Pakistan	0.021	0.037	0.047	0.052	0.043	0.318	0.072	2.420**	Y	0.342	-0.077	2.906***	Y	-0.026	0.382	-0.764	N
	Philippines	0.361	0.040	0.122	0.176	0.171	0.701	0.817	6.113***	Y	0.537	0.545	3.712***	Y	0.299	0.650	1.432	N
	S. Korea	0.469	0.034	0.020	0.035	0.034	0.527	1.724	5.060***	Y	0.477	1.348	4.734***	Y	0.350	1.410	3.687***	Y
	Sri Lanka	0.204	0.027	-0.006	-0.005	-0.004	-0.127	-0.216	-1.056	N	0.434	-0.271	4.687***	Y	0.286	0.017	3.362***	Y
	Taiwan	0.429	0.035	-0.034	-0.050	-0.048	0.639	1.028	7.839***	Y	0.311	0.945	3.711***	Y	0.355	1.105	4.876***	Y
	Thailand	0.355	0.037	0.109	0.121	0.111	0.605	0.374	4.908***	Y	0.353	0.527	2.282**	Y	0.296	0.815	2.087**	Y
	Vietnam	0.204	0.060	0.172	0.109	0.098	0.687	-0.327	5.169***	Y	0.299	0.155	1.862*	Y	0.165	0.416	0.744	N
Latin America	Argentina	0.543	0.041	0.538	0.579	0.410	0.654	0.746	1.006	N	0.565	0.407	-0.139	N	0.293	0.976	-1.312	N
	Brazil	0.773	0.043	0.724	0.728	0.601	0.765	0.586	0.352	N	0.640	0.550	-0.843	N	0.557	0.900	-0.482	N
	Chile	0.690	0.034	0.453	0.454	0.326	0.589	1.044	1.174	N	0.577	1.035	1.189	N	0.434	1.228	1.198	N
	Columbia	0.475	0.032	0.316	0.300	0.252	0.359	0.142	0.370	N	0.567	0.289	2.665***	Y	0.394	0.377	1.591	N
	Costa Rica	-0.020	0.028	-0.108	-0.097	-0.123	-0.111	-0.376	-0.031	N	-0.231	-0.235	-1.294	N	-0.120	-0.309	0.033	N
	Ecuador	0.030	0.029	0.145	0.047	0.034	0.017	-0.659	-1.106	N	0.022	2.360	-0.236	N	0.006	1.517	-0.308	N
	Mexico	0.774	0.037	0.657	0.655	0.537	0.761	0.430	0.898	N	0.820	0.442	1.607	N	0.614	0.715	0.857	N
	Peru	0.422	0.052	-0.045	-0.046	-0.029	0.824	1.184	15.092***	Y	0.555	1.072	7.210***	Y	0.242	1.268	3.117***	Y
	Venezuela	0.119	0.034	0.042	0.037	0.044	0.229	-0.301	1.642	N	0.285	-0.114	2.452**	Y	0.201	-0.216	1.760*	Y

Note: The table shows the unconditional (adjusted) cross market correlation coefficients (ρ) and standard deviations for the US and other stock markets. Test statistics is obtained from t-transformations. The stable period is defined as the 14-month pre-crisis period (June 08, 2006 to August 09, 2007). The short-term turmoil period is defined as the four-month crisis period (August 09, 2007 to December 06, 2007). The medium-term turmoil period is defined as the eight months crisis period (August 09, 2007 to April 10, 2008). The long-term turmoil period is defined the fifteen months crisis period (August 09, 2007 to November 13, 2008). The full period is the stable period plus the long-term turmoil period (June 08, 2006 to November 13, 2008). Contagion (Co) occurs (Y) when the test statistics is greater than the critical values. No contagion (N) occurs when the test statistics is less than or equal to the critical value.*, **, ***: represent significance at 10%, 5% and 1% respectively. (nt+ns-4) degrees of freedom for the t-statistics are (66+61-4); (35+61-4);(17+61-4) for the long, medium and short terms respectively. σ: represents the standard deviation. ρ*stp, ρ*mtp, ρ*ltp denote adjusted correlation coefficients for the short, medium and long term periods respectively. δ: correlation coefficient adjuster.

1.3.3 Presentation of results and discussion

As shown in Tables 1.1 and 1.2, contagion results based on significant shifts in conditional (unadjusted) correlation coefficients are robust to adjusted (unconditional) correlations. Broadly, the following effects of the financial crisis could be observed: (1) with the exceptions of India and Dhaka, Asian markets were worst hit; (2) but for Peru, Venezuela and Columbia, Latin American countries were least affected and; (3) Africa and Middle East emerging markets were averagely contaminated with the exceptions of Kenya, Namibia, Nigeria, Morocco, Dubai, Jordan, Israel, Oman, Saudi Arabia and Lebanon.

The quasi-immunity of Latin American countries to this recent global financial meltdown was not unexpected. Given its relative important history in the management of financial crises, the continent was the most prepared. Current trends show that, Latin America has improved since the Russian crisis, which has given countries in the continent some leeway (particularly in monetary policy) to implement measures that attenuate the effect of crises. Latin America and the Caribbean countries have built-up to 400 billion dollars in international reserves and have substantially reduced their dollar-denominated debt (especially within the banking system). For example, lower levels of debt dollarization has allowed Brazil to loosen monetary policy in the face of the credit crunch in ways that many countries could not in the post Russian crisis era. In the wake of the financial crisis, Latin American countries swiftly depreciated their currencies without getting into the turmoil. From a fiscal standpoint, many of these countries have saved a considerable amount of their tax income on extra revenue from commodity bonanza at the turn of the century. For instance, Chile has spent only 34% and kept the rest of increased tax collected in a special fund. Hence, even if the crisis had affected these countries, they would still have had the leeway of increasing spending while lowering taxes, in order to easily recover from recession.

Results from Africa were not entirely unexpected. With the exceptions of Kenya, Namibia, Nigeria and Morocco, African stock markets are contaminated in at least one time horizon. This reflects the increasing connection between African markets with global capital flows. Accordingly, African markets are growing in size, liquidity and degree of foreign participation. However misleading it may be to equate contagion to integration, a logical extension of the results could make a case for African equity markets global integration.

Turning to the Middle East, but for Israel, Oman and Saudi Arabia, oil exporting countries (Bahrain and Qatar) have been contaminated while, with the exception of Abu Dhabi, non-oil producing states (Dubai, Jordan, Lebanon) have remained unaffected. Consistent with Anoruo and Mustafa (2007) (on the relation between oil and stock prices, where causality runs from the Dow Jones Industrial Average (DJIA) to oil prices and not vice versa), the DJIA which is our base criterion in this study negatively affected oil prices (which in-turn has had a toll on the stock markets of oil exporting countries).

Whereas Dhaka and India in Asia have remained uncontaminated, China and Mongolia have been affected only in the short- and long-run horizons respectively. Other emerging markets have also been affected at least in two time-horizons. The unexpected speed and force with which the global financial crisis has affected Asian economies could be explained from trade channels. The region currently has deep economic integration with the rest of the world, especially developments in the

United States. A case in point is the loss in export volume growth in Western Asia from 6.4% in 2006 to -0.6% in 2007. Conversely, the fact that India has been broadly unaffected is not unexpected. India has a completely different approach to financial globalization. Whereas the Indian current account was fully opened on a gradual basis in the 1990s, a more calibrated approach has been followed to the opening of the capital account and subsequently the financial sector. This approach is consistent with the available weight of empirical evidence on the benefits of capital account liberalization for acceleration of economic growth, particularly in emerging economies. Further evidence suggests that, the greatest gains are obtained from openness to foreign direct investment followed by portfolio investment. Benefits resulting from external debt flows are questionable until greater domestic financial market development has taken place (Henry, 2007; Asongu, 2012c). As a policy implication, policy making bodies should reconsider Latin American monetary and fiscal strategies in the fight against external financial shocks. Also, the validity of India's financial liberalization strategy could serve as a guide for governments in other developing countries[8].

1.4 The 2011 Japanese earthquake, tsunami and nuclear crises

Natural disasters may inflict significant damage upon international financial markets. The purpose of this section is to investigate if any contagion effect occurred in the immediate aftermath of the Japanese earthquake, tsunami and subsequent nuclear crises.

1.4.1 Data

To investigate the correlations among returns of the Japanese daily stock index (exchange rate) and 33 international stock indices (exchange rates) returns, the Japanese equity and foreign exchange markets are the base criteria. Thus, we examine whether co-movements among national stock and foreign exchange markets increased significantly after the major earthquake, tsunami and nuclear disasters. The sample period is divided into two sections: the 12-month pre-earthquake period (March 11, 2010 to March 10, 2011) and the 2-month post-earthquake period (March 11, 2011 to May 10, 2011)[9]. Whereas the stability period is defined as the pre-earthquake period, the turbulent (turmoil) period is the post-earthquake period. In order to ensure robustness of our findings, the turmoil period is further divided into two equal sections: the 1-month (short-term) post-earthquake period (March 11, 2011 to April 10, 2011) and, the 2-month (medium-term) post-earthquake (March 11, 2011 to May 10, 2011). The number of days is respectively 365,31, 62 days for the stable, short-term turmoil and medium-term turmoil periods. Data used in the study is obtained from Bloomberg's database. In the computing stock returns, last values are carried over for non-trading days. The US dollar is used as the common "x" unit of foreign currency for each unit of national/regional currency in

[8]"Whereas the Indian current account has been opened fully though gradually in the 1990s, a more calibrated approach has been followed in the opening of the capital account and subsequently the financial sector. This approach is consistent with the weight of available empirical evidence on the benefits of capital account liberalization for acceleration of economic growth, particularly in emerging economies. Evidence suggests that the greatest gains are obtained from openness to foreign direct investment followed by portfolio investment. Benefits resulting from external debt flows are questionable until greater domestic financial market development has taken place" (Henry, 2007).

[9] Differences in pre-earthquake and post-earthquake sample periods are in line with Collins and Biekpe (2003); Lee *et al*. (2007) and Asongu (2011, 2012a).

the computation of exchange rate returns. The use of local currency index return is consistent with Forbes and Rigobon who have shown that, using dollar or local indices will produce similar results.

1.4.2 Methodology

Borrowing from Forbes and Rigobon, contagion is a significant increase in market co-movements after a shock has occurred in one country.

The coefficient of correlation is defined as:

$$\rho = \frac{\sigma_{xy}}{\sigma_x \sigma_y} \tag{1.4}$$

Where: 'x' represents the base criterion and 'y' an international market. This correlation coefficient is adjusted in the following manner to take account of heteroscedasticity:

$$\rho^* = \frac{\rho}{\sqrt{1+\delta[1-(\rho)^2]}} \tag{1.5}$$

where:

$$\delta = \frac{\sigma_{xx}^h}{\sigma_{xx}^l} - 1$$

It measures the change in high-period volatility against volatility in the low-period. Whereas the crisis interval is used as the high volatility period, the tranquil (or stable-period) represents the low volatility period. Contagion is accordingly measured as the significant increase of adjusted correlation coefficients in time-varying turmoil periods against the stability period.

Consistent with Lee *et al.* (2007), the following hypotheses are tested:

$H_o : \rho_t - \rho_s \leq 0$ *versus* $H_1 : \rho_t - \rho_s > 0$

Where, ρt is the adjusted correlation coefficient during the turmoil period and ρs the adjusted correlation coefficient for the stable period. A comparison of the variation in correlation between the stable and crisis periods is then analyzed. The null hypothesis (*H0*) is the hypothesis of no contagion whereas *H1* is the alternative hypothesis for the presence of contagion. Fisher's Z transformations of correlation coefficients are employed to test pair-wise cross-country significance. The Fisher's Z-transformations change standard coefficients to normally distributed Z variables. Therefore, prior to hypothesis testing, ρ values must be converted to Zr values.

$$H_o : \rho_t - \rho_s \leq 0 \Rightarrow H_o : Z_{rt} - Z_{rs} \leq 0$$
$$H_1 : \rho_t - \rho_s > 0 \Rightarrow H_1 : Z_{rt} - Z_{rs} > 0$$

Where:

$$Z_{rt} = \frac{1}{2}\ln\left(\frac{1+\rho_t}{1-\rho_t}\right)$$

$$Z_{rs} = \frac{1}{2}\ln\left(\frac{1+\rho_s}{1-\rho_s}\right)$$

$$Z = \frac{Z_{rt} - Z_{rs}}{\sqrt{(1/(n_t - 3)) + (1/(n_s - 3))}}$$

1.4.3 Empirical results and discussion

A. Contagion Effect in International Stock Indexes Returns after earthquake

Table 1.3 below shows the conditional (unadjusted) correlation coefficients of international stock indices for the 2011 Japanese Tsunami. Cross-market correlations of stock index returns are analyzed before and after the earthquake of March 11, 2011. But for China, Taiwan, New Zealand, Argentina, Bahrain, Egypt, Saudi Arabia and South Africa; cross-market correlations between Japan and most countries in the sample during stable period are higher than those during medium-term turmoil period. For the short-run interval, correlations are strengthened for China, Hong Kong, Taiwan, New Zealand, Argentina, Germany, South Korea, Australia, Bahrain, South Africa and Saudi Arabia. There is significant evidence of contagion in Saudi Arabia, Taiwan, Bahrain and South Africa for the short-term turmoil period and only in Bahrain and Saudi Arabia for the medium-term turmoil interval. Relatively for the most part, volatilities of most countries during the stable period are higher than those during turmoil periods (short and medium terms). Table 1.4 presents unconditional correlation coefficients. These adjusted correlations are higher than their unadjusted counterparts in Table 1.3. Ultimately, the findings in Table 1.3 are robust to those in Table 1.4.

B. Contagion effect in international exchange rates returns after earthquake

Table 1.5 presents findings for exchange rate conditional (unadjusted) correlation coefficients. Accordingly, cross-market correlations during turmoil periods are higher than those during the stable period. Strengthened cross-market correlations with insignificant evidence of contagion are noticeable for the Argentine Peso (ARS), Thai Baht (THB), Egyptian Pound (EGP), and Qatari Riyal (QAR) for the short-term turmoil period. Looking at the medium-term, the Chinese Yuan (RMB), Canadian Dollar (CAD), Egyptian pound (EGP), Qatari Riyal (QAR) and Emirati dirham (AED) have also witnessed insignificant stronger co-movements with the Japanese Yen (JPY). Adjusted findings in Table 1.6 confirm those in Table 1.5. Ultimately, no national/regional exchange market is found to have suffered from contagion two months in the aftermath of the Japanese earthquake and the ensuing collateral disasters.

Table 1.3 International stock indices returns conditional (unadjusted) correlation coefficients in 2011 Japanese earthquake

		Full period		Stable Period		Short-term turmoil period				Medium-term turmoil period			
Regions	Countries	ρ	σ	ρ	σ	ρ	σ	Z-test	Co	ρ	σ	Z-test	Co
	India	0.288	0.009	0.343	0.009	0.247	0.009	-0.538	N	0.171	0.009	-1.321	N
South Asia	Malaysia	0.372	0.005	0.405	0.005	0.392	0.005	-0.080	N	0.348	0.005	-0.474	N
and South-East	Philippines	0.317	0.009	0.357	0.009	0.295	0.009	-0.353	N	0.266	0.008	-0.715	N
Asia	Singapore	n.a	0.000	n.a	0.000	n.a	0.000	n.a	n.a	n.a	0.000	n.a	n.a
	Thailand	0.308	0.009	0.361	0.010	0.278	0.008	-0.470	N	0.209	0.008	-1.180	N
East Asia and	China	0.283	0.011	0.309	0.012	0.477	0.007	1.022	N	0.321	0.007	0.100	N
North-East Asia	Hong Kong	0.510	0.009	0.542	0.009	0.574	0.009	0.240	N	0.525	0.008	-0.166	N
	Taiwan	0.587	0.008	0.591	0.008	0.781	0.008	**1.881***	Y	0.694	0.008	1.247	N
	South Korea	0.575	0.008	0.606	0.008	0.660	0.008	0.458	N	0.566	0.008	-0.437	N
Australasia	Australia	-0.004	0.008	0.000	0.008	0.073	0.007	0.373	N	-0.021	0.007	-0.147	N
	New Zealand	0.440	0.004	0.459	0.004	0.609	0.004	1.080	N	0.515	0.004	0.525	N
North America	Canada	-0.055	0.197	-0.013	0.208	-0.441	0.125	-2.348	N	-0.343	0.110	-2.455	N
	U.S.A	0.176	0.012	0.217	0.013	0.054	0.008	-0.848	N	0.074	0.007	-1.041	N
	Mexico	0.159	0.007	0.208	0.007	0.048	0.006	-0.831	N	0.027	0.006	-1.310	N
South America	Argentina	0.174	0.012	0.163	0.013	0.312	0.011	0.807	N	0.269	0.010	0.795	N
	Brazil	0.076	0.010	0.120	0.010	-0.033	0.006	-0.783	N	-0.069	0.008	-1.351	N
	Chile	0.117	0.007	0.178	0.007	-0.086	0.008	-1.357	N	-0.035	0.007	-1.532	N
	France	0.321	0.012	0.366	0.012	0.253	0.011	-0.639	N	0.254	0.010	-0.883	N
	Poland	0.218	0.008	0.287	0.008	-0.045	0.006	-1.735	N	0.013	0.006	-2.014	N
Europe	Germany	0.325	0.009	0.366	0.009	0.350	0.012	0.083	N	0.334	0.011	-0.012	N
	Italy	0.248	0.013	0.292	0.013	0.142	0.009	-0.806	N	0.169	0.009	-0.928	N
	Holland	0.332	0.010	0.378	0.010	0.296	0.008	-0.473	N	0.271	0.008	-0.851	N
	Spain	0.193	0.015	0.255	0.016	-0.116	0.009	-1.923	N	-0.001	0.009	-1.860	N
	U.K	0.292	0.009	0.361	0.009	0.135	0.008	-1.234	N	0.129	0.008	-1.764	N
	Bahrain	0.006	0.005	-0.050	0.005	0.290	0.006	**1.774***	Y	0.207	0.005	**1.850***	Y
	Egypt	0.116	0.013	0.104	0.011	0.098	0.028	-0.027	N	0.131	0.022	0.198	N
Middle East and	Jordan	-0.035	0.005	-0.020	0.005	-0.101	0.006	-0.413	N	-0.097	0.005	-0.554	N
Africa	Kuwait	-0.073	0.005	-0.026	0.005	-0.298	0.006	-1.431	N	-0.256	0.004	-1.679	N
	Qatar	0.019	0.009	0.046	0.009	-0.080	0.009	-0.641	N	-0.064	0.008	-0.785	N
	Saudi Arabia	0.182	0.011	0.117	0.011	0.493	0.013	**2.154****	Y	0.457	0.010	**2.678*****	Y
	UAE	0.080	0.006	0.109	0.006	-0.055	0.006	-0.836	N	0.010	0.005	-0.706	N
	South Africa	0.348	0.009	0.343	0.009	0.634	0.008	**1.994****	Y	0.434	0.009	0.766	N
Other	Russia	0.290	0.012	0.378	0.012	0.007	0.010	-1.992	N	0.069	0.012	-2.338	N

Note 1: *, **, ***: statistical significance at 10%, 5% and 1% respectively.

Note 2: The table shows conditional (unadjusted) cross-market correlation coefficients (ρ) and standard deviations (σ) for Japan and other stock indexes. The test statistics are obtained from Fisher Z transformations. The stable period is defined as the 12-month pre-earthquake period (March 11, 2010 to March 10, 2011). The short-term turmoil period is defined as the 1-month post-earthquake period (March 11, 2011 to April 10, 2011). The medium-term turmoil period is defined as the 2-month post-earthquake period (March 11, 2011 to May 10, 2011). The full period is the stable period plus the medium-term turmoil period. Co: contagion .While "Y" denotes that the test statistics is greater than the critical value and contagion occurred, "N" indicates that the test statistics was less or equal to the critical value and no contagion occurred.

Note 3: Correlation coefficients are unadjusted for heteroscedasticity.

Table 1.4 International stock indices returns unconditional (adjusted) correlation coefficients in 2011 Japanese earthquake

		Full period		Stable Period		Short-term turmoil period				Medium-term turmoil period			
Regions	Countries	ρ	σ	ρ*stp	ρ*mtp	ρ*	δ	Z-test	Co	ρ*	δ	Z-test	Co
	India	0.288	0.009	0.430	0.445	0.315	-0.017	-0.679	N	0.229	0.032	-1.745	N
South Asia	Malaysia	0.372	0.005	0.500	0.516	0.485	-0.077	-0.099	N	0.451	-0.111	-0.609	N
and South-East	Philippines	0.317	0.009	0.445	0.460	0.373	0.007	-0.443	N	0.351	-0.143	-0.933	N
Asia	Singapore	n.a	0.000	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
	Thailand	0.308	0.009	0.450	0.465	0.352	-0.165	-0.591	N	0.279	-0.155	-1.549	N
East Asia and	China	0.283	0.011	0.389	0.403	0.577	-0.433	1.262	N	0.418	-0.387	0.130	N
North-East Asia	Hong Kong	0.510	0.009	0.642	0.658	0.674	0.048	0.283	N	0.642	-0.106	-0.203	N
	Taiwan	0.587	0.008	0.690	0.706	0.852	0.047	**2.119****	Y	0.794	-0.043	1.458	N
	South Korea	0.575	0.008	0.704	0.719	0.753	0.016	0.528	N	0.682	0.092	-0.523	N
Australasia	Australia	-0.004	0.008	0.000	0.000	0.095	-0.706	0.485	N	-0.028	-0.120	-0.199	N
	New Zealand	0.440	0.004	0.558	0.574	0.707	-0.119	1.283	N	0.632	-0.172	0.651	N
North America	Canada	-0.055	0.197	-0.017	-0.018	-0.539	-0.401	-2.985	N	-0.445	-0.473	-3.277	N
	U.S.A	0.176	0.012	0.278	0.289	0.070	-0.410	-1.096	N	0.100	-0.458	-1.401	N
	Mexico	0.159	0.007	0.267	0.278	0.063	-0.174	-1.074	N	0.037	-0.118	-1.767	N
South America	Argentina	0.174	0.012	0.210	0.219	0.393	-0.139	1.029	N	0.355	-0.198	1.059	N
	Brazil	0.076	0.010	0.155	0.162	-0.043	-0.381	-1.018	N	-0.094	-0.228	-1.833	N
	Chile	0.117	0.007	0.229	0.238	-0.112	0.215	-1.761	N	-0.048	0.038	-2.073	N
	France	0.321	0.012	0.456	0.471	0.322	-0.124	-0.805	N	0.336	-0.188	-1.153	N
	Poland	0.218	0.008	0.364	0.377	-0.058	-0.295	-2.240	N	0.017	-0.295	-2.702	N
Europe	Germany	0.325	0.009	0.421	0.436	0.437	0.255	0.104	N	0.434	0.142	-0.015	N
	Italy	0.248	0.013	0.369	0.383	0.183	-0.314	-1.032	N	0.227	-0.306	-1.232	N
	Holland	0.332	0.010	0.469	0.485	0.374	-0.209	-0.593	N	0.358	-0.242	-1.108	N
	Spain	0.193	0.015	0.324	0.337	-0.151	-0.406	-2.489	N	-0.001	-0.443	-2.504	N
	U.K	0.292	0.009	0.450	0.465	0.175	-0.152	-1.571	N	0.175	-0.120	-2.333	N
	Bahrain	0.006	0.005	-0.065	-0.067	0.367	0.022	**2.290****	Y	0.276	-0.156	**2.501****	Y
	Egypt	0.116	0.013	0.134	0.140	0.127	1.605	-0.036	N	0.177	0.991	0.268	N
Middle East and	Jordan	-0.035	0.005	-0.026	-0.027	-0.131	0.077	-0.537	N	-0.132	-0.159	-0.752	N
Africa	Kuwait	-0.073	0.005	-0.034	-0.036	-0.376	0.088	-1.841	N	-0.339	-0.157	-2.257	N
	Qatar	0.019	0.009	0.059	0.062	-0.104	0.037	-0.834	N	-0.087	-0.133	-1.066	N
	Saudi Arabia	0.182	0.011	0.152	0.158	0.594	0.170	**2.705*****	Y	0.572	-0.111	**3.502*****	Y
	UAE	0.080	0.006	0.141	0.147	-0.071	0.012	-1.087	N	0.014	-0.085	-0.957	N
	South Africa	0.348	0.009	0.429	0.444	0.730	-0.136	**2.394****	Y	0.548	-0.036	0.980	N
Other	Russia	0.290	0.012	0.469	0.485	0.009	-0.176	-2.550	N	0.094	-0.006	-3.100	N

Note 1: *, **, ***: statistical significance at 10%, 5% and 1% respectively.

Note 2: The table shows conditional (unadjusted) cross-market correlation coefficients (ρ) , adjuster for heteroscedasticity (δ) and standard deviations (σ) for Japan and other stock indexes. The test statistics are obtained from Fisher Z transformations. The stable period is defined as the 12-month pre-earthquake period (March 11, 2010 to March 10, 2011). The short-term turmoil period is defined as the 1-month post-earthquake period (March 11, 2011 to April 10, 2011). The medium-term turmoil period is defined as the 2-month post-earthquake period (March 11, 2011 to May 10, 2011). The full period is the stable period plus the medium-term turmoil period. Co: contagion. While "Y" denotes that the test statistics is greater than the critical value and contagion occurred, "N" indicates that the test statistics was less or equal to the critical value and no contagion occurred. ρ*stp, ρ*mtp, denote adjusted correlation coefficients for the short and medium term periods respectively. δ: correlation coefficient adjuster.

Note 3: Correlation coefficients are adjusted for heteroscedasticity using Equation 1.2.

Table 1.5 International exchange rates returns conditional (unadjusted) correlation coefficients in 2011 Japanese earthquake

		Full period		Stable Period		Short-term turmoil period				Medium-term turmoil period			
Regions	Countries	ρ	σ	ρ	σ	ρ	σ	Z-test	Co	ρ	σ	Z-test	Co
	India	-0.136	0.004	-0.130	0.005	-0.282	0.002	-0.807	N	-0.207	0.002	-0.560	N
South Asia	Malaysia	-0.197	0.004	-0.191	0.005	-0.332	0.002	-0.773	N	-0.267	0.003	-0.570	N
and South-East	Philippines	-0.129	0.004	-0.128	0.005	-0.439	0.003	-1.746	N	-0.143	0.003	-0.105	N
Asia	Singapore	-0.029	0.003	-0.015	0.004	-0.197	0.003	-0.940	N	-0.109	0.003	-0.674	N
	Thailand	0.061	0.002	0.066	0.004	0.235	0.002	0.885	N	0.023	0.002	-0.307	N
East Asia and	China	0.030	0.001	0.018	0.004	-0.090	0.001	-0.551	N	0.085	0.001	0.482	N
North-East Asia	Hong Kong	-0.049	0.000	-0.020	0.004	-0.223	0.000	-1.049	N	-0.225	0.000	-1.481	N
	Taiwan	-0.104	0.003	-0.080	0.004	-0.400	0.002	-1.748	N	-0.251	0.002	-1.256	N
	South Korea	-0.242	0.007	-0.226	0.007	-0.500	0.005	-1.630	N	-0.415	0.004	-1.508	N
Australasia	Australia	-0.080	0.007	-0.042	0.007	-0.428	0.006	-2.120	N	-0.325	0.006	-2.099	N
	New Zealand	-0.031	0.007	0.035	0.007	-0.612	0.007	-3.812	N	-0.419	0.006	-3.432	N
North America	Canada	-0.272	0.006	-0.275	0.006	-0.390	0.004	-0.662	N	-0.274	0.004	0.010	N
	Mexico	-0.338	0.005	-0.339	0.006	-0.521	0.003	-1.151	N	-0.385	0.004	-0.378	N
South America	Argentina	-0.030	0.001	-0.026	0.001	-0.024	0.001	0.010	N	-0.059	0.001	-0.237	N
	Brazil	-0.205	0.006	-0.181	0.006	-0.415	0.005	-1.316	N	-0.356	0.006	-1.347	N
	Chile	0.012	0.005	0.046	0.006	-0.281	0.004	-1.707	N	-0.234	0.004	-2.028	N
Europe	Euro	0.166	0.006	0.211	0.006	-0.204	0.004	-2.151	N	-0.079	0.006	-2.094	N
	U.K	0.043	0.005	0.073	0.005	-0.211	0.005	-1.467	N	-0.147	0.004	-1.576	N
	Bahrain	-0.021	0.006	-0.014	0.000	-0.029	0.000	-0.077	N	-0.043	0.000	-0.208	N
	Egypt	0.037	0.001	0.022	0.001	0.133	0.001	0.566	N	0.194	0.001	1.239	N
Middle East and	Jordan	-0.026	0.001	-0.024	0.001	-0.131	0.000	-0.548	N	-0.036	0.000	-0.088	N
Africa	Kuwait	0.247	0.001	0.258	0.001	0.182	0.001	-0.408	N	0.187	0.001	-0.533	N
	Qatar	0.037	0.000	0.029	0.000	0.211	0.000	0.994	N	0.178	0.000	1.072	N
	Saudi Arabia	-0.027	0.000	0.005	0.000	-0.334	0.000	-1.795	N	-0.194	0.000	-1.431	N
	UAE	-0.086	0.000	-0.094	0.001	-0.211	0.005	n.a	n.a	-0.037	0.000	0.406	N
	South Africa	-0.130	0.007	-0.074	0.007	-0.601	0.007	-3.170	N	-0.448	0.007	-2.906	N
Other	Russia	-0.140	0.004	-0.132	0.005	-0.377	0.003	-1.347	N	-0.211	0.004	-0.580	N

Note 1: *, **, ***: statistical significance at 10%, 5% and 1% respectively. n.a: the presence of zero exchange rate return for all periods of the series.

Note 2: The table shows conditional (unadjusted) cross-market correlation coefficients (ρ) and standard deviations (σ) for Japan and other stock indexes. The test statistics are obtained from Fisher Z transformations. The stable period is defined as the 12-month pre-earthquake period (March 11, 2010 to March 10, 2011). The short-term turmoil period is defined as the 1-month post-earthquake period (March 11, 2011 to April 10, 2011). The medium-term turmoil period is defined as the 2-month post-earthquake period (March 11, 2011 to May 10, 2011). The full period is the stable period plus the medium-term turmoil period. Co: contagion .While "Y" denotes that the test statistics is greater than the critical value and contagion occurred, "N" indicates that the test statistics was less or equal to the critical value and no contagion occurred.

Note 3: Correlation coefficients are unadjusted for heteroscedasticity.

Table 1.6 International exchange rates returns unconditional (adjusted) correlation coefficients in 2011 Japanese earthquake

		Full period		Stable Period		Short-term turmoil period				Medium-term turmoil period			
Regions	Countries	ρ	σ	ρ*stp	ρ*mtp	ρ*	δ	Z-test	Co	ρ*	δ	Z-test	Co
	India	-0.136	0.004	-0.181	-0.168	-0.379	-0.487	-1.104	N	-0.265	-0.408	-0.721	N
South Asia	Malaysia	-0.197	0.004	-0.262	-0.245	-0.441	-0.510	-1.045	N	-0.339	-0.356	-0.728	N
and South-East	Philippines	-0.129	0.004	-0.178	-0.166	-0.564	-0.267	-2.341	N	-0.184	-0.281	-0.136	N
Asia	Singapore	-0.029	0.003	-0.021	-0.020	-0.270	-0.154	-1.304	N	-0.141	-0.088	-0.874	N
	Thailand	0.061	0.002	0.092	0.086	0.320	-0.282	1.222	N	0.030	-0.194	-0.399	N
East Asia and	China	0.030	0.001	0.024	0.023	-0.126	-0.142	-0.769	N	0.110	0.135	0.626	N
North-East Asia	Hong Kong	-0.049	0.000	-0.029	-0.027	-0.304	0.072	-1.453	N	-0.287	-0.099	-1.913	N
	Taiwan	-0.104	0.003	-0.112	-0.104	-0.520	-0.065	-2.367	N	-0.320	-0.085	-1.617	N
	South Korea	-0.242	0.007	-0.308	-0.289	-0.628	-0.322	-2.138	N	-0.510	-0.375	-1.892	N
Australasia	Australia	-0.080	0.007	-0.059	-0.055	-0.552	-0.096	-2.868	N	-0.407	-0.142	-2.690	N
	New Zealand	-0.031	0.007	0.049	0.046	-0.734	-0.051	-5.032	N	-0.515	-0.078	-4.378	N
North America	Canada	-0.272	0.006	-0.371	-0.349	-0.509	-0.275	-0.878	N	-0.347	-0.260	0.013	N
	Mexico	-0.338	0.005	-0.449	-0.424	-0.649	-0.407	-1.480	N	-0.476	-0.350	-0.470	N
South America	Argentina	-0.030	0.001	-0.261	-0.033	-0.033	-0.261	0.013	N	-0.077	-0.067	-0.308	N
	Brazil	-0.205	0.006	-0.246	-0.233	-0.537	-0.231	-1.761	N	-0.444	-0.072	-1.708	N
	Chile	0.012	0.005	0.064	-0.072	-0.378	-0.253	-2.359	N	-0.444	-0.233	-2.622	N
Europe	Euro	0.166	0.006	0.289	0.271	-0.280	-0.231	-2.983	N	-0.103	-0.001	-2.712	N
	U.K	0.043	0.005	0.102	0.095	-0.289	-0.074	-2.038	N	-0.190	-0.150	-2.045	N
	Bahrain	-0.021	0.006	-0.019	-0.018	-0.041	9.215	-0.107	N	-0.056	6.189	-0.271	N
	Egypt	0.037	0.001	0.031	0.029	0.184	-0.400	0.788	N	0.249	-0.496	1.603	N
Middle East and	Jordan	-0.026	0.001	-0.034	-0.031	-0.181	-0.560	-0.763	N	-0.047	-0.495	-0.114	N
Africa	Kuwait	0.247	0.001	0.349	0.328	0.250	-0.419	-0.557	N	0.240	-0.338	-0.681	N
	Qatar	0.037	0.000	0.041	0.038	0.289	-0.500	1.308	N	0.229	-0.649	1.387	N
	Saudi Arabia	-0.027	0.000	0.006	0.006	-0.444	0.079	-2.464	N	-0.249	0.025	-1.852	N
	UAE	-0.086	0.000	-0.131	-0.122	n.a	-1.000	n.a	n.a	-0.048	-0.816	0.526	N
	South Africa	-0.130	0.007	-0.103	-0.095	-0.725	0.003	-2.038	N	-0.545	-0.041	-3.676	N
Other	Russia	-0.140	0.004	-0.183	-0.170	-0.494	-0.316	-1.821	N	-0.270	-0.187	-0.746	N

Note 1: *, **, ***: statistical significance at 10%, 5% and 1% respectively.

Note 2: The table shows conditional (unadjusted) cross-market correlation coefficients (*ρ*), adjuster for heteroscedasticity (δ) and standard deviations (*σ*) for Japan and other stock indexes. The test statistics are obtained from Fisher Z transformations. The stable period is defined as the 12-month pre-earthquake period (March 11, 2010 to March 10, 2011). The short-term turmoil period is defined as the 1-month post-earthquake period (March 11, 2011 to April 10, 2011). The medium-term turmoil period is defined as the 2-month post-earthquake period (March 11, 2011 to May 10, 2011). The full period is the stable period plus the medium-term turmoil period. Co: contagion .While "Y" denotes that the test statistics is greater than the critical value and contagion occurred, "N" indicates that the test statistics was less or equal to the critical value and no contagion occurred. ρ*stp, ρ*mtp, denote adjusted correlation coefficients for the short and medium term periods respectively. δ: correlation coefficient adjuster.

Note 3: Correlation coefficients are adjusted for heteroscedasticity using Equation 2.

C. Discussion of results, policy implications and future research directions

This section has examined if the March 2011 Japanese earthquake, tsunami and nuclear disaster affected the stability of the correlation structure in international stock and foreign exchange markets.

On a first note, with regard to international equity markets, there is substantial evidence of contagion in Taiwan, Bahrain, Saudi Arabia and South Africa. The effect on Saudi Arabia was not unexpected because it is one of the four countries from which a large part of Japan's imports in raw material source. For the other three, cross-market correlations strengthened only with China and Australia in the short-run, although insignificant to account for contagion. A possible explanation as to why Saudi Arabia was most strongly affected both in the immediate and medium terms may be seen from Japan's boost in fuel imports in substitution to energy formerly provided by the wrecked Fukushima nuclear plants. Bahrain, being an oil-export driven economy (like her sisterly neighbor Saudi Arabia), could not have been victim of a different fate. As for Taiwan, as pointed-out by Asongu (2012b), Japan is its second largest trading partner and official estimates on the effect of the Japanese earthquake on the Taiwanese economy stand at a yearly fall in growth by 0.2% of Gross Domestic Product (GDP).

Secondly, international foreign exchange market results show no presence of contagion. Accordingly, one would have expected the widespread disruption to Japan's US$5.5 trillion economy to inevitably affect other countries in the Asia-Pacific region and beyond. Regional trade would immediately have been affected by the damage to Japanese ports. The unexpected findings could be explained by the fact that, major Japanese manufacturers of automobiles, semiconductors, computers and other goods immediately took advantage of their international supply chains and production networks. Thus, moving production elsewhere in Asia or to North America, where capacity utilization is still low. Moreover, since Japanese factories generally produce consumer goods rather than intermediate products, disruptions to outbound shipments should not have been expected to seriously affect production processes in other countries.

On managing and mitigating spillovers and contagion, it is worth emphasizing that globalization comes with costs and benefits. Therefore, managing financial market contagion resulting from natural disasters requires that governments minimize the costs and maximize the benefits of financial market integration. Most countries in the sample have undoubtedly benefited from integration, however based on the weight of empirical evidence above; measures need to be taken in an effort to manage the downside ramifications of integration in the event of a natural disaster.

The following are some recommendations policy makers need to take into account in order to minimize (mitigate) the adverse financial market effects of disasters. (1) The banking system of a country should not be directly exposed to foreign assets that natural disasters can easily stress and render worthless. This recommendation also applies to assets in institutions that natural disasters could make futile. Accordingly, this caution would attenuate the knock-on effects through monetary, financial and real channels. (2) Domestic financial markets (equity, money, foreign exchange and credit markets) may also suffer due to the 'substitution effect'. As credit channels and credit lines in the affected (or contaminated) countries run dry, some of the credit-demand earlier met by overseas financing could easily shift to the domestic sector and put pressure on domestic resources. The

reversal of capital flows arising from the de-leveraging process could put pressure on the foreign exchange market, leading to sharp fluctuations in overnight money market rates and undue depreciation of currency. Hence, it is in the interest of central banks to adopt a monetary policy stance that is adequate to growth, inflation and financial stability concerns. (3) In circumstances where the natural disaster mirrors an expected decline in inflation, it is also in the interest of the central bank to adjust its monetary stance and manage liquidity: both domestic and foreign exchange to ensure that credit continues to flow for productive activities at both aggregate and sector specific levels. (4) In order to enable economic agents plan their business activities with more assurance, the central bank could ensure an orderly adjustment of the pain of its policies by maintaining a comfortable liquidity position: ensuring that the weighted average overnight money market rate is maintained within the repo-reverse repo corridor (margin) and ensure conditions conducive for flow of credit to productive sectors (particularly the stressed export industry sectors).

Before we conclude this section, it is important to highlight the implications of this chapter to the future of natural disasters. Though the crisis is over, from a financial standpoint the following concerns on future natural disasters are most likely to preoccupy policymakers. (1) *Is self-insurance a viable (and/or feasible) option for emerging economies?* In other terms*, could the accumulation of foreign reserves buffer against financial market crises cropping-up from natural disasters?* Whether these reserves derive from current account surpluses (China for example) or capital flows (India for instance), relying on them to hedge contagion could still represent some form of liability. This draws to mind the need of finding a way of balancing the trade-off between 'vulnerability to financial contagion' and 'vulnerability to trade contagion' in the event of a disaster. Another imperative strand within this framework points to the redundancy of self-insurance if international arrangements (regional and multilateral) could provide easy, quick and unconditional liquidity during such crises (Asongu, 2012b). (2) *How do policy makers keep the financial sector consistent with the real sector in case of a natural disaster?* Forgotten and abandoned in the euphoria of financial alchemy is the basic tenet that the financial sector has no standing of its own. Hence, it derives its strength and resilience from the real economic sector. Thinking the other way round has led many into believing that, substantial value could be created by slicing and dicing securities. (3) *How should regulatory arbitrage be addressed in times of crisis?* If under the nose of regulators, grows a broad, extensive and complex network of a 'shadow banking system' that encourages loose practices, hunt for quick yields and 'non-transparent and risky' financial products, when systems unravel (due to natural disasters), many of these institutions will pose a systematic risk to the financial systems. Therefore, the regulatory architecture has to be modeled (and/or fashioned) to keep pace with innovation and the possibility of natural shocks. (4) Simulating natural disasters and learning how to manage global imbalances resulting from them could also help countries brace for potential financial and real sector consequences of natural crises.

1.5. Conclusion

Financial integration among economies has the benefit of improving allocation efficiency and risk diversification. However the recent global financial crisis, considered as the most severe since the Great Depression has re-ignited a fierce debate about the merits of financial globalization and its

implications for growth especially in developing countries. A section in this chapter has examined whether equity markets in emerging countries were vulnerable to contagion during the recent global financial meltdown. Findings have shown: (1) with the exceptions of India and Dhaka, Asian markets were worst hit; (2) but for Peru, Venezuela and Columbia, Latin American countries were least affected; (3) Africa and Middle East emerging markets were averagely contaminated with the exceptions of Kenya, Namibia, Nigeria, Morocco, Dubai, Jordan, Israel, Oman, Saudi Arabia and Lebanon. The results have two important policy implications. Firstly, we have confirmed that Latin America was most prepared to brace the financial crisis, implying their fiscal and monetary policies could serve as a benchmark for other emerging economies. Secondly, we have confirmed that, the strategic opening of the current and capital accounts based on the available weight of empirical evidence for a given region/country (as practiced by India) is a caution against global economic and financial shocks.

The effects of natural disasters on financial markets are important in investment decisions, as the benefits of portfolio diversification are severely limited during periods of high volatility and increased cross-market correlations. In the fourth section of the chapter, we have used unadjusted and adjusted correlation coefficients to test for contagion effects across 33 economies in the aftermath of the Japanese earthquake, ensuing tsunami and worst nuclear crisis in recent history. Results have shown that, no international foreign exchange market experienced significantly stronger correlations with the Japanese Yen two months into the crises. However, with respect to international stock markets, Taiwan, Bahrain, Saudi Arabia and South Africa experienced contagion. The results have two paramount implications. Firstly, we have confirmed the existing consensus that in the face of natural crises that could take an international scale, only emerging markets are overwhelmingly affected .Secondly, we have also shown that international financial market transmissions not only occur during financial crisis; natural disaster effects should not be undermined. Other policy implications and future research directions have been discussed.

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Chapter 2

INFLUENCE OF THE ECONOMIC CRISIS ON THE FULFILLMENT OF THE TARGET OF STRATEGY EUROPE 2020 IN THE AREA OF RESEARCH AND DEVELOPMENT

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INFLUENCE OF THE ECONOMIC CRISIS ON THE FULFILLMENT OF THE TARGET OF STRATEGY EUROPE 2020 IN THE AREA OF RESEARCH AND DEVELOPMENT

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Abstract

The chapter deals with the influence of the economic crisis on the fulfillment of one of the five targets identified in new European Union strategy called Europe 2020. It points out the fact, that research, development and innovation activities are way out of the economic crisis. There is analyzed and compared the indicator expressing the share of gross domestic expenditure on research and development on GDP in selected countries and also the structure of gross domestic expenditure on research and development. We also described expected trend of the indicator by several functions in six countries.

Keywords: research and development, innovations, European Union, economic crisis.

2.1 Introduction

The chapter deals with the influence of the economic crisis on the fulfillment of one of the five targets identified in new European Union strategy called Europe 2020. It points out the fact, that research, development and innovation activities are way out of the economic crisis. There is analyzed and compared the indicator expressing the share of gross domestic expenditure on research and development on GDP in selected countries and also the structure of gross domestic expenditure on research and development. We also described expected trend of the indicator by several functions in six countries.

Based on the results of the present situation analysis, we will try to fulfill the *aim of chapter, which is to propose how expenditure on research and development in selected countries should grow so that these countries will reach the target value of each country identified in Europe 2020 until the year 2020.*

For comparison we chose six European Union countries at different levels of economic and social development, different sizes and different locations. It will be three small economies - Slovakia, Portugal and Finland and three major economies - Poland, Spain and Germany. In terms of the realization of innovation activities, which are depended on the level of R&D, Slovakia, Poland, Portugal and Spain are included into the group of moderate innovators, Finland and Germany into the group of innovation leaders.

Methods used in the elaboration of the chapter are the most commonly used methods of economic research, and they are based on the aim and structure of the chapter. These are general methods such as analysis, spatial comparison and trend comparison, synthesis, induction, deduction

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and mathematical - statistical methods. For analysis and comparison were used statistics of Eurostat and also official documents of the European Union.

The time period for which the countries are compared and analyzed is 1995 - 2011, or for analyzing and comparing the structure of expenditure on research and development, is the period 2000 - 2010, 2011 (depending on the availability of data for selected countries).

2.2 Research, development and innovation as a way out of economic crisis

The world economy has faced in recent years the threat of a significant decline in economic growth. The main reason for this situation was the mortgage crisis in US, which has gradually spilled over to global financial markets. The symptoms of the financial crisis in one of the world's major centres, i.e. in the US, began to show more than a year, but the situation has significantly deteriorated and sharpened in September 2008.

In recent years significantly increased the standard of living of the population of several countries as a result of very easy access to loans. Mortgage loans obtained also less creditworthy customers, who would normally never have access to them. This relatively free monetary policy was not accompanied by a classic inflation, because it was stopped by the import of cheap goods from developing countries (especially form China). Rising inflation has started to show up in 2008 as a result of significant price increase of oil and other commodities. At the end of the year, era of easy loans ended and people's inability to repay loans led to the collapse of the world's major banks and other institutions, to the forced sales and government interventions in Europe and in the US, i.e. mortgage crisis led to the financial crisis (Krugman, 2008).

The financial crisis in the US began to move into other open and prosperous countries in the world. In most countries the crisis had a secondary character in the form of economic crisis. The economic crisis is not the result of small error, but the result of several uncontrolled issues. The world experts say that the crisis is not uncommon. This is only a cleansing of the economy from the mistakes of previous years (Krugman, 2012).

Based on the knowledge of economic theory, it can be stated that the current economic crisis is a crisis of the demand associated with a significant decrease in aggregate demand. It is also called as an imported crisis. It negatively influences mainly export-oriented economy, because it causes a decrease in exports of the production of these countries to the most developed countries in the world influenced by the financial crisis, i.e. demand for production of exporting countries by foreign customers significantly decreases. Fears of the financial and economic crisis and decrease demand (Figure 2.1, decrease from AD_0 to AD_1) lead in exporting countries to reduction of production. Production not only individual companies, but also the entire economy gets below the potential output (Y_0) and the production possibility frontier, which means that the country produces less than it would be able to produce by the utilization of all available production resources.

With the decline of production in the domestic economy there is a surplus of labour. It leads to a reduction in the number of employees in enterprises, and thus to an increase in unemployment rate. Increasing unemployment rate has resulted in a decrease in disposable income of the population, which is used on purchase goods to meet their needs, and thereby has reduced the standard of living of the population. This causes a further decrease in aggregate demand (decrease from AD_1 to AD_2)

(Spišáková, 2010). As a result of layoffs and significant increase of unemployment, domestic production decline and some economies come to the recession.

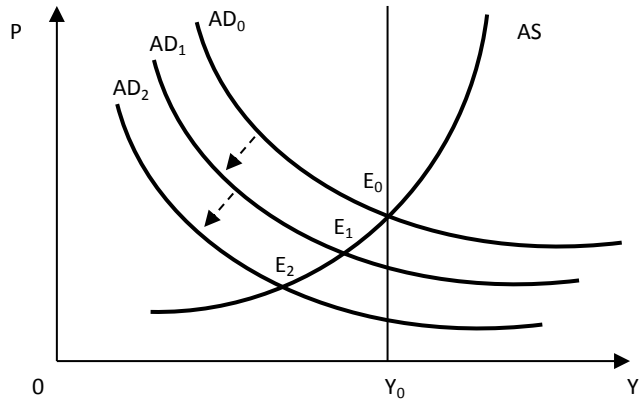


Figure 2.1 Decrease of aggregate demand as a result of the economic crisis

The crisis has negatively affected almost all sectors of the economy. As an example of a highly sensitive response to unfavorable development in the global markets, it is possible to give the automotive industry. Due to the significant decline in interest for cars during the crisis were car factories forced to reduce or stop production for a time. Low consumer interest also forced them to gradually reduce prices of selling cars. They did it in the belief that the lower prices will lead to the sale of old cars stock.

Based on this example, it can be stated that the current crisis is forcing all enterprises to use their own innovation potential so that they should be able to produce their products without loss. Following this pressure, enterprises try to produce at the lowest possible production costs and try to introduce product innovation in technology, materials, logistics, marketing and sales. Not only innovation, but also the leaving of competitors from the market allows them to survive the negative impacts of the economic crisis. This will create new opportunities for enterprises to expand their production and to application of recovery investments, which represent investments in the renewal of used capital goods or the purchase of new capital goods. This should be reflected in the growing demand for these goods.

In this situation, it will be essential that the enterprises producing and selling capital goods were ready for a possible increase in demand for their goods and have sufficient amount of innovative products which meet the demands of both domestic and foreign customers. Growing demand for production of capital goods (growth of aggregate demand from AD_1 to AD_2) should lead to the production growth of enterprises producing capital goods, to the growth of employment in these enterprises and to the increase in income of the population. With the increasing income, the household will be able to buy more goods to meet basic or luxury needs. This is reflected into a growing demand for consumer goods (growth of aggregate demand from AD_1 to AD_0). It will force the producers of these goods to expand their production and to involve new workers into production (Spišáková, 2010).

The described process should have a positive impact on the economies of individual countries, because it will positively affect the total production of the country, i.e. GDP will increase and gradually will approximate to the level of potential output, respectively production possibility frontier,

unemployment rate will be reduced and national income will increase. A substantial part of the economic growth in the medium term will be manufacturing, but its internal structure have to change - from low-cost manufacturing to the production supported by research, development, knowledge and innovation (Archibugi, Filippetti and Frenz, 2012b). Therefore, enterprises should consider present worsened situation as an opportunity that allows them to survive in a market with a radical, strategic innovation, and this will significantly strengthen their market position and competitiveness, increase added value, efficiency and so on.

The problem of most enterprises and economies influenced by the crisis at the present time is the lack of financial resources necessary for the support of creative and innovative projects. Lack of financial resources is also in the area of research and development (R&D), which is the basis of innovation activities and technology transfer, because funds that should be used on the support of mentioned activities are directed to the areas influenced by the crisis (Archibugi, Filippetti and Frenz, 2012a). Enterprises and national governments therefore need to thoroughly review the decision about the location of financial resources, their use and the most efficient utilization.

With the problem of long-term lack of funding of R&D activities in most European countries deals also the European Commission. Commission pointed out this problem in the Lisbon Strategy valid until 2010, and in a new strategy called Europe 2020. The following section of chapter will therefore deals with the issue of funding of R&D in selected countries, as a basis for innovative activity of enterprises. It will also highlight the targets of these two strategies in mentioned area and their fulfillment by selected European Union countries.

2.3 Expenditure on Research & Development in selected countries in comparison with European Union average

In recent years, one of the most important factors of economic growth has become investment into R&D activities[11]. They allow not only to innovate the production, but also to increase business competitiveness and competitiveness of the whole economy. The current business enterprise resources to fund R&D are insufficient in most cases; therefore it is necessary to support this area also by the resources from government sector and from abroad. The serious problem is insufficient funding from the government sector, lack of legislation and tax instruments that should have a positive impact on the business sector in field of R&D.

Until recently, the question of economy competitiveness was deal with Lisbon Strategy for growth and jobs, whose primary target was, that the European Union should become (until 2010) most competitive and most dynamic knowledge-based economy in the world, capable of sustainable economic growth in which will be more and better jobs and greater social cohesion. The mentioned document (Ministerstvo financií SR, 2012), adopted also by Slovakia, was also focused on improving living standards of citizens of the European Union, through the support of R&D funding.

Upon the Lisbon Strategy, which expired in 2010, has followed a new strategy developed by the European Commission called Europe 2020. As in the Lisbon Strategy, also in Europe 2020, the European Commission identified key targets which fulfillment, until the year 2020, will contribute to

[11] R&D activities comprise a creative work undertaken on the systematic basis in order to increase the stock of knowledge, including knowledge of individuals, culture and society and the use of this stock of knowledge to derive new applications (Zákon č. 172/2005).

achieve desired growth and progress in individual Member States, as well as in the European Union. Strategy includes five following targets 0: (European Commision, 2010)

1. *Employment* - 75% of the 20-64 year-olds should be employed;
2. *R&D* - 3% of the European Union's GDP should be invested in R&D;
3. *Climate change/energy* - greenhouse gas emissions should be 20% (or even 30%, if the conditions are right) lower than in 1990; 20% of energy should be from renewable; energy efficiency should increase about 20%;
4. *Education* - in European Union should be reducing school drop-out rates below 10%; at least 40% of 30 – 34 year-old people should complete 3rd level of education;
5. *Poverty/social exclusion* - in European Union should be at least 20 million fewer people in or at risk of poverty and social exclusion.

For the purpose of this chapter is major the second target about investment into R&D, i.e. gross domestic expenditure on research and development (GERD)[12], according to which expenditure should growth until 2020 to 3% of GDP[13] (average value for European Union). The promotion of basic and applied R&D creates a strong presumption for building the knowledge economy, contributes to employment growth, improves quality of life, solves social problems and also contributes to the economic growth of the euro area.

The partial target of the strategy is, that from mentioned 3%, at least 2/3 should come from business enterprise sector and 1/3 of financial resources from government sector. From the EU Member States and also candidate countries, only three countries achieve average value of this target until the year 2011 - Finland 3.78% of GDP, Sweden 3.37% of GDP and Denmark with a value of 3.09% of GDP. Only these three countries can now compete with the research strength of Japan, South Korea and other developed countries (Figure 2.2). From the other countries, Germany (2.84% of GDP) and Austria (2.75% of GDP) are approaching to the target.

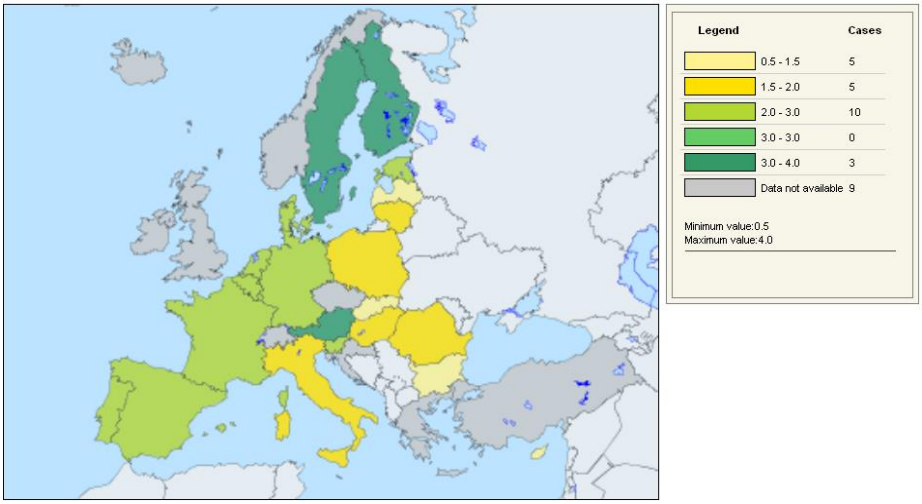


Figure 2.2 Gross domestic expenditure on research and development in 2011 (% of GDP)

[12] Gross domestic expenditure on R&D represents domestic and foreign expenses to conduct R&D within the country over a period of time (with the exception of expenses on R&D that are carried out abroad) (Eurostat).

[13] The target value for EU 27 average is 3% of GDP. The target of Slovakia is to increase expenditure on R&D until 2020 to 1% of GDP, in Poland to 1.7% of GDP, in Spain to 3% of GDP, in Portugal of 2.7% GDP, Finland 4% of GDP and Germany 3% of GDP (European Commission, 2012).

Spain and Portugal are in a half of the scoreboard and Slovakia and Poland are in the second half of the scoreboard created from EU Member States. In the year 2011 GERD in Spain were 1.31% of GDP, in Portugal 1.59% GDP, in Slovakia were only 0.68% of GDP (which is the lowest value of the V4 group) and in Poland 0.77% of GDP. The lowest value of the indicator was recorded in Romania, 0.48% of GDP.

As the level of countries´ development is affected by a degree of development of its individual parts, i.e. regions, also the level of R&D and its funding in the country is influenced by the level of implementation and realization of R&D activities and projects in the regions. If the country wants to achieve the target of the strategy Europe 2020, it is essential that also individual regions should converge to the target value.

Not a very positive trend in funding of R&D can be seen in the EU, where in recent years, there is a decrease, respectively stagnation. In 2011 GERD were only 2.02% of GDP. The reason has been a number of Member States, especially from a group called catching up countries, which display a lack of activity in this area, and thereby decelerate the fulfillment of the target of the Europe 2020.

Despite the fact that GERD in Slovakia have long been below the EU average value, their share of GDP in recent years have growing slightly. The situation is still very unfavorable, because significant economic growth in the pre-crisis period did not contribute to increase the share of expenditure on R&D in relation to GDP. In 1995, the value of the indicator was 0.92% of GDP, in 1997 even 1.08% GDP. Until the year 2009, the indicator was gradually decreasing to 0.47% of GDP. The decreasing value of the monitored indicator caused over the years 2002 - 2009 divergence, not required convergence of Slovakia to the EU average (Figure 2.3). During the last monitored year, the share of R&D on GDP has increased to 0.68%.

Decreasing trend of the indicator was recorded also in individual regions of the country at NUTS 2 level. As expected, the highest values of the indicator show the Bratislava region. The reason of this is a concentration of large and major international companies in the western part of the country (Volkswagen Slovakia, ISS Facility Services, Dell Ltd., etc.), which in addition to creating new jobs bring to the region other positive externalities in the form of transfer of research results, development and innovation from the mother country.

Lagging the eastern Slovakia (Prešov and Košice region) behind the other regions in Slovakia was reflected also in this field. The causes can include marginal eccentric position of the region and its lack of transport infrastructure facilities, completion of which would significantly increase the attractiveness of the region in relation to foreign investors. Foreign investors would mean to the region not only additional external financing, but also the inflow of know-how, experience, knowledge and also the arrival of new technologies supporting R&D activities in the region.

Poland, as only one European country, achieved in 2009 a positive growth rate of GDP, i.e. in mentioned year was at 1.9%. In 2010 the economy grew by 3.8%, which represented the fastest growth in EU. Despite of the positive results in the economic growth, the country lags in R&D funding behind other Member States. Not only Slovakia but also Poland didn't exceed the 1% of GDP. The value of GERD in this country slightly increased during last years, and their share of EU GERD was around 37% (Figure 2.3). On the positive side, despite the persistent negative result of the financial,

economic crisis and the current global crisis, is the fact, that his development represents very slow convergence of the indicator to the EU average.

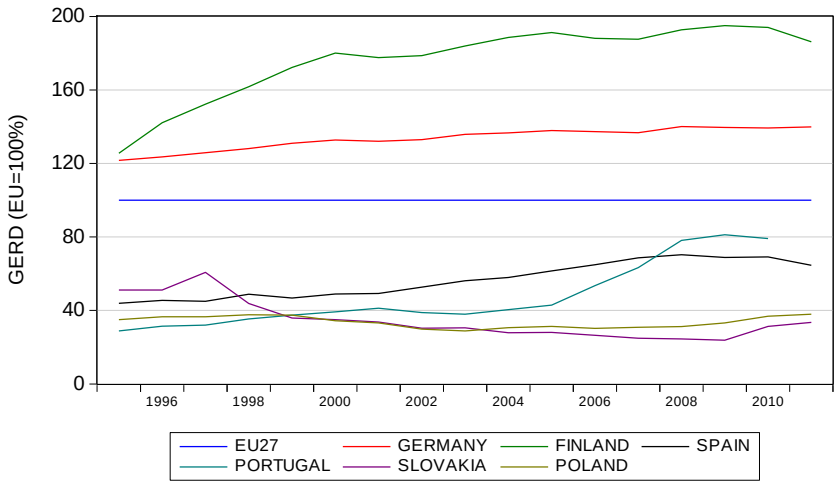


Figure 2.3 Development of GERD in selected countries in comparison with the EU average

Similarly as in Slovakia and Poland, also in Spain and Portugal was the value of the indicator during the period below the EU average value of the indicator. However, both countries converge to the EU average (Figure 2.3). In Spain, the indicator increased until the year 2010 by 0.6% (at 1.39% GDP). In 2011 it decreased slightly to 1.31% GDP. In Portugal, at the beginning of the monitored period, was invested in R&D activities only 0.52% GDP. In 2008, the country overtook Spain and the indicator increased faster. In 2009 was the value of the indicator equal to 1.64% GDP and in 2010 decreased by 0.05%.

The share of expenditure on R&D to GDP in Finland and Germany was during the period above the average value of the indicator for the European Union (Figure 2.3). Expenditures in both countries increased every year, and thus proportionally increased the value of the indicator. In Finland, the indicator rose from 2.26% in 1995 to 3.94% in 2009. The economic crisis has negatively affected this area, and as a result, the indicator decreased in 2010 by 0.04% and in 2011 by another 0.12% (at 3.78% of GDP). In Germany was the highest share of expenditure on R&D to GDP in 2011, i.e. at 2.84% of GDP.

2.4 Structure of Gross Domestic Expenditure on Research and Development in selected countries

GERD comes from three main sources: *business enterprise sector*, *government sector* and financial resources received from *abroad* and from two secondary sources, i.e. the resources from *higher education sector* and *private non-profit sector*. In this part we will therefore follow, how analyzed countries fulfilled the partial target of Europe 2020 (European Commission, 2010), concerning the structure of expenditure on R&D, i.e. 2/3 of resources should come from business enterprise sector and 1/3 from government sector[14].

[14] In Germany we will monitor only four sector from which are research and development activities financing, because the data for higher education sector are not available.

Germany, as the first analyzed countries, fulfillment the partial target of the European Union identified already in the Lisbon Strategy. The value of monitored indicator, expressing the share of expenditure of business enterprises sector to realize R&D activities in the country to total GERD, during the period developed unstable. The lowest value of the indicator was recorded in 2002 (65.5%) and the highest in the period before the outbreak of the economic crisis. In 2006 was at 68.3% and exceeded even required 2/3 of total GERD (Figure 2.4a). Expenditure from government sector was almost one third of total GERD. The highest share of total GERD reached in 2002 (31.6%) and since then the indicator gradually decrease to 27.5% in 2007. The economic crisis has led to a prudent investment realized by the business enterprise sector and on the other hand to the slightly increase in government spending on R&D activities. Their share of total GERD has increased in 2010 to 30.3%. In 2010 were foreign funds, intended for financing R&D in Germany, at 3.9% of total GERD. Indicator value moved between 2.1% in 2000 to 4% in 2008. The share of private non-profit sector expenditure of total GERD was in 2010 only 0.2%.

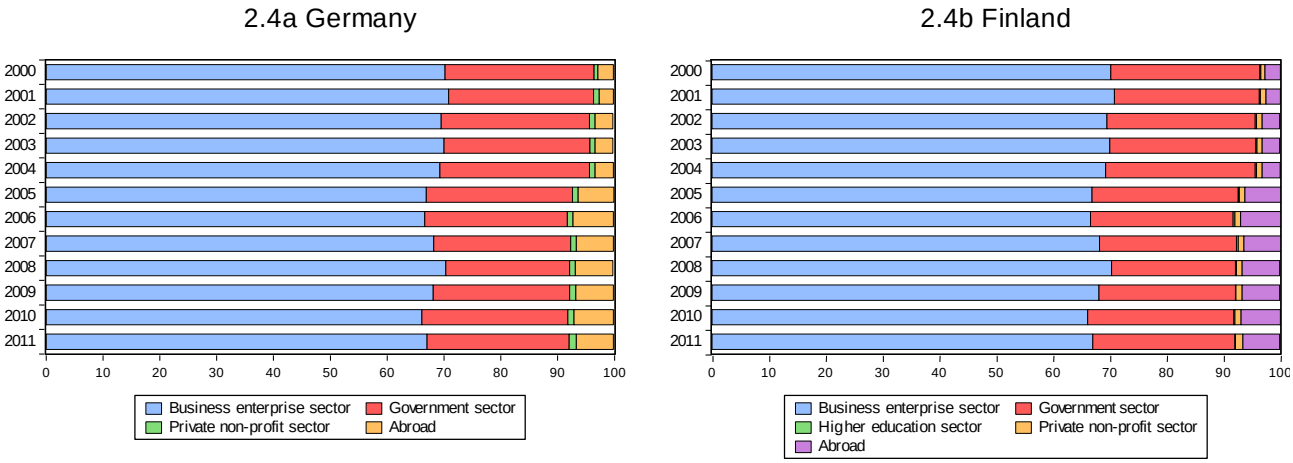


Figure 2.4 Structure of GERD by source of funds in Germany and Finland

Finland is a country that fulfilled both targets (main and partial) of the European Union identified already in the Lisbon Strategy and also in Europe 2020. Country has fulfilled not only the first target, i.e. the share of GERD in GDP was more than 3%, but also it has fulfilled the second partial target, relating to the share of expenditure on R&D of various sources to total GERD. Expenditure on R&D in monitored period has come mainly from the business enterprise sector and their share in total GERD has increased gradually until the year 2008 up to 70.3% (Figure 2.4b). The share of government sector expenditure of total GERD during the period has slowly decreased, i.e. from 26.2% in 2000 to 21.8% in 2008. Even in this country began to show the negative impact of the financial and economic crisis. Enterprises have become more cautious when investing in R&D activities and their share of total GERD fell in 2010 to 66.1%, respectively to 67% in 2011. In contrast, government expenditure increased to 25.7%. Country obtained sufficient financial resources also from abroad. The highest foreign expenditure on R&D was recorded in 2006 and their share of total GERD was 7.1%. Since mentioned year, the indicator decreased slightly to 6.6 %. The share of expenditure from non-profit sector of total GERD during the period moved between 0.7% and 1.3%. The share of expenditure of the higher education sector was even lower, only 0.1% of total GERD in 2011.

In contrast to the previous two countries, the structure of expenditure on R&D activities in Spain is partially different. The share of expenditure of business enterprise and government sectors to total GERD were in recent years almost the same. The business enterprise sector has recorded the opposite trend than it is desirable. Instead growth, the value of indicator has declined over the period from 49.7% to 43%. On the other hand, the share of government expenditure of total GERD has risen.

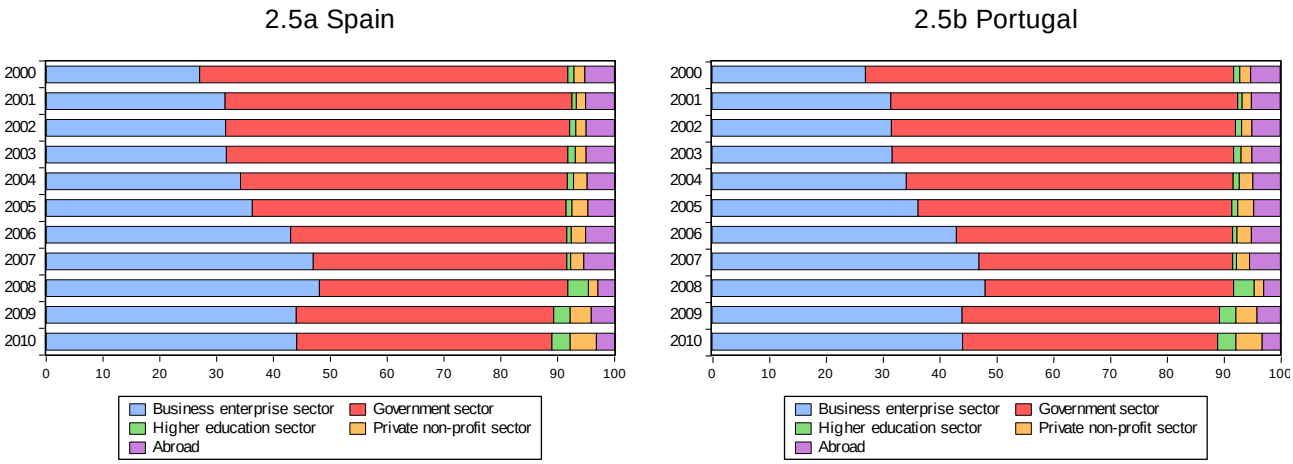


Figure 2.5 Structure of GERD by source of funds in Spain and Portugal

Their share increased from 38.6% in 2000 to 47.1% in 2009, respectively to 46.6% in 2010. (Figure 2.5a) The economic crisis has negatively influenced the fulfillment of the target of the Lisbon Strategy and the value of indicator for the government sector even exceeded the value of the indicator for the business enterprise sector. Compared to Finland, the share of the higher education sector expenditure on R&D of total GERD was higher. Its value was highest in 2003 (5.4%) and the lowest in the period after the outbreak of the economic crisis, i.e. in 2008 at 3.2% of total GERD. The value of indicator expressing the share of expenditure from abroad on R&D activities of total GERD was in average 6%. The share of the private non-profit sector expenditure was during the whole monitored period less than 1% of total GERD.

As Spain, also Portugal failed until 2010 in fulfillment the main and partial targets of the Lisbon Strategy. The share of expenditure of business enterprise sector on R&D to total GERD since 2000 increased from 27% to 44.1% in 2010 and the share of government expenditure in total GERD decreased from 64.8% in 2000 to 43.7% in 2010 (Figure 2.5b). However, their values have not achieved the desired structure of the 2/3 and 1/3 GERD. The economic crisis and its negative impacts have become evident also in this country. Since 2008, the business enterprise sector has reduced the share of expenditure on R&D activities to total GERD. On the other hand, the share of government expenditure increased slightly. The other three sectors invested into R&D significantly less amount of financial resources. The average value of indicator expressing the share of expenditure of the higher education sector on R&D was 1.6%, of private non-profit sector was 2.5% and from abroad was 4.6% of total GERD.

As mentioned earlier, GERD in Slovakia experience a decline. During recent years, the share of expenditure on R&D from business enterprise sector to total GERD significantly decreased, i.e. from 54.4% in 2000 to 33.9% in 2011 (Figure 2.6a). On the other hand, government expenditure and

also resources from abroad on R&D in this period increased. Expenditure of private non-profit sector and the higher education sector were only a small proportion of total GERD. The structure of expenditure in this area has developed in the opposite direction, as it was required by the Lisbon Strategy and now it is required by Europe 2020. In most cases Slovak enterprises are unable to compete with foreign companies or enterprises which dispose of new technologies and sufficient equity to finance research, development and thus innovation. Entry of Slovakia to the European Union positively influenced the flow of foreign resources into the country to support R&D activities, which increased from the year 2004 by 9.9%. The share of abroad expenditure on R&D to total GERD in 2011 was 14.2%.

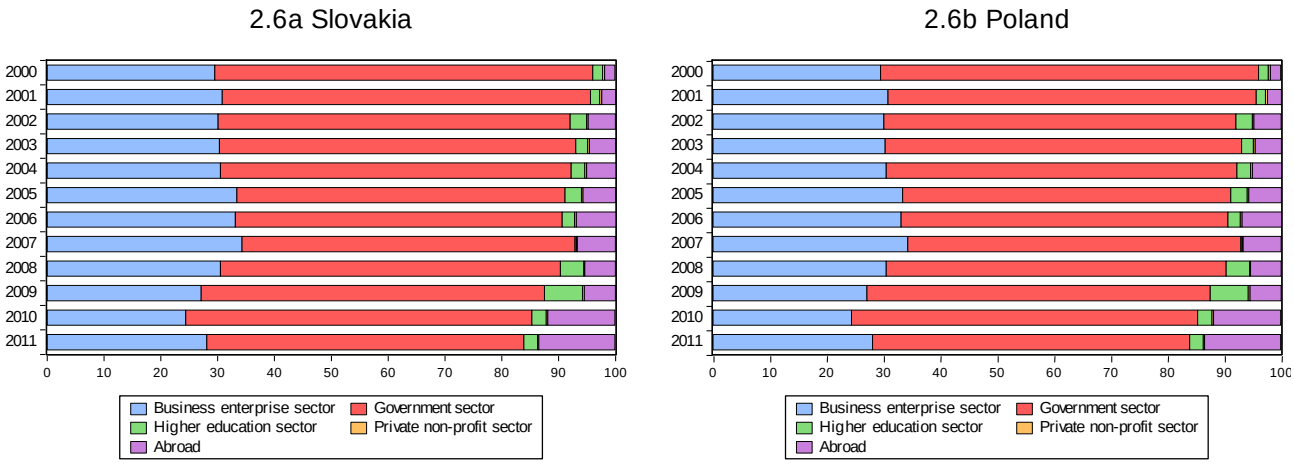


Figure 2.6 Structure of GERD by source of funds in Slovakia and Poland

Expenditure on R&D in Poland during the years 2000 - 2011 consisted mostly of government expenditure, which was at average 60.7% of total expenditure (Figure 2.6b). Polish enterprises have been able to invest into this area only a small amount of their resources. It is the lowest share from all analyzed countries, i.e. only 28.1% in 2011. As the effect of the economic crisis the expenditure of business enterprise sector significantly decreased and government expenditure increased. To achieve the target of Europe 2020, the amount of business enterprise resources invested in R&D should be double and the amount of government funds should decrease nearly in half. The share of resources from abroad on R&D grew from 1.8% in 2000 to 13.4% in 2011 of total GERD. The share of expenditure from the higher education sector declined from 6.7% of total GERD in 2009 to 2.4% in 2011.

2.5 Expected trends in Research & Development funding in selected countries

Engine of any economy in the world influenced by crisis in recent years has become research, development and learning that underlie innovative activity of enterprises. Innovation as a key tool for increasing competitiveness has been so understood in the Lisbon Strategy and also in present strategy Europe 2020. Therefore, all advanced economies try to put more emphasis on application of *triple helix model*, which focuses on cross-linking and co-operation with universities, business and government sectors. The aim of the model is to transfer research results, development and knowledge into practice. Increasing capacity in research, development and innovation across all sectors of the

economy, coupled with more efficient use of inputs, will improve the country's competitiveness and support job creation. This will ultimately help countries to overcome the negative impacts of the economic and global crisis.

Current trend in GERD in all analyzed countries, we can describe by different functions. Monitoring this trend can serve for modeling the expected development of GERD for following years and also for assess the feasibility of achieving the Europe 2020 target by all six countries (Figure 2.7, Figure 2.8, Figure 2.9).

If we consider the continuation of trend of GERD development over the past 17 years and we would predict the development of this indicator in following years (for example to the year 2015), we find several points. Conclusions will vary depending on the chosen trend.

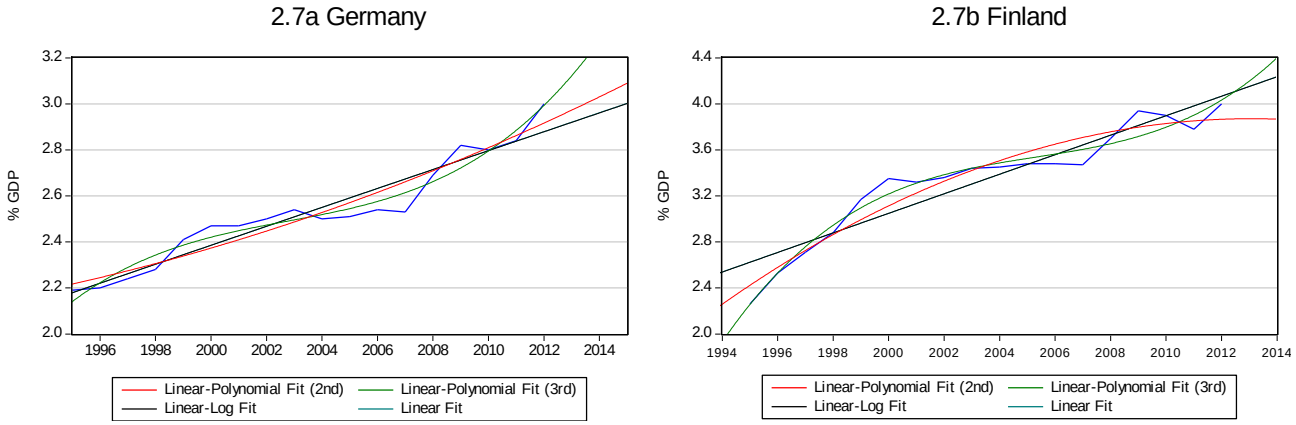


Figure 2.7 Expected development of expenditure on R&D in Germany and Finland

The current trend of GERD in Germany can be described by different functions. We have chosen four functions. Development described by a linear and polynomial function of 2nd range is very similar. If the share of expenditure in GDP increases very slightly in the coming years, its development should be described by three functions (Table 2.1), i.e. linear, exponential and polynomial function of 2nd range. If the indicator grows faster, its future trend can be described by polynomial function of 3rd range. In this case, the value of indicator in 2015 should be at 3.83% of GDP and it is well above the target of 3% of GDP for this country. According to the described trend of indicator, Germany will fulfill the Europe 2020 target already in 2015.

Table 2.1 Expected development of expenditure on R&D in Germany (% of GDP)

Trend	Function	R^2	Expected value in 2015
Linear	y= 0.038x + 2.155	0.915	2.96
Polynomial – 2nd range	$y = 0.0002x^2 + 0.0346x + 2.1676$	0.915	2.99
Polynomial – 3rd range	y = 0.0004x3 – 0.0094x2 + 0.1062x + 2.0453	0.943	3.42
Exponential	$y = 2.171e^{0,015x}$	0.772	3.00

Finland, as only one of the analyzed countries, fulfilled the target of the original Lisbon Strategy. Since 1999, the share of expenditure on R&D to GDP was higher than 3%. Thus, the

European Union set in the Europe 2020 for this country a new target. According to this, the expenditure on R&D should rise until the year 2020 to 4 % GDP.

As in the case of other analyzed countries, also in Finland it is possible to describe the current trend of GERD by different functions. According to the development described by polynomial function of 2nd range and by logarithmic function, the value of the indicator in 2015 will still below 4 % (Table 2.2). If the indicator development will be directed by other functions, already in next year the country should reach the target value (Figure 2.7b). Despite a slight decrease in the value of the indicator in 2010 and 2011, the country should not have a problem with the fulfillment of the target of Strategy.

Table 2.2 Expected development of expenditure on R&D in Finland (% of GDP)

Trend	Function	R^2	Expected value in 2015
Linear	y= 0.086x + 2.529	0,864	4,34
Polynomial – 2nd range	y = -0.005x2 + 0.183x + 2.220	0,929	3,69
Polynomial – 3rd range	$y = 0.0009x^3 – 0.0297x^2 + 0.3639x + 1.9132$	0,962	4,79
Logarithmic	y = 0.574ln(x) + 2.174	0,951	3,92
Exponential	$y = 2.554e^{0.027x}$	0,825	4,55

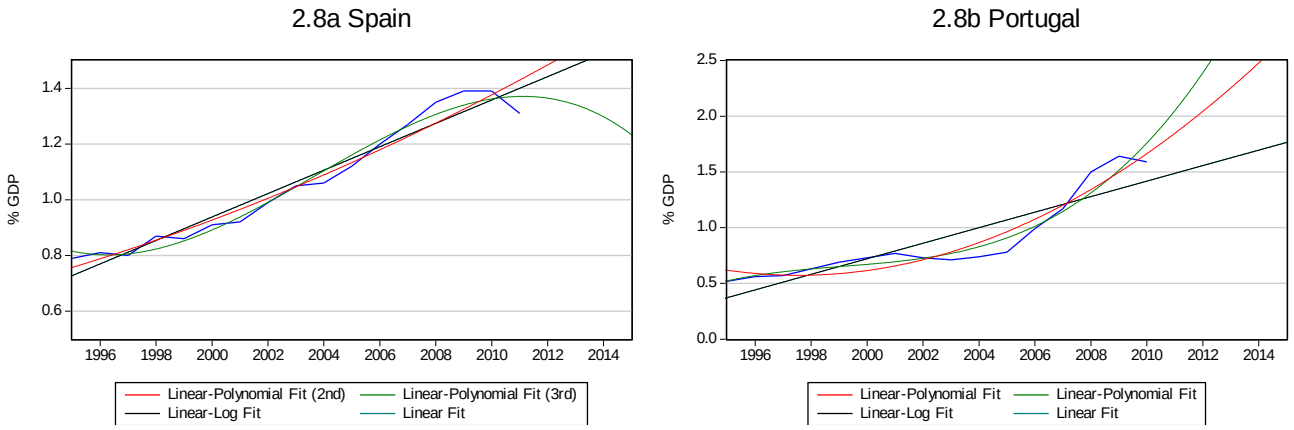


Figure 2.8 Expected development of expenditure on R&D in Spain and Portugal

The economic crisis and the current global crisis slowed the growth of the value of the indicator expressing the share of expenditure on R&D also in Spain. In 2011 it was at 1.31%, i.e. decline by 0.08 % in comparison with 2010. Also in this country we can describe present trend of indicator by a number of functions and based on this predict the future, expected development. If the present trend will follow a polynomial function of 3rd range, the share of GERD to GDP would decline in the coming years, and in 2015 it reached a value of 1.23%. (Table 2.3) If we describe the current development by linear, exponential or polynomial function of 2nd range in the future we can expect growth in the value of the indicator and the slow moving to the target of 3% (Figure 2.8a). However, if the country wanted to achieve the target of the Strategy until the year 2020, the share of GERD to GDP should grow much faster. But at present time, when the economic problems caused by the economic crisis still persist, it is less probable.

For the description of the previous trend of expenditure on R&D in relation to GDP in Portugal, we choose only three functions, because the development described by other functions, we seem to

be less real, accurate, and with low coefficient of determination (Figure 2.8b). For the most accurate estimation of future indicator development can be regarded trend described by a polynomial function of 2nd range. According to this trend, the value of the indicator will already in 2015 achieve target value of 2.7% set by the European Union for this country (Table 2.4).

Table 2.3 Expected development of expenditure on R&D in Spain (% of GDP)

Trend	Function	R^2	Expected value in 2015
Linear	y= 0.042x + 0.686	0.950	1.57
Polynomial – 2nd range	y = 0.0007x2 + 0.0289x + 0.7276	0.956	1.66
Polynomial – 3rd range	$y = - 0.0003x^3 + 0.0101x^2 – 0.0409x + 0.8469$	0.978	1.23
Exponential	$y = 0.730e^{0.039x}$	0.964	1.68

This significant increase in the expected value of the indicator is caused by a significant increase of the indicator since 2005. However, if the future development of the country will be more negatively influenced by impacts of the financial, economic and global crisis, the value of the indicator will lower than 2% (depending on the selected function describing the present trend of expenditure on R&D in relation to the country's GDP).

Table 2.4 Expected development of expenditure on R&D in Portugal (% of GDP)

Trend	Function	R^2	Expected value in 2015
Linear	y= 0.069x + 0.302	0,787	1,77
Polynomial – 2nd range	y = 0.007x2 – 0.049x + 0.661	0,921	2,72
Exponential	$y = 0.448e^{0.073x}$	0,867	2,08

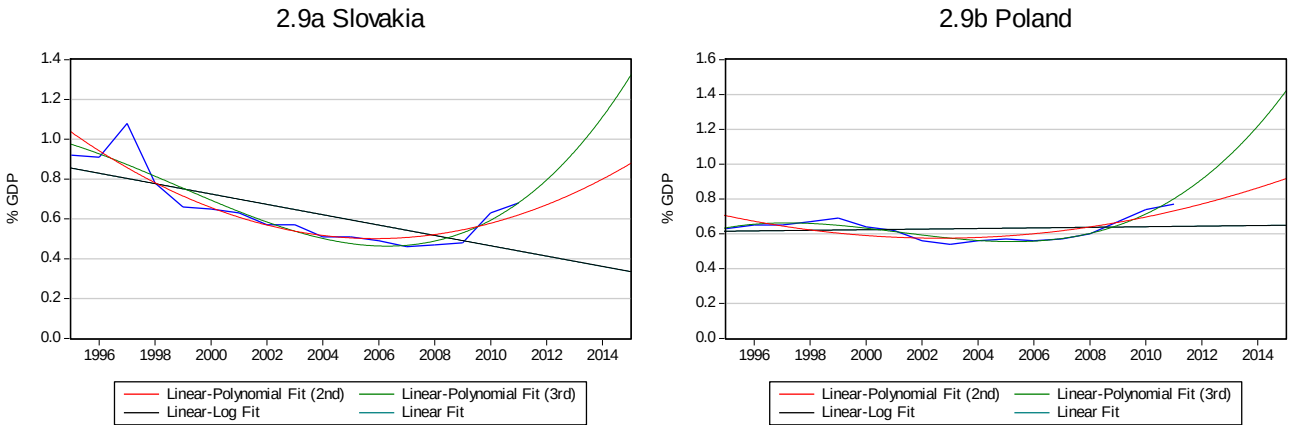


Figure 2.9 Expected development of expenditure on R&D in Slovakia and Poland

For Slovakia, we decided to describe the expected development of the indicator by polynomial functions of 2nd range (Table 2.5), because this development seems to be the most realistic and accurate. As an example we also state the expected development of indicator described by other functions (Figure 2.8a). According to the logarithmic function the indicator should record in following years even bigger decline than during much of the reporting period. According to the polynomial

function of 3rd and 4th range (with higher coefficient of determination) the indicator should grow faster, that seems to be less probable considering present development of the indicator.

As in other countries also in Poland occurred in recent years to recovery of R&D funding that is positively reflected in the growth of GERD value. In this case, we have from a number of functions describing present trend of indicator chosen only polynomial functions, because trend described by other functions is not so exact (very low coefficient of determination). For the most suitable seems to be polynomial function of 4th range with the highest coefficient of determination (Figure 2.9b).

Table 2.5 Expected development of expenditure on R&D in Slovakia (% of GDP)

Trend	Function	R^2	Expected value in 2015
Polynomial – 2nd range	$y = 0.004x2 – 0.107x + 1.139$	0,837	0,88
Polynomial – 3rd range	$y = 0.0004x^3 – 0.0053x^2 – 0.0346x + 1.0146$	0,873	1,32
Polynomial – 4th range	$y = - 0.000017x^4 + 0.000959x^3 – 0.012329x^2 – 0.004605x + 0.980656$	0,875	1,12
Logarithmic	$y = - 0.18\ln(x) + 1.013$	0,673	0,45

Estimated share of GERD to GDP would be at 1.48%, if the current trend will continue (Table 2.6). This development would positively contribute to the gradual convergence of the indicator value to the target of 1.7%, which the country should reach until the year 2020.

Table 2.6 Expected Development of Expenditure on R&D in Poland (% of GDP)

Trend	Function	R^2	Expected value in 2015
Polynomial – 2nd range	$y = 0.002x^2 – 0.038x + 0.740$	0,563	0,92
Polynomial – 3rd range	$y = 0.0004x^3 – 0.0090x^2 + 0.0445x + 0.5987$	0,903	1,42
Polynomial – 4th range	$y = - 0.00003x4 + 0.00144x3 – 0.02104x2 + 0.09614x + 0.54034$	0,931	1,07

2.6 Simulation of required growth of the Gross Domestic Expenditure on Research and Development to Gross Domestic Product share in selected countries

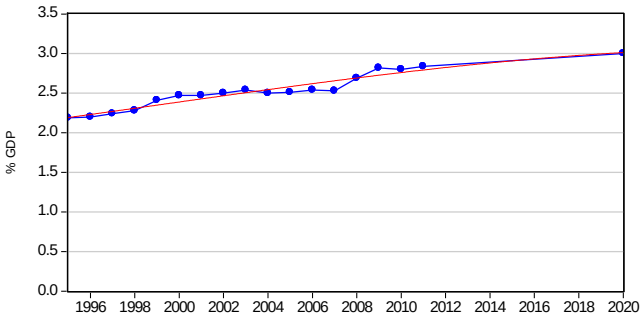
Based on previous findings, maintaining the current development of the share of GERD to GDP does not allow (until the year 2015) to achieve in four analyzed countries the target of Europe 2020 (Spain 3% GDP, Portugal 2.7% GDP, Slovakia 1% GDP, Poland 1.7% GDP), because current economic situation is significantly affected by negative impacts of financial and economic crisis. But in the case of positive economic development in following years, the share of R&D expenditure on GDP should rise and so that the countries should gradually approach the target value until the year 2020.

If the Germany wants to achieve the target of Europe 2020, it is necessary that the expenditure on R&D in the next years grow and also grow their share on country's GDP. Due to the fact, that the value of this indicator in 2011 was at 2.84%, its future increase should be only slight. The desired development of the indicator can be described by a polynomial function of the 3rd range:

$$y = -0.00002x^3 + 0.00028x^2 + 0.03815x + 2.15344 \qquad R^2 = 0{,}934 \qquad (2.1)$$

Its graphic interpretation is shown on figure (Figure 2.10a).

2.10a Germany



2.10b Finland

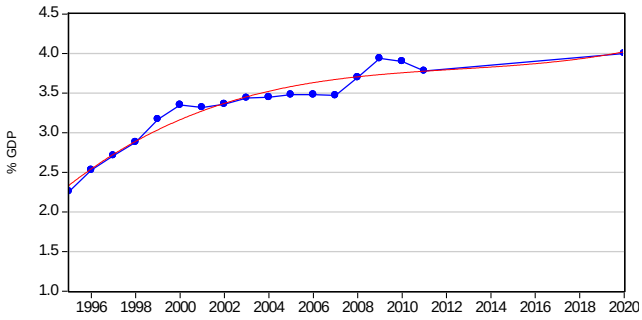


Figure 2.10 Simulation of required growth of the indicator in Germany and Finland until 2020

If in the future there will be no significant negative events that would influence the country's development, achievement of the target value in 2020 is very real. Expenditure on R&D should grow and their share of GDP should be approximately equal to the values given in the table (Tab. 2.7).

Table 2.7 Expected growth of expenditure on R&D in Germany as % of GDP until 2020

Year	2012 (18)	2013 (19)	2014 (20)	2015 (21)	2016 (22)	2017 (23)	2018 (24)	2019 (25)	2020 (26)
Expenditure on R&D (% GDP)	2.81	2.84	2.87	2.89	2.92	2.94	2.95	2.97	2.98

Finland, as one of the most developed European Union countries, achieves in comparison with the other analyzed countries in long-term best value of the monitored indicator. Target of 4 % was almost reached in 2009, when the value of indicator was 3.94 % of GDP but from mentioned year the value of the indicator slightly decreased. If the country wants to achieve the target until 2020, the share of expenditure on R&D in relation to GDP has to rise. As in Germany, also in Finland is in the future sufficient only slight increase described by a polynomial function of the 3rd range. Its graphic interpretation is shown on figure (Figure 2.10b).

$$y = 0.00022x^3 - 0.01206x^2 + 0.24044x + 2.10944 \qquad R^2 = 0{,}948 \qquad (2.2)$$

If the indicator will develop according to the mentioned function, it will grow very slowly and the values of the indicator will be equal to the values given in the table (Table 2.8).

Table 2.8 Expected growth of expenditure on R&D in Finland as % of GDP until 2020

Year	2012 (18)	2013 (19)	2014 (20)	2015 (21)	2016 (22)	2017 (23)	2018 (24)	2019 (25)	2020 (26)
Expenditure on R&D (% GDP)	3.81	3.83	3.85	3.88	3.90	3.94	3.97	4.02	4.08

The share of expenditure on R&D in the Spanish GDP is well below the target value of 3%. If the country wants to achieve the target until 2020, it is essential that expenditure on these activities grow faster in future. Their development should be directed by a polynomial function of the 3rd range:

$$y = 0.00020x^3 - 0.00401x^2 + 0.05811x + 0.68954 \qquad R^2 = 0{,}985 \qquad (2.3)$$

Its graphic interpretation is shown on figure (Figure 2.11a).

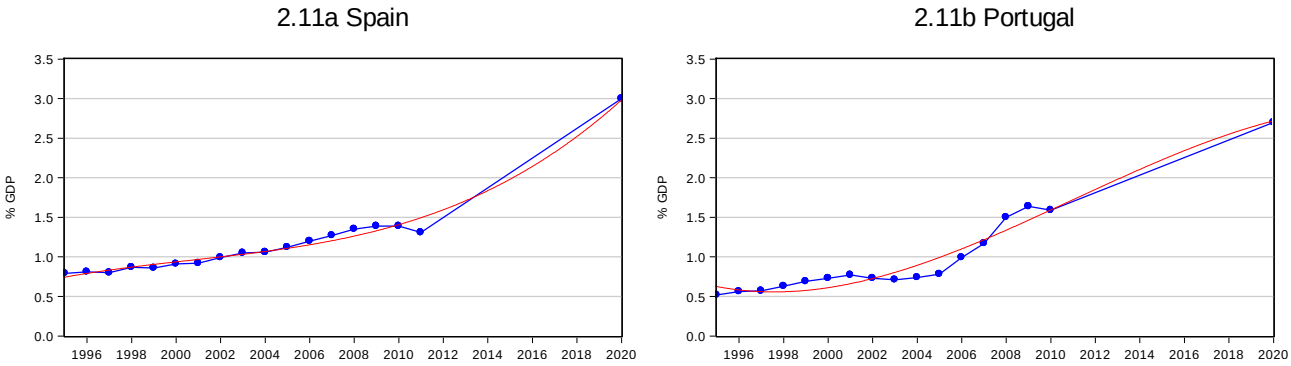


Figure 2.11 Simulation of required growth of the indicator in Spain and Portugal until 2020

If Spain would like to really achieve the target of Europe 2020, expenditure on R&D in relation to GDP should gradually increase and achieve the values given in the table (Table 2.9). Also in this case, the growth rate of expenditure should be faster from year to year.

Table 2.9 Expected growth of expenditure on R&D in Spain as % of GDP until 2020

Year	2012 (18)	2013 (19)	2014 (20)	2015 (21)	2016 (22)	2017 (23)	2018 (24)	2019 (25)	2020 (26)
Expenditure on R&D (% GDP)	1.60	1.72	1.85	1.99	2.16	2.34	2.54	2.76	3.00

Not only the previous three countries, but also Portugal has not achieved the target of the strategy yet, i.e. the share of expenditure on R&D is not at 2.7% of GDP. If the country wants to achieve this target, it is necessary to manage the future development of the indicator by polynomial function of 3rd range. Its graphic interpretation is shown on figure (Figure 2.11b).

$$y = -0.00024x^3 + 0.01225x^2 - 0.07830x + 0.69146 \qquad R^2 = 0{,}960 \tag{2.4}$$

The share of expenditure on R&D to GDP should grow faster than in the case of Finland and Germany. The economic crisis has slowed growth in this country and the value of the indicator during last years has decreased. Further decrease would mean moving away from the target value. However, if future development will follow mentioned function, the indicator should be equal to values given in the next table (Table 2.10).

Table 2.10 Expected growth of expenditure on R&D in Portugal as % of GDP until 2020

Year	2012 (18)	2013 (19)	2014 (20)	2015 (21)	2016 (22)	2017 (23)	2018 (24)	2019 (25)	2020 (26)
Expenditure on R&D (% GDP)	1.85	1.98	2.11	2.23	2.34	2.45	2.55	2.64	2.72

If the Slovakia would like to fulfill mentioned target until the year 2020, it is essential that the growth rate of R&D expenditure in the next few years rose considerably. It is difficult to assume major changes in this area, so after extensive analysis, in our view seems to be the best choose for the

simulation of GERD growth in relation to GDP the polynomial functions of 3rd range and its graphic interpretation is shown on figure (Figure 2.12a).

$$y = -0.00006x^3 + 0.00566x^2 - 0.11138x + 1.13656 \qquad R^2 = 0{,}854 \tag{2.5}$$

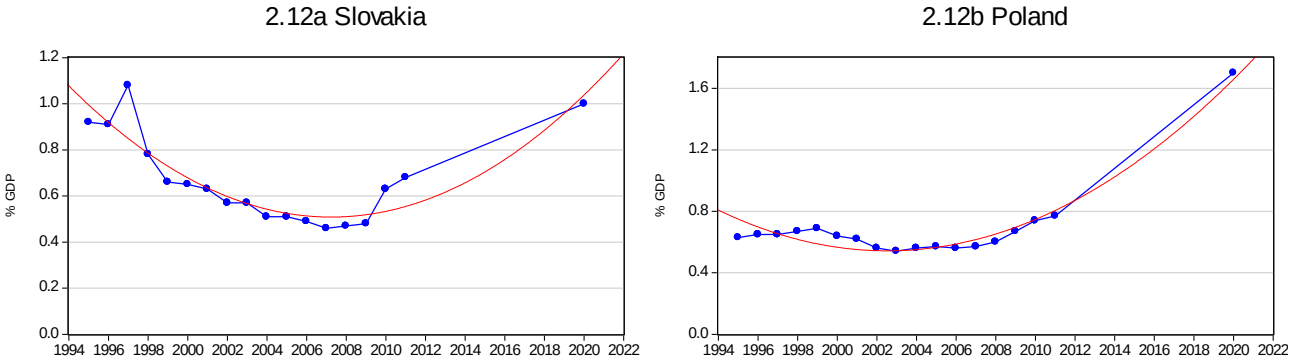


Figure 2.12 Simulation of required growth of the Indicator in Slovakia and Poland until 2020

If the share of expenditure on R&D on GDP should be 1 % until the year 2020, their development should have the values listed in the table below (Table 2.11). We presume that in following years due to persistence of the negative impacts of economic and financial crisis the funding of R&D will limited. Gradually the share of R&D expenditure in relation to GDP should grow faster.

Table 2.11 Expected growth of expenditure on R&D in Slovakia as % of GDP until 2020

Year	2012 (18)	2013 (19)	2014 (20)	2015 (21)	2016 (22)	2017 (23)	2018 (24)	2019 (25)	2020 (26)
Expenditure on R&D (% GDP)	0.62	0.65	0.69	0.74	0.79	0.84	0.89	0.95	1.01

Based on the calculations provided in the table we can state that such values ofmonitored indicator could be achieved only if the necessary measures will be taken in this area and after their application in practice. After completion of the transport infrastructure, that in recent years has become a priority of the Slovak government and into which flows the greatest amount of funds (for example, from the EU funds[15]), most of the funds should be directed to research, development and innovation that the country converge to the developed European countries and actually achieve the objective of Europe 2020.

Similarly, we can predict the expected development of expenditure on R&D relative to GDP for Poland. Estimated expenditure trends can be described by more functions, but as in the case of other five analyzed countries, also in Poland there is development accurately captured by polynomial function of 3rd range (with the high coefficient of determination). Its graphic interpretation is shown on figure (Figure 2.12b).

$$y = 0.00013x^3 - 0.00167x^2 - 0.00649x + 0.67967 \qquad R^2 = 0.984 \tag{2.6}$$

[15] In the current programming period, i.e. 2007 - 2013, are the financial resources from EU funds intended to support the various operational programs of the Slovakia mainly directed to the *Transport* (34,7% of the total budget from EU funds for Slovakia for the period). Than followed the area of *Environment protection and risk prevention* (18,9%), and *Research and technological development, innovation and entrepreneurship* (12,2%). 0

If Poland would like to really achieve the target of Europe 2020 until the year 2020, expenditure on R&D should gradually increase and their share to GDP should achieve the values given in the table (Tab. 2.12). Also in this case, the growth rate of expenditures should be faster from year to year.

Table 2.12 Expected growth of expenditure on R&D in Poland as % of GDP until 2020

Year	2012 (18)	2013 (19)	2014 (20)	2015 (21)	2016 (22)	2017 (23)	2018 (24)	2019 (25)	2020 (26)
Expenditure on R&D (% GDP)	0.78	0.85	0.92	1.01	1.11	1.23	1.36	1.50	1.67

To achieve the target value 1.7% of GDP should help the financial resources from EU Structural funds. But as in the case of the Slovakia, also in this country is in the current programming period the priority area of *Transport*, to which has been allocated 40.9% of the budget and to the area of *Research and technological development, innovation and entrepreneurship* should be allocated only 18.8 % of financial resources from the EU Structural funds for individual operational programs of Poland (European Commission, 2007d).

For the comparison, Germany and Finland, which are in the level of its R&D activities further than the other analyzed countries, significantly supported these activities also by the financial resources obtained from the European Union funds. In the current programming period has been from the European Union funds allocate to the area of *Research and technological development, innovation and entrepreneurship* the largest amount of financial resources. In Germany, the funds allocated to support the projects in this area during the years 2007 - 2013 have been at 46.9% (European Commission, 2007b), in Finland at 59.2% of the total financial resources obtained from European Union (European Commission, 2007a). In contrast to Slovakia and Poland, these two countries do not solve the problem with the completion of transport infrastructure. In Finland, should be directed to the area *Transport* only 3.5% of the total financial resources obtained from European Union.

Even in Spain and Portugal, is the area of *Research, technological development, innovation and entrepreneurship* the most supported area from the European Union funds. During the current programming period these activities should be supported by 30,1% of the total budget obtained from European Union in Spain 0(European Commission, 2007f) and by 30.2% in Portugal (European Commission, 2007d).

2.7 Conclusion

Continuing negative impacts of economic crisis and also current global crisis influenced all sectors of the economy. This resulted in a lack of financial resources in support of improving the situation in sectors and their return to pre-crisis period. The lack of financial resources has been also in the area of research and development which is the basis of innovation activities and technology transfer. These activities can positively contribute to improving the situation in enterprises and in whole economy, to increasing their competitiveness and thus to support the economic development. Therefore, in following years, it will be important to increase emphasize on the financing of research and development so that their share on GDP will rise and it will converge to the target values of the

strategy Europe 2020. By the modeling of expected development of expenditure on R&D in relation to GDP, we have pointed out possible scenarios for the indicator in the future.

According to this, we set the aim of this chapter: To propose how expenditure on research and development in selected countries should grow so that these countries will reach the target value of each country identified in Europe 2020 until the year 2020.

Basis on the analysis of the present trend of the indicator expressing the share of expenditure on research and development to GDP, we can state that Germany and Finland are the countries which should have no problem to fulfill this target until 2020. So the indicator should grow very slowly.

On the other hand, the share of expenditure on research and development to GDP in Spain, Portugal, Slovakia and Poland is lower than it should be. Therefore in following years expenditure in this area should increase and their share on GDP should rise faster than in recent years. The structure of expenditure should change, i.e. it is important, that business enterprise sector increase investment into monitored area in a future (at required 2/3 of total GERD) and government sector decrease investment at required 1/3 of total GERD in all four countries.

Acknowledgement

The chapter is prepared within the project of young researchers No. 2330263 “Target of Strategy Europe 2020 - Expenditure on Research and Development to 3% of GDP. Reality or Fiction?”

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Chapter 3

GROWTH DESIGN AND MONETARY POLICY AFTER THE CRISIS

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GROWTH DESIGN AND MONETARY POLICY AFTER THE CRISIS

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Abstract

Despite the indisputable fact that the 2008 Global Financial Crisis, the continuous debt overhang, and the everlasting Eurozone problem, constituted the most substantial economic downturn since the Great Depression, this slowdown has not necessarily been equally destructive for all parts of the world. This chapter proposes a case study of four relatively small and open economies which differ in their respective growth design.

In each of the four economies growth has been historically heavily financed either by natural resources, influx of foreign investments, external debt, or exportation. Azerbaijan has been chosen to represent the "resource-driven", Singapore – "investment-driven", Hungary – "debt-driven", and Switzerland – "export-driven" model of economic development. A supposedly very broad narrative converges naturally into just a few main talking points. Narrowly designed economic models leave nations dangerously dependent on their respective key factors of growth. Under systemic negative shocks, the factor of dependence impedes policy making and contributes to multiple structural problems that prevent sustainable recovery. Industrial diversification appears to be the chief differentiating factor for success and at least one of the key solutions to systemic financial crises. Monetary policy often becomes restricted by the path imposed by the choice of the growth design; protection of the growth regime becomes a priority for monetary policy makers, either directly or indirectly. Exchange rate management evolves into a key instrument of monetary policy-making in small open economies under large negative external economic shocks.

Keywords: economic growth, monetary policy, global financial crisis.

3.1 Executive summary

This chapter establishes a nexus between growth design, monetary policy, and crisis resistance. The basic motivation is to see how nations operating on different economic development models respond to the same systemic financial threat, how central banks in those countries conduct monetary policy, and whether there is a factual interaction between the two. Four countries have been chosen for the purpose of a case-study analysis of economies financed by different factors of growth. Azerbaijan represents a resource-rich state, Hungary - a debt-financed economy, Singapore - an investment-driven, and Switzerland - an export-driven economic model. Only countries with an autonomous monetary policy-maker, i.e. with an independent ability to issue and print currency, have

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[17] I express my gratitude to the book editor, Rajmund Mirdala, for valuable guidance. I am thankful to Taleh Ziyadov (Azerbaijan Diplomatic Academy), Salman Huseynov and Ramiz Rahmanov (both – Central Bank of Azerbaijan) for fruitful comments and discussions. I am also grateful to all students and guests of my "Foreign Models of Economic Development" course at the Special Talents Group faculty of Azerbaijan State Economic University for endless contributions of interesting ideas. Everything expressed in this essay belongs solely to me and does not reflect the viewpoint of either the Central Bank of Azerbaijan or the Azerbaijan State Economic University.

been chosen, in order to limit the confounding elements associated with belonging to a common currency area such as the EU.

In Azerbaijan, a classic resource-rich state, declining oil prices on the global energy markets have hit hard at domestic budget revenues and the overall economy as a whole, which didn't generate any growth in 2011. However, the central bank may not pursue an aggressive monetary expansion due to the persistent inflation pressures created by the broad fiscal apparatus financed by the oil money, and the inability to devalue the domestic currency which is constantly under appreciative pressures from the oil-Dollar influx. The struggling non-oil exports, which constitute just 5% of the country's foreign trade turnover, are not boosted with a currency devaluation, and the nation's diversification efforts are on stall. The resource-funded growth model is dangerously dependent on global oil prices and prevents the economy from capitalizing on a potentially lucrative export-based diversification theme.

In Switzerland, the historically established "Made in Switzerland" brand - the comparative advantage of highest-level quality of exportation of both goods and services - has made the economy highly depended on sales abroad. Meanwhile, a continuously negative outlook on the global economy and the everlasting Eurozone crisis, have led to the Swiss Franc becoming a continental safety haven, with foreign funds flooding into Switzerland. The incredibly appreciated Franc has put the country, which is highly reliant on healthy exports, at a very dangerous long-run position. The Swiss National Bank, therefore, implemented unprecedented policy measures by imposing an exchange rate ceiling to protect the Franc from further rises in value. The continuous expansion of the national bank's balance sheet signals that the Franc is still overvalued, and the exit strategy to be eventually implemented in the future becomes a legitimate concern.

Hungary, a small and indebted state which is very much integrated into the continent's economy, has been hit harder than any other Central European country. The large government deficit cloud is looming over the struggling economy, and the domestic demand base is suffering from the massive household debt overhang. The crisis has led investors to pull funds out of Hungary, and the country, suffering from significant disinvestment, saw its domestic currency devalue to historically low levels. Domestic wages, which are paid to the population in the now-cheaper Forint, are not enabling the private sector to repay the more expensive debt baggage, which is ironically denominated mostly in the consistently appreciating Swiss Franc. The national bank has its hands tied up as no monetary expansion is possible since it could contribute to Forint's decline, and hiking up interest rates to foster appreciation can damage the already bleeding Hungarian economy.

Singapore, a city-state acting as a global infrastructural hub for the flow of both goods and services, is plugged into the international economic architecture and absorbs many of the foreign financial shocks. The dependence on Foreign Direct Investment and overall capital influx from abroad has caused the Singaporean economy to contract noticeably during the worst times of the Crisis. However, an economically diversified structure has allowed Singapore to rebalance growth perspectives and return to the pre-crisis level remarkably quickly. Acknowledging the nation's role as a global financial center, the central bank has focused on the maintenance of this position by broadening macro-prudential regulatory practices and prioritizing the business-friendly price stability even amidst the toughest moments of the storm. Despite all of our four case-study economies, by and large, operating on an identifiable growth formula with some priority economic factors, Singapore's

very diversified economy makes the country stand out over every other nation in the study. And even in the supposed factor of dependence - investment flow and FDI - Singapore is very much diversified, trading with all parts of the world in equal proportions.

The bottom-line finding is that every economic formula of dependence on some single key factor impedes policy making at the time of crisis. In other words, the factor of dependence itself, on which an economy relies during periods of prosperous growth, creates multiple policy-related problems and frictions. Formation of any narrow economic growth model - dependence on any one single source of GDP generation - be it natural resources, exports, external debt, or foreign investment leaves small open economies very vulnerable to external shocks. Among our four case-study countries only Singapore, the most diversified economy of all four, has survived the crisis relatively well, pointing at industrial diversification being a key component of crisis resistance.

Another observation is that although classic monetary theories dictate very well the actions adopted by central banks, monetary policy has been often restricted by the urge of protection and maintenance of the growth regime installed in the respective country. From exchange rate floors in Switzerland to macro-prudential regulation in Singapore, monetary policy makers focus at the protection of the domestic growth design, deeming their roles somewhat endogenously dependent on the pre-determined domestic growth foundations. In all four cases, exchange rate management appears to be the most reoccurring policy instrument of choice, the one that central banks resort to, or cite, most often in the attempt to defend the national growth formula.

3.2 Foreword

"The global financial crisis of 2007-2009 was not only a tsunami that flattened the economy, but in the eyes of some commentators it has flattened the science of monetary policy."
(Frederick Mishkin) [18]

The recent Financial Crisis has been the most significant and reoccurring topic in economic literature for the past four years. The Crisis has caught households, policy makers, central bankers, and economists across the world almost completely off guard. Since the Great Depression, the global economy has experienced multiple downturns, and sometimes even significant ones, but none of them can even remotely compare to the deep and structural cuts that the recent slowdown has inflicted on the international economic eco-system. Perhaps the most striking peculiarity of this particular crisis is the very long-lasting aftermath of the original storm.

From an asset bubble to a credit crunch, to an international lending freeze, a global savings glut, and numerous enduring complications for fiscal, monetary, and private agents. A collapse in global asset prices has led to an evaporation of trillions of dollars in private capital and estate, bringing upon a period of dreadful deleveraging. Private sector deleveraging has moved in parallel with a substantially grim fiscal outlook for most of the world's developed economies, including the world's largest single market - Eurozone. The life for monetary policy makers has been equally problematic. Policy interest rates in most countries are stuck at the zero-lower bound, leaving no room for conventional policy-making. While central banks resort to unconventional decisions, financial instability coupled with the fiscal debt overhang and private deleveraging are dragging global growth

[18] Quoted from Mishkin (2012)

perspectives downward. Another important contextual feature of this Crisis is the systemic nature of the collapse: countries of all sizes, of all cultures, economic designs, and internal market structures have suffered from the global recession.

However, a careful scrutiny of the effects of the crisis and its aftermath on policy responses in various countries reveals that the downturn has not been *perfectly* homogeneous across different economies. This chapter proposes an original prism of analysis, a linkage between economic growth design and monetary policy at the time of crisis. The basic idea is quite straightforward: the recession has evolved slightly differently in countries differing in the fundamental model of economic development. Moreover, the needs of countries, which are dictated by the imposed growth design, demand different monetary policy responses. A small country which has been historically growing only through natural resources like oil and gas and a sophisticated global financial center should not respond to a crisis in an absolutely equivalent manner. This chapter introduces a narrative-based case study of countries for which the fundamental design of economic development differs. Resource-driven, debt-driven, export-driven, and investment-driven economic models are represented by Azerbaijan, Hungary, Switzerland, and Singapore. The main prediction of this chapter is threefold: economic growth design may explain the heterogeneity in countries' evolution through the crisis, monetary policy has not been conducted homogeneously across the four countries of different growth design, and there is a logical and technical nexus between these two notions.

An opening quote from the household name in monetary economics, F. Mishkin, is not accidental: the international community is full of critique against the conventional concepts in monetary theory, and is now calling for innovative suggestions and contributions to the ongoing policy discourse. This chapter proposes a systematic nexus between economic growth design, monetary policy, and crisis resistance, and appears to provide a fresh view on this long-standing issue. I hope that this humble contribution to literature will be of relevant use for the audience.

3.3 Case study analysis

3.3.1 Natural resources growth model - Azerbaijan

Azerbaijan is a classic resource-rich state with great dependence on energy sales, a noticeably under-developed non-resource sector, and a clear selection for a natural resource-driven model of economic growth. Back in the early 1990s, the country's leaders signed what was later labeled as the "contract of the century" - a consortium established by the world's largest oil companies, led by British Petroleum, to invest into and develop the oil fields in the coastal lands of the country. After the multiple phases of construction, the nation escalated to record-breaking growth indicators in 2004, when the oil contracts began to generate revenues. Since 2004, Azerbaijan's economy has more than quadrupled in size (Table 3.1). During the three years before the Global Financial Crisis of 2008, Azerbaijan posted headline-catching annual growth rates of approximately 25% on average. The so-called Azerbaijani economic miracle brought on a massive expansion in government-led domestic spending, richer households, influx of foreign investments, a solid current account surplus of around 27%, and ultimately a stable and legitimate USD 50 billion-plus economy.

However, a brief look at the data will reveal the enduring structural problems associated with such growth path. The challenges were brought to the surface by the time oil prices on the global

energy markets dropped from their historic highs to historic lows. As a result of the collapse of prices, coupled with some ad hoc pipeline-related problems, Azerbaijan's economy didn't grow in 2011. In fact, the economy would have shrunk if not for the more vibrant non-oil sector which grew by 9.5% in 2011. The small size of the non-oil sector is not enough to compensate for the massive role that oil and gas play in Azerbaijan's economic formula. In 2011, the share of oil in the country's overall GDP was roughly 50% (Figure 3.1). Of the AZN 8.6 billion in total investments into the economy (approximately USD 9.5 billion), 40% were targeted at the oil sector. Moreover, almost 80% of foreign direct investments belong to oil quarrying. As a result, it is not surprising that 70% of the state budget consists of oil-related receipts. Since much of the government expenditure schedule consists of discretionary spending (such as pension and healthcare) with medium-term planning, such over-reliance on volatile prices of oil creates both short-run uncertainty and severely gloomy long-run perspectives since Azerbaijan's population is aging quite rapidly. Finally, Azerbaijan's non-oil exportation is practically non-existent. Oil constitutes the miraculous 95% of overall foreign trade turnover[19]. For a small open economy, the potential of an export-oriented growth should be lucrative, but Azerbaijan's resource-driven economic model is a textbook scenario of the so-called Resource Curse - inability, for various reasons, to initiate any significant non-resource growth projects (Shaffer and Ziyadov, 2012).

Table 3.1 Azerbaijan National Account

	2005	2006	2007	2008	2009	2010	2011
Total GDP	**12523**	**18037**	**26815**	**40137**	**34579**	**41575**	**51158**
Final consumption by government	1305	1601	2740	3410	3571	4914	4341
Final consumption by households	5211	6873	9375	13286	12963	15194	21983
Gross fixed capital formation	**5173**	**5568**	**6069**	**7457**	**8690**	**8116**	**9091**
GDP real growth rate	126	135	125	111	109	105	100
Oil Sector	5521	9808	15412	22251	16257	20165	26787
Oil Share in GDP, per cent	44%	54%	57%	55%	47%	49%	52%
Oil Sector real growth rate (Index)	166	163	137	107	114	102	90
Total Investments into Economy	**4893**	**5053**	**6674**	**6847**	**5469**	**8248**	**8674**
Oil Share in Investments, per cent	78%	68%	60%	49%	44%	36%	39%
Foreign Direct Investment	**4475**	**4469**	**4291**	**3982**	**761**	**1519**	**2105**
Oil Share in FDI, per cent	95%	92%	90%	84%	74%	77%	78%
Government Budget	**2040**	**3847**	**6049**	**13212**	**8856**	**10209**	**14423**
Oil Revenues	300	2140	3086	9749	5428	6656	10331
Oil Share in Total Budget, per cent	15%	56%	51%	74%	62%	65%	72%
Exports of goods and services	**7882**	**12467**	**19322**	**26401**	**18365**	**22908**	**29418**
Exports/GDP, per cent	63%	69%	72%	66%	53%	55%	58%
Oil Share in Total Exports, per cent	90%	93%	95%	95%	95%	95%	95%

Note: Unless otherwise specified, all figures are in million, AZN

The fiscal policy apparatus has a stronger linkage with Azerbaijan's real sector, and more influence on domestic price levels than even the money supply. During the peak growth years, Azerbaijan posted dangerously high levels of price increases (Figure 3.2), and inflation was induced

[19] Broader discussions of Azerbaijan's currency management and non-oil foreign trade are provided in Huseynov and Jamilov (2012a), and Jamilov (2012a).

by the fiscal expansion package directed largely at construction and other forms of domestic investment. In an economy driven by oil and fiscal stimulus, with substantial stimulus-induced inflation persistence, there is this much monetary policy can make to help the economy during crisis times. This is true considering that the exchange rate policy is fixed and essentially mandated by the oil revenues flowing into the state budget. If capital flows are liberalized then by the basic definition of the monetary policy trilemma, there cannot be monetary policy independence. Among the policies that *were* available for the Central Bank: provision of liquidity via refinancing interest rate channel, risk regulation and macroprudential control – the Central Bank of Azerbaijan performed very well, and also managed to protect medium-term price stability. In 2011, the CBAR began its path towards an inflation targeting regime and more flexibility of the exchange rate.

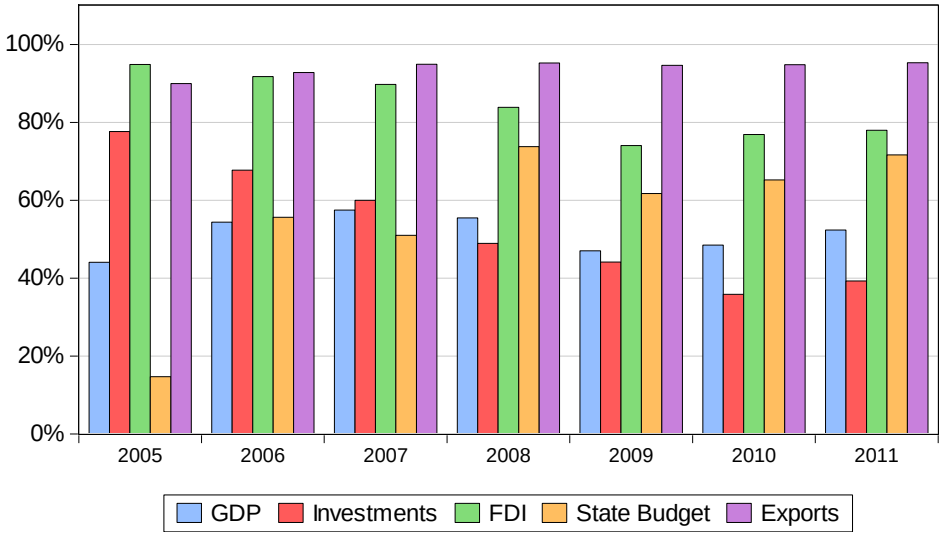

Figure 3.1 Share of oil in Azerbaijan's Economy

Azerbaijan's monetary response to the crisis can be placed into two time frames. The anti-inflation measures adopted back in early-mid 2008 were targeted at the escalating domestic price levels, which were largely inflicted by the aggressive fiscal apparatus. The Central Bank of Azerbaijan (CBAR), although briefly, switched to the two currency basket regime (USD and the Euro) from the bilateral peg to the US dollar (CBAR Annual Report 2010). However, the sudden urgency of the Financial Crisis put the Bank's anti-inflation policies on hold as a substantial disinflation period commenced. The Central Bank lowered the main policy rate to 9% and later to 6%, providing the financial sector with AZN 220 million and AZN 130 million in liquidity (Figure 3.3). The REPO transactions in 2011 jumped 6 times against the previous year and made 40.9 million Manat. During the same tear, the money base increased by 29.3 percent. Seasonally adjusted money base growth was 31.6 percent comparing to the beginning of the year. The 5% reserve requirement for external borrowing in the bank sector has been abolished. The overall final impact of Central Bank's monetary stimulus resulted in the liquidity injection of up to 10% of the total monetary base (CBAR Annual Reports 2008 and 2009). The exchange rate policy didn't alter, however, although the exchange rate corridor was narrow during the crisis - a natural phenomenon aimed at granting the central bank more control over the currency manipulations.

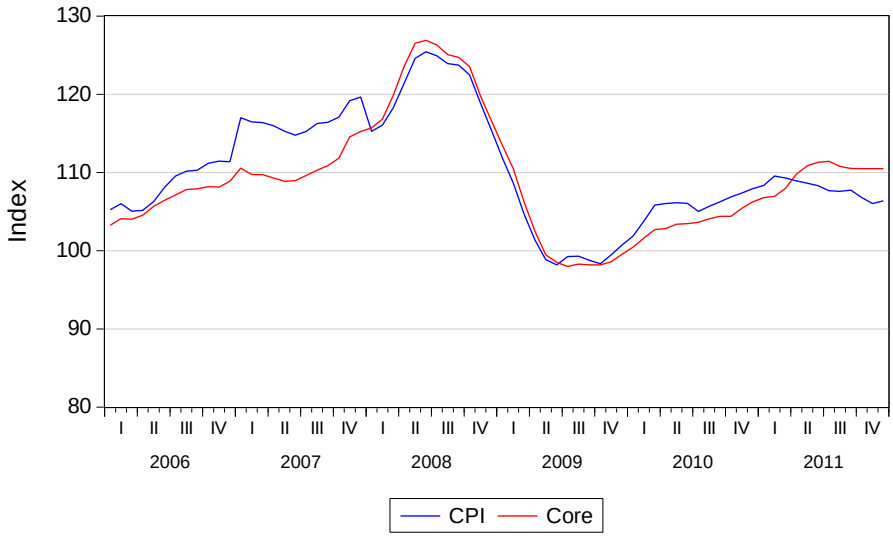

Figure 3.2 Azerbaijan core and headline inflation

Provision of liquidity via the monetary policy arm during the crisis helped the damaged financial sector, and stricter prudential regulation ensured stability and moderate risk management. Although as part of the general crisis response, the central bank did aggressively decrease the policy rate, it is noteworthy that the action has limited weight on the macro picture because the market of formal refinancing is rather small. In addition, although the central bank prioritizes financial sector control and macroprudential regulation, it's researched that monetary policy transmission is often jeopardized by the sluggish and incomplete pass-through from the main policy interest rate to retail rates on credit and deposits (Jamilov, 2012b). This is evident clearly on Figure 3.3. The turnover in the refinancing and repo rate markets is not substantial, with financing typically obtained from sources other than the Central Bank's formal channel. One of the examples of these informal sources of financing are incoming remittances from abroad. Remittance in Azerbaijan also factors in as a determinant of both inflation and output (Huseynov and Jamilov, 2012b).

On financial regulation fronts, the Central Bank tightened the degrees of assets in terms of their risk, provisioning norms have been raised for sub-standard, non-performed, and loss assets. Moreover, required minimum for the loan to value (LTV) ratio increased from 120% to 150%. LTV for the mortgage loans have been raised from 50% to 100%. The share of subordinated debts in total capital portfolio has been limited. Profits of banks and insurance companies, which are used for recapitalization purposes, were exempted from taxes. In addition, numerous private talks with individual commercial banks on the topic of risk management were held (CBAR Annual Report 2011). Due to the apparent revival of aggregate demand, medium-term inflation factors, forecasts for the balance of payments, the Central Bank took a decision to raise the refinancing rate in mid-2011 from 3 up to 5 percent, and later to 5.25%.

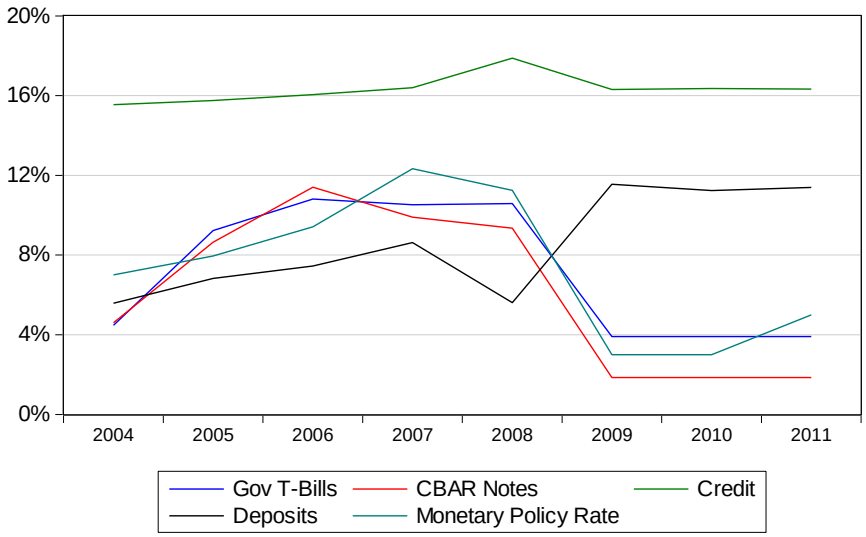

Figure 3.3 Azerbaijan interest rates

The Central Bank of Azerbaijan does not manipulate the nominal effective exchange rate (NEER) of the Manat as much as, say, the Monetary Authority of Singapore. Because of the country's oil-related links with the US dollar, the main regulatory arm of the bank is the AZN/USD bilateral exchange rate. The CBAR specifically targets single-digit inflation, stable exchange rate, stability in the banking and the financial sector, and stable money growth which fits the long-run aggregate demand growth projectile. The exchange rate policy arm of the Central Bank is *de facto* tied up due to the continuous appreciation of the domestic currency, caused by the oil money influx. In other words, monetary policy in Azerbaijan is not independent, since the Central Bank is obliged to protect the exchange rate from further appreciations and/or deviations. Since oil revenues play an important part in the economy's current account as well as the state budget, protection of a stable exchange rate regime is top priority. In general, continuous appreciation of the currency leads to the accumulation of strategic foreign exchange reserves, since CBAR is forced to buy out lots of Dollars and inject Manat liquidity (Figure 3.4). It's important to highlight that although the Manat is stable at its long-term path, reserves continue to pile up signaling a moderately overvalued domestic currency.

All in all, Azerbaijan has reacted to the Crisis relatively well at least for two reasons. First, since the economy is very much dependent on the inelastic supply of natural resources, growth can rarely if ever become negative, since oil sales are projected to remain roughly the same for the next 10 years. Since forecasted oil sales are fixed, and since the non-oil economy is either stagnant or growing modestly, the worst case scenario under current conditions is that Azerbaijan will post annual growth rates of 2-4%, largely reflecting the expansion of the non-oil economy. Second, and more importantly, Azerbaijan is quite a restrained economy finance-wise. In other words, Azerbaijan is not integrated into global financial markets as some of the other countries in our case study (Hungary via foreign debt, Singapore via foreign investment inflow, Switzerland via exportation of goods and services). The flow of capital is constrained, and dependence on global markets is rather low (Jamilov, 2012c). Such capital immobility has allowed Azerbaijan to isolate itself from the worst possible developments of the Crisis and its aftermath. However, it's only natural that such isolation is impossible to maintain in the long run and some sort of financial integration will have to be introduced.

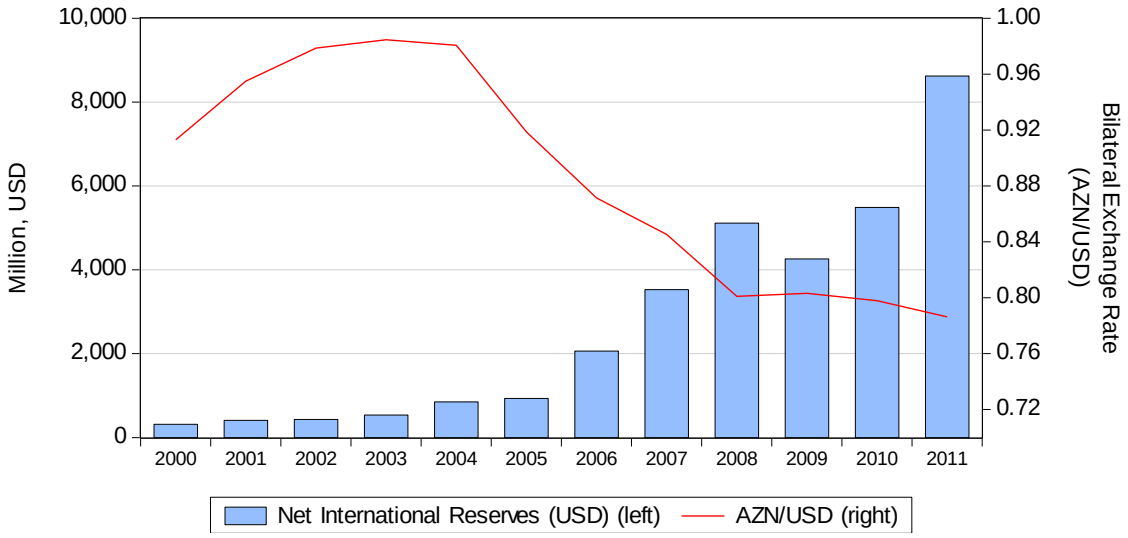

Figure 3.4 Azerbaijan international reserves and exchange rate dynamics

The peculiar case of Azerbaijan can be further summarized by the fact that the only side from which Azerbaijan had a real crisis is the oil sector, the decline of which was caused by the falling oil prices. No long-term debt problems, no capital or investment withdrawals. The most valuable take-away point from the recent crisis is that the oil prices decline showed the vulnerability and lack of the non-oil economy. The financial sector was maintained by macroprudential risk regulation, liquidity was provided via lower interest rates, exchange rate was kept to preserve oil revenues and no depreciation can be pursued due to inflation pressures induced by the fiscal institute. Azerbaijan's lack of economic diversification has been boldly revealed by the recent crisis.

3.3.2 Exportation-driven growth model – Switzerland

Similarly to Azerbaijan, Switzerland is a small economy which relies on its exports being solved effectively abroad. Exports constituted as much as 50% of the Swiss GDP in 2011 (Table 3.2). However, unlike Azerbaijan, the Swiss economy is naturally more diversified and does not rely on natural resources or any single concrete unit of exports. Every third Swiss Franc is said to be generated abroad. The Swiss economy is very much reliant on healthy exportation of goods and services, with the latter playing an extremely important role. Provision of financial services and strategic positioning of the country as a financial household in the international economy has built up a solid comparative advantage for the economy - a solid and reliable currency, the Swiss Franc.

It's ironic, to say the least, that the two most valuable factors of growth for the Swiss economic model - the powerful Swiss Franc and export-dependent growth - have backfired as a result of the recent crisis and the prolonged aftermath. The trustworthy Franc created a safety heaven with capital inflow and massive currency appreciation. The struggling exports and the current account threat in general, affect the overall national GDP and put a downward pressure on prices, creating a dangerous deflationary tendency. The monetary policy maker co-integrates its price-stability mandate with its attempt to defend the design of the growth regime: export-driven growth must be protected via a stable and, preferably, cheap currency. The tools and measures adopted by the central bank,

although targeting price stability and fighting deflation, were also *explicitly* aimed at the perseverance of the national growth formula, very similar to our prior finding in the case of Azerbaijan.

Table 3.2 Switzerland national account

Classification	2005	2006	2007	2008	2009	2010	2011
Final consumption expenditure	**342,510**	**352,067**	**365,222**	**379,573**	**386,189**	**395,320**	**401,830**
Households and non-profit institutions serving households	286,900	295,720	307,227	320,693	324,146	332,066	336,595
General government	55,610	56,347	57,996	58,880	62,042	63,254	65,236
Gross capital formation	**104,747**	**115,228**	**121,920**	**125,280**	**106,950**	**114,581**	**121,777**
Gross fixed capital formation	102,719	109,227	117,433	120,762	110,409	115,016	119,726
Fixed assets and software	56,913	62,679	70,120	71,653	60,327	62,983	65,247
Construction	45,805	46,549	47,313	49,109	50,082	52,033	54,479
Changes in inventories*	-408	2,004	3,568	3,535	-5,357	124	2,195
Acquisitions less disposals of valuables	2,436	3,997	920	983	1,898	-559	-144
Total exports of goods and services	**227,957**	**258,188**	**294,008**	**308,162**	**279,221**	**296,963**	**300,448**
Exports of goods	163,358	185,529	206,938	216,910	188,369	204,255	208,933
Exports of services	64,599	72,659	87,069	91,252	90,852	92,708	91,514
Imports of goods and services	**196,126**	**217,447**	**240,350**	**245,163**	**217,988**	**232,551**	**237,271**
Imports of goods	162,967	183,301	200,647	205,079	174,887	190,757	194,205
Imports of services	33,159	34,146	39,703	40,083	43,101	41,793	43,066
GDP	**479,088**	**508,036**	**540,800**	**567,852**	**554,372**	**574,314**	**586,784**

Note: all figures are in millions of CHF and at current market prices.

In the first half of 2008, in the middle of rapidly rising energy prices, the Swiss National Bank was facing a dilemma of maintaining monetary policy and allowing for higher than accepted inflation levels or contracting the money supply and exacerbating the already negative shocks that higher oil costs carry onto the supply side of the economy. In the second half of the year, however, inflationary shocks were no longer a problem as Switzerland felt the shock from the Global Financial Crisis. The primary problem consisted of analyzing the magnitude of the Crisis and estimating the policy intervention that would be needed to respond to it. (SNB Annual Report 2008).

Right before the crisis hit in 2008, the Swiss financial giant UBS announced heavy losses. Uncertainty, liquidity hoarding have put upward pressures on 3M Libor, the main policy target. The SNB has naturally put its tightening practices on hold. International central bank cooperation was established in order to provide domestic banks with USD liquidity. The 1-week repo rate was reduced to keep the LIBOR target steady. In brief, aggressive monetary policy easing was initiated in the middle of 2008: a 225 basis point reduction in the key policy rate. In addition to the increase in repo operations volume, the maturities of repo operations were extended to up to 6 months (SNB Annual Report 2009). This was probably done to attempt to affect longer-term interest rates too. Later on, the Swiss Franc swaps with foreign central banks like the Polish central bank, Hungarian central bank, and ECB. As a result of all these activities, even before the notorious Swiss Franc ceiling imposition in 2011, the SNB balance sheet increased considerably. Interestingly, the establishment of these Swiss Franc swaps actually *contributed* to the record appreciation of the currency in 2011: foreign banks and

their stakeholders built up trust in the liquidity and stability of the Franc, which later led to more capital inflow and the rise in currency value.

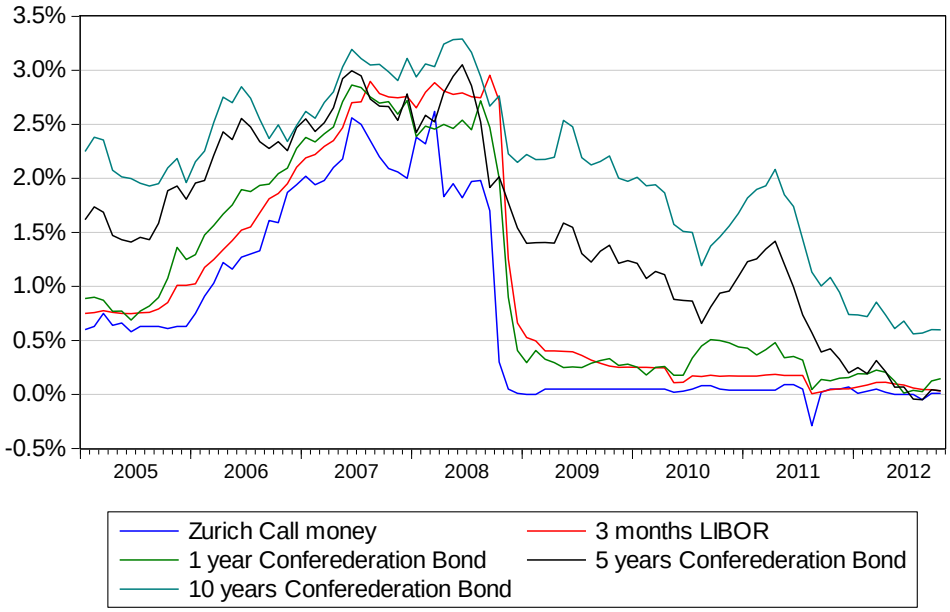

Figure 3.5 Switzerland interest rates

After Lehman Brothers collapsed, panic started in the money markets; Risk premia soared, and the Swiss Franc appreciated in comparative value again. An expansionary stance therefore continued in 2009: a medium term deflation risk, poor macroeconomic expectations, although a decline in the money market panic but a falling aggregate demand. Further monetary loosening was said to be desirable but the lower interest rate bound was already reached (Figure 3.5). The SNB triggered unconventional monetary policy measures to affect the economy under the zero-lower bound condition. The 3-month LIBOR was at 0.25%, repo operations were raised by 12% to provide more liquidity holding, multiple purchases of private sector CHF bonds performed by the SNB, and perhaps most crucially - massive FX interventions to prevent any further appreciation of the Swiss Franc (SNB Annual Report 2010).

The next significant phase in the SNB monetary policy dynamic occurred in December 2009. The Swiss Franc raced dangerously to historical highs, and the SNB has to step up to prevent any further excessive appreciation of the Franc. All in all, the Swiss Franc has appreciated by 40% between January 2008 and August 2011 (Figure 3.6). The Bank stopped purchasing corporate bonds, stopped the foreign currency swaps, and discontinued the US dollar repo liquidity operations. The Greek debt crisis and the Eurozone breakup fears definitely contributed to the Franc growing in strength. As a result - deflation risks due to the strong currency and grim growth expectations preserved. The SNB continued its aggressive asset purchase program and fought against the Franc appreciation as much as it could.

The Swiss Franc really performed as the safety haven during the crisis. The correlation between the EUR/CHF exchange rate and gold price return and the Volatility Index (VIX) return is 20% and 45%, respectively. Basically, it's sufficient to just monitor the Swiss Franc dynamic in order to grasp the trend in the economy, since the Franc can be viewed as a solid proxy indicator of market confidence. As the spread of interest rates of German and Spanish government bonds has been

increasing in 2008-2011, the Swiss Franc has been steadily gaining in value. This is an easy consequence of the reallocation of capital from the PIIGS (Portugal, Italy, Ireland, Greece, and Spain) into the safer Franc.

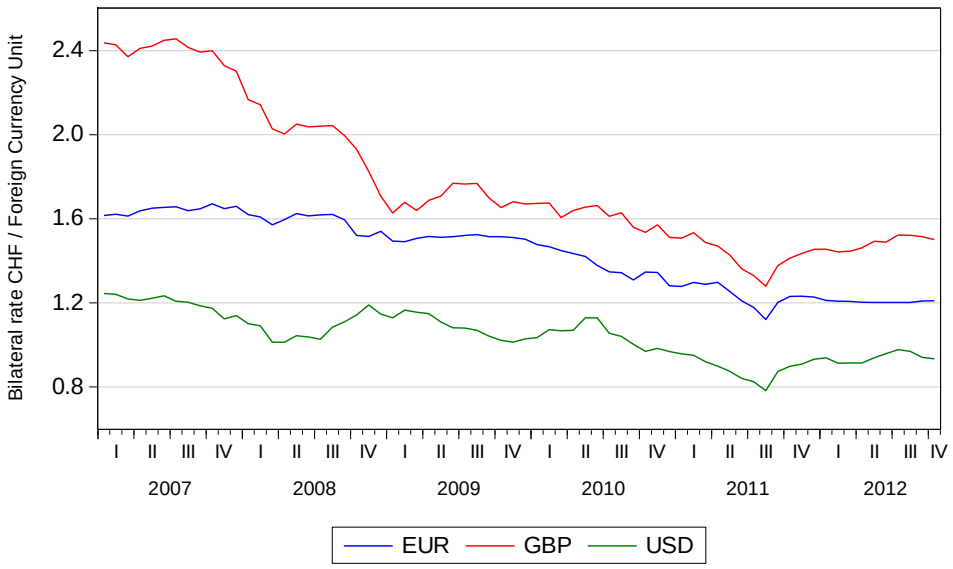

Figure 3.6 Switzerland exchange rate dynamics

The Swiss Franc saga is also an exemplified scenario of the North-South debt cycle, where capital has flown extensively from abroad into the safer Switzerland. The SNB at one point was financing 90% of the deficit of Germany, Finland, Austria, Dutch, French with new bond purchases. Although aggressive, the reaction from the Swiss National Bank has not brought any cardinal effect as of yet. "We will continue to enforce the minimum exchange rate with the utmost determination," - promised Thomas Jordan, Governor of the Swiss National Bank (Bloomberg News). And the pressure on Mr. Jordan to protect the Franc cap is increasing, amidst the everlasting Eurozone crisis, the debt overhang, and even the fear of an eventual systemic breakup. At one point, Mr. Jordan claimed that there is "no limit" to potential FX interventions. The SNB even diversified its currency portfolio by adding the Swedish krona, Singapore and Australian dollars, and the Danish krone.

On September 2011, unable to tolerate any more appreciation of the Franc, the SNB introduced the minimum exchange rate of 1.2 EUR/CHF (SNB Annual Report 2011). With this extremely unorthodox measure, the SNB will require a significant weakening of the Franc, and the Bank will take whatever action necessary to achieve that goal. The deflationary environment, nurtured by the strong Franc, creates a dangerous condition for the economy. The SNB argued for this unconventional decision by claiming that the Swiss Franc appreciation continually feeds through import prices, which place downward pressure on inflation. The small size of the domestic financial market limits the possibility of standard quantitative easing. Introduction of the minimum rate to prevent excessive CHF appreciation via the currency floor seemed to be the last most appropriate step. As a result of this measure, the already extended SNB balance sheet skyrocketed to historically high levels (Figure 3.7). Notably, foreign exchange reserves continued to accumulate through much of the 2012, suggesting that the Franc is still substantially overvalued and its inherent value continues to soar up even if the headline figure is controlled with the exchange rate floor.

Most of Swiss trade is conducted vis-à-vis the Euro area, thus the EUR/CHF bilateral exchange rate floor. It is apparently also easier to protect a bilateral exchange rate rule rather than a whole basket of currencies. The SNB still buys Euros in unlimited quantities, places Francs into the system, attempting to devalue it. In so doing it protects the minimum exchange rate floor. The better the situation with the Eurozone becomes, the weaker the Franc. As soon as the Eurozone steps on a sustainable positive long-term path, the Franc will improve and the exchange rate floor will no longer be needed. Stable economies amidst chaos attract too much attention indeed. Relative geographical proximity and integration with the Euro area played the wrong card for Switzerland: all the continental capital flew into Zurich seeking protection and risk-free interest. Of course, financially speaking, foreign currency investments pose a risk of loss if CHF continues to appreciate, but the goal of monetary policy is to achieve price stability, while profitability is a secondary issue. The concern on exports and growth are, technically, out of scope for SNB to care, although they do contribute to the medium-term deflationary environment and thus to a negative price situation, therefore entering the SNB mandate territory.

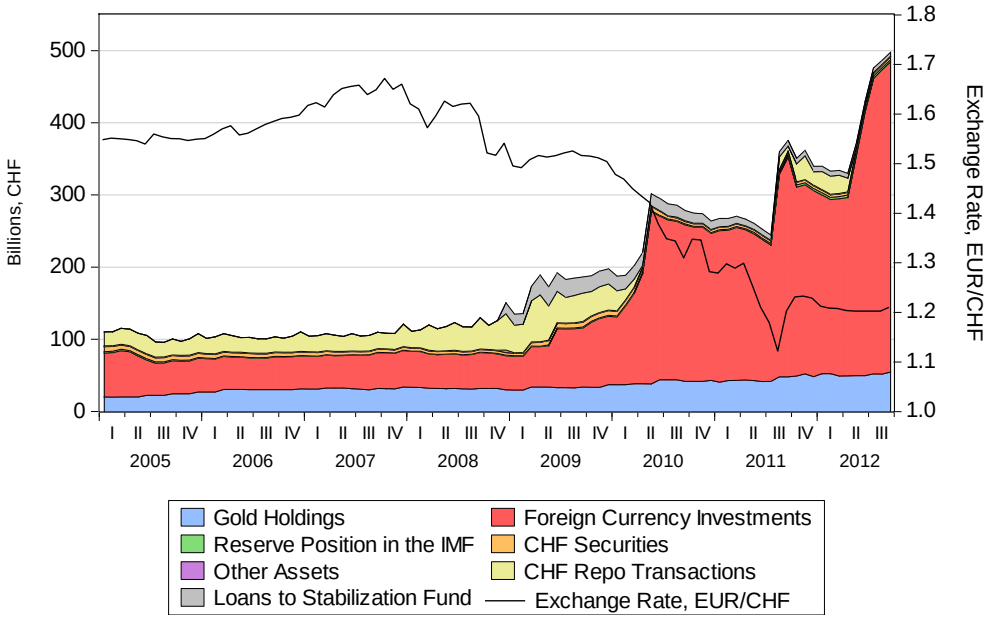

Figure 3.7 Swiss National Bank balance sheet expansion

The mandate of the Swiss National Bank (SNB) does include in its peripheral priorities the overall soundness of the financial system and the economy, but price stability is historically the SNB's bread and butter. The recent crisis and its aftermath present a historical case when the central bank, in order to protect the broader economy, established unorthodox measures without precedent, acting perhaps not in-line with the direct traditional mandate but aiming at the general well-being of the nation as a whole. Of course, the SNB's motivation to prevent a stall in exportation coincides with the continuous deflationary pressures on the national economy. An aggressive purchase of foreign exchange reserves and provision of Franc liquidity is a certain form of a monetary expansion with which the SNB attempts to fight deflation and return domestic price dynamics to the acceptable level of 2% annualized. The dampening deflationary threat is, ironically, also induced by the gloomy exportation prospects, which jeopardize growth projectiles and degrade prices (Telegraph).

3.3.3 Debt-driven growth model - Hungary

Hungary has been historically financing its economic growth with external debt. The debt portfolio is somewhat uniformly distributed across public and private sources, with both the general government and households holding substantial amounts of obligations, often denominated in foreign currencies such as the Euro and the Franc. Hungarian economy, being rather small and heavily dependent on foreign fund influx, suffered from substantial disinvestment during the Financial Crisis's worst periods. Coupled with a negative fiscal outlook and troublesome perspectives on potential EU and IMF loan assistance, disinvestment brought upon a steady depreciation in the domestic currency - the Forint. A weaker Forint has put the economy under a massive FX losing position: households, which earn income in domestic money, are now suddenly earning less due to the relative weakness of the Forint.

Table 3.3 Hungary National Account

	2005	2006	2007	2008	2009	2010	2011
GDP volume index (year-to-year)	104	103.9	100.1	100.9	93.2	101.3	101.6
Households consumption (year-to-year)	102.6	101.9	99.0	99.8	94.3	97.3	100.2
Net lending position of households in percent of GDP (%)	4.4	3.4	1.6	1.4	3.8	4.4	-4.3
Net financial wealth of households[1]	13537.9	15093.4	16081.2	14680.6	16823.8	17683.6	16121.6
M3	118.1	110.8	106.3	118.0	99.6	97.2	101.2
Direct investment in Hungary[2]	5884.1	2834.0	3118.5	4166.8	-1781.1	3013.3	3835.2
Total debt service denominated in foreign currencies (%)	15.4	12.5	12.5	17.3	27.5	22.5	24.2
Exchange rate (against Euro)	252.7	252.3	253.4	264.8	270.8	278.8	311.1

Note: [1]-numbers in billions of Forint, [2]-numbers in millions of Euro

In the meantime, Hungary's external debt (both on private and public levels) is now weighting more due to the relatively more expensive Euro and the Franc. One fourth of all national debt service payments are now accrued in the foreign currency; almost a trillion of Forints worth of net household financial wealth evaporated in 2011 (Table 3.3). The Franc, ironically, transformed into a continental safety haven and thus appreciated to historically high levels, as discussed in the earlier analysis of the Swiss economic model. Unlike Switzerland where deflationary environment, looming recession, export shortage, liquidity deficit and the strong Franc can all be solved with one single aggressive measure – a currency devaluation (expansionary intervention), in Hungary monetary policy had its hands tied since the domestic currency was already losing value fast and devaluation as a means to boosting exportation was out of the equation.

In comparison to most countries in the region, Hungary's debt situation is continuously worrisome (Figure 3.8). As of 2011, the debt to GDP ratio for Hungary equaled 80%, while for the second-placed Poland the figure is barely 60%. Also, we must consider that Poland is a bigger market

with a stronger domestic consumer base. Note that Hungarian public or private debt *individually* is larger than the total debt in Romania or Czech Republic. Among all European countries, Austria is the one most exposed to Hungarian debt with 40 billion of Austrians debt assets located in Hungary. Critics call Hungary the so-called Austrian periphery. In recent times, the Austria-German bond yield rose, thus reflecting the scare that Hungary may face further deficit problems. With the government's top priority being to keep the fiscal deficit less than 3 percent of GDP, further fiscal tightening measures look likely as output contraction would make it more difficult to reduce the fiscal deficit as much as the government targets over the medium term. With government focused on contraction, coupling it with monetary contraction would be disastrous; the MNB is really tied between the weak Forint and inflation threats on one side with government debt on the other side.

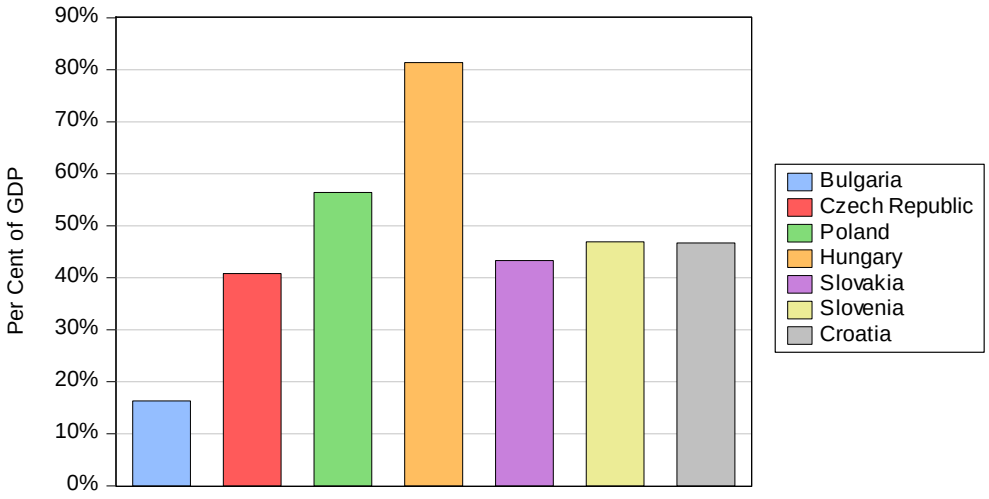

Figure 3.8 General government gross debt, 2011

The problematic fiscal situation may be alleviated if an agreement between Hungary and IMF or EU could be reached on a new financing package. The Agreement on a new IMF-EU program would depend on how much the Hungarian government would be prepared to do to meet IMF-EU requests to undergo fiscal adjustments by more sustainable measures. In addition, the notorious Hungarian central bank law (which supposedly limits the MNB's independence mandate) created the dispute between EU and Budapest, which is denied a much needed assistance loan. Central Europe's most indebted nation has also scared financial markets with unconventional government policies, including Europe's highest bank levy. The Hungarian government, however, recently introduced a second bill revising its controversial central bank law, in an attempt to end a dispute over political influence that has held up international assistance for the debt-troubled economy. Before an agreement with IMF-EU is reached on a new financing arrangement, the central bank looks likely to refrain from further interest rate hikes to support the Forint and better anchor inflation expectations. Analysts predict that an agreement will be found sometime by the end of the 2012 calendar year.

In the past years, Hungarian households have been building up more and more credit for the purchases of real estate, automobiles, and various other consumer goods. The trend has developed into granting consumer debt in foreign currency, mostly Swiss Francs. Foreign currency has always had its share in the household debt portfolio, however in recent year that share has increased substantially. Consider the case of overall credit for long-term (5yr plus) individual purposes (Figure

3.9). Foreign currency denominated credit grows significantly while the Forint's share declines. And this is just one particular portion of the big picture. In general, Swiss Franc loans make up around 45% of Hungary's entire household debt stock and 55% of all mortgages the IMF has put into various support mechanisms. Hungary notoriously stands out in terms of its vulnerability to any future growth shock or lack of foreign funding because its foreign debt to GDP ratio is already 130%; if the dynamic of growth will be significantly slower than debt accumulation, the long-run fiscal trajectory is extremely worrisome.

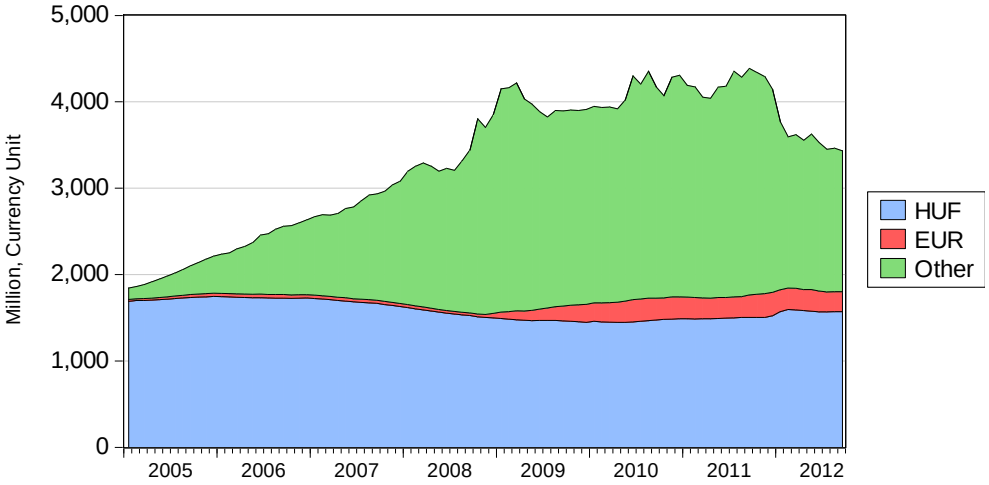

Figure 3.9 Long-term credit to physical entities

An interesting debate would emerge on the driving force of this trend: is it the demand side which demands to borrow in other currencies due to a loss of trust in the Forint? Or is the trend supply side-driven? The latter argument is more probable since credit suppliers (banks) are on a winning side of the FX bargain if the Forint weakens and the Franc strengthens. In fact, this is one motivation for the Hungarian government to issue a law that requires banks refinance consumer loans on any request by the borrower, including the mandate to adjust payments schedules to the new exchange rate. The Hungary's ruling Fidesz party has drafted proposals to help troubled foreign exchange loan holders, which would force banks to use more favorable exchange rates, ban rises in interest rates, and automatically extend the maturity of loans by five years at the borrowers' request. It's argued that this legal provision could somewhat restore parity in the lending channel.

Apart from the enduring debt problems, in order to understand the Hungarian monetary context one has to comprehend the persistent inflationary environment. Wages, a big component of nominal prices, increased a lot between 2005 and 2008: by 25%, to be precise (MNB Annual Report 2008, 2009). This wage inflation stimulated long-run inflation, which was also partially fueled by temporary food and energy price hikes and imported inflation from abroad. A dangerously higher core inflation, which necessarily drags along future headline inflation upwards, also played a role (MNB Annual Report 2010). Eventually, this created the anchor for permanently high inflation expectations, leaving the MNB basically unable to lower the interest rates too much in order to provide a little bit more stimulus to the slowing down economy: private industry suffering from massive disinvestment in 2008-2009, the struggling households repaying back the debt, the financial sector struggling under bank levies and state mandates to provide favorable FX refinancing (thus incurring big losses), and

the government which gets limited liquidity for its bond sales and is accumulates huge deficits. High anchored inflation expectations have basically taken the Magyar Nemzeti Bank (MNB) out of the expansionary game; and when the Forint continued to lose more and more value, event driven by the fiscal outlook and capital outflows, the Bank would need to even hike interest rates up - dealing an even stronger blow to the economy. The general solution, therefore, lies within the fiscal gap which will grant more confidence to the debt markets and drive long-term interest rates down, thus alleviating Forint depreciation.

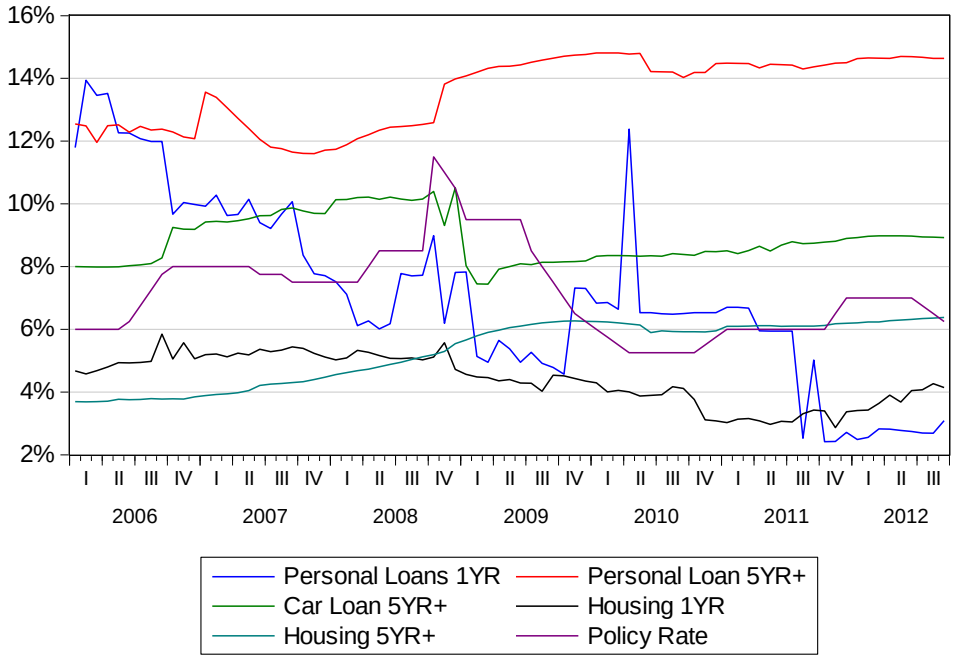

Figure 3.10 Hungary interest rates

Despite all the attenuating factors, the Magyar Nemzeti Bank (Hungarian Central Bank) still managed to devise a solid response package to tackle the crisis (MNB Annual Report 2011). For example, MNB introduced new measures which contributed to a better distribution of interbank Forint and FX liquidity and to the preservation of the financial markets' ability to operate. MNB also established direct FX swaps with the Euro, lowered the reserve requirement ratio, broadened the range of eligible collateral, and purchased vast amounts of government securities to mitigate liquidity shortages in the market for Hungarian government bonds. MNB also ordered a removal of the exchange rate band in February 2008, which expanded the room for monetary policy interventions and strengthened the credibility of the anti-inflationary commitment. Despite all these efforts, the retail yields often remain quite exaggerated. In particular, interest rates actually rose in 2009, and the policy rate was purposefully lowered by the MNB (Figure 3.10). The policy rate never went below some threshold mark, however, due to Hungarian market being inherently inflationary.

The Hungarian Forint depreciated massively in late 2008-early 2009, but the removal of the policy band by the central bank brought more flexibility. A similar situation occurred in late 2011-early 2012 - Forint depreciated steadily and rapidly. Experts claim that the depreciation of the Hungarian currency was partially due to the decline in risk appetite because of the Greek problem, though the Forint's underperformance in the region showed Hungary's structural fragility in response to external shocks (MNB Annual Report 2011). This obviously puts a lot of additional burden on the already

struggling consumers and feeds into the inflationary environment. The dynamic is clearly visible for all bilateral exchange rates (Figure 3.11). Consider the special case of the Swiss Franc, which has risen from 160 to 240 - almost a 50% depreciation of the Forint with respect to the Franc. This is a negative sign for consumer, banking, and government debt portfolios which became more expensive since they are, typically, denominated in foreign currencies. The situation is particularly troublesome for households, which saw their real wages decline noticeably in 2009 and 2010 which, coupled with the appreciating debt baggage, puts quite a burden on the private sector.

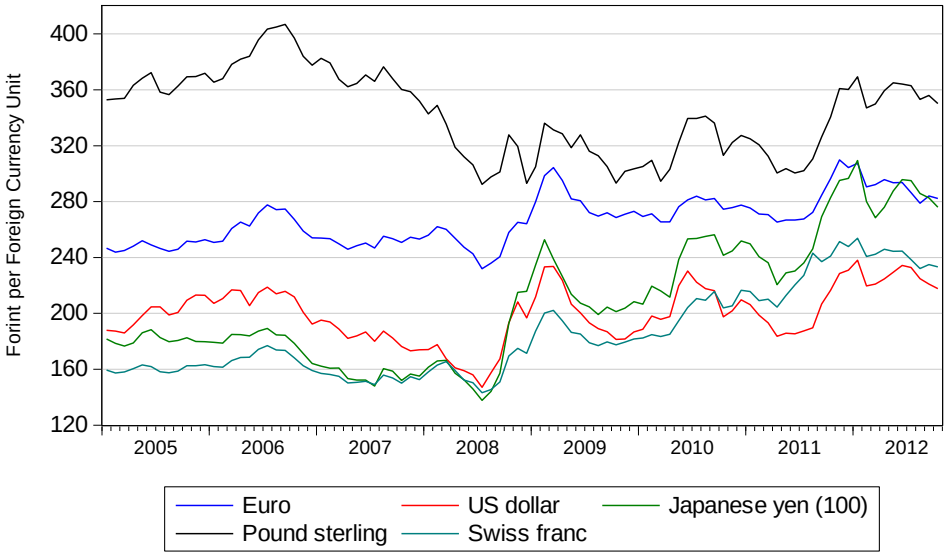

Figure 3.11 Hungary exchange rates

Facing conflicting domestic hardships such as the weak currency, inflation pressures, and the fiscal situation, which were further enhanced by the government tax levy on commercial banks, the central bank of Hungary chose to hike up interest rates in 2011 in order to prevent further appreciation of the currency and any more capital outflows. The monetary policy-maker, keeping in mind the poor nominal anchoring system, heavy core inflation, the imported inflation component, wage inflation, and the weak expectations channel of transmission, could not afford to loosen monetary policy stance too much given all the aforementioned medium-term augmenting forces on prices. However, due to the devalued Forint caused by the continuously grim fiscal situation and the uncertainty over the IMF assistance loan, the central bank was basically forced to raise interest rates and inflict further damage to the already bleeding economy. Once again we observe a case when the supposedly independent monetary policy-maker is *de facto* constrained in its choice of interventions by the realities of the nation's growth design: in this case, by the debt-driven nature of the Hungarian economy. Also, once more the exchange rate is on the headlines of our analysis.

3.3.4. Investment-driven growth - Singapore

Singapore is a unique economy because almost no other state in the world functions as a high-income global financial infrastructural hub while counting just one major city. Singapore is highly integrated into the international flow of goods and services, and it should come as no surprise that the country experienced a big step-back during the recent financial crisis. However, the case of Singapore is particularly attractive because the country reached its pre-crisis growth levels very quickly (Table

3.4). Although the response from policy makers, including the central bank, was not marginal, it was also not comparable to the massive and aggressive agendas adopted by their counterparts in, say, Switzerland or Hungary. What makes this more interesting is the fact that the Monetary Authority of Singapore (the central bank of Singapore) won the Asian central bank of the year award in 2011, implying that whatever the MAS did was probably quite effective and noteworthy.

Table 3.4 Singapore National Account

	2006	2007	2008	2009	2010	2011
	231,580.6	267,630.4	268,772.4	270,012.7	310,036.8	326,832.4
Private Consumption	89,786.9	99,734.1	108,166.1	108,417.2	119,017.7	128,684.3
Government Expenditure	23,873.7	25,540.3	28,629.8	28,638.2	32,632.1	33,739.6
Gross Fixed Capital Formation	50,233.4	61,358.9	73,512.0	74,148.8	74,981.8	76,542.6
Changes in Inventories	-1,252.2	-1,659.1	5,496.3	-5,169.4	-6,376.8	-3,202.4
Exports of Goods & Services	540,519.7	582,629.7	626,662.8	536,123.6	642,304.9	682,917.1
Imports of Goods and Services	472,382.6	500,464.6	571,495.8	472,005.2	554,187.4	595,756.8
Statistical Discrepancy	801.7	491.1	-2,198.8	-140.5	1,664.5	3,908.0

Note: All figures in current market prices, million USD.

There were only two fundamental monetary interventions performed by the Monetary Authority of Singapore, as a result of which the main policy rate was lowered: in October 2008 and later in April 2009. Afterwards, the main direction of the monetary strategy was at tightening of the nominal effective exchange rate (NEER) policy band. Although slight tweaks in the main policy rate and adjustments in the NEER policy band constituted the two primary policy tools at the time of the crisis, there were other channels through which the MAS was controlling the situation. During the actual financial crisis and in its aftermath, MAS prioritized non-stop monitoring of the healthiness of the domestic financial system, conducted informal talks and discussions with leaders of the systemically important financial institutions. The specifics of the matter is that the Monetary Authority of Singapore is not a classic central bank per se. MAS oversees a city-state which is a single large commercial center, and the healthy performance of the financial ecosystem is the policy maker's primary tactical objective. Over the course of the crisis, MAS showed clear strategic preference towards medium-run price stability, perhaps because all foreign agents and investors that operate in Singapore are quite susceptible to price hikes.

As mentioned above, the ongoing crisis has brought into greater focus the need for MAS to leverage on Singapore's structure of a global financial infrastructural hub. The role of external trade and financial flows in the economy of Singapore is indeed substantial. Total trade (exports plus imports of goods and services) amasses to 400% of GDP (Figure 3.12). Exports alone constitute an amount twice larger than Singapore's overall economy. The flow of FDI into Singapore has been growing steadily at a good pace, and in 2011 equaled to almost 200% of GDP. The financial component of FDI accounts for half of the overall FDI influx, and is greater than 70% of Singapore's total domestic output. The central bank of Singapore, due to the very geographically consolidated financial nature of the economy, has economies of scale advantage in terms of access to information from key players in the market. The process of monitoring economic and financial developments for any potential risks to Singapore's financial stability is therefore concentrated in the hands of the MAS. Indeed, MAS has continued to step up efforts to combine information perspectives from

macroeconomic surveillance, supervisory and market analysis. The ability of the MAS to generate responses to risk events quickly has been considerably improved. All in all, the context of financial investment reliance has prompted the monetary policy maker to surround the country's growth formula with appropriate measures and response mechanisms, generally supporting our thesis of pseudo endogenous central banks and monetary policy-making being directed at growth regime maintenance.

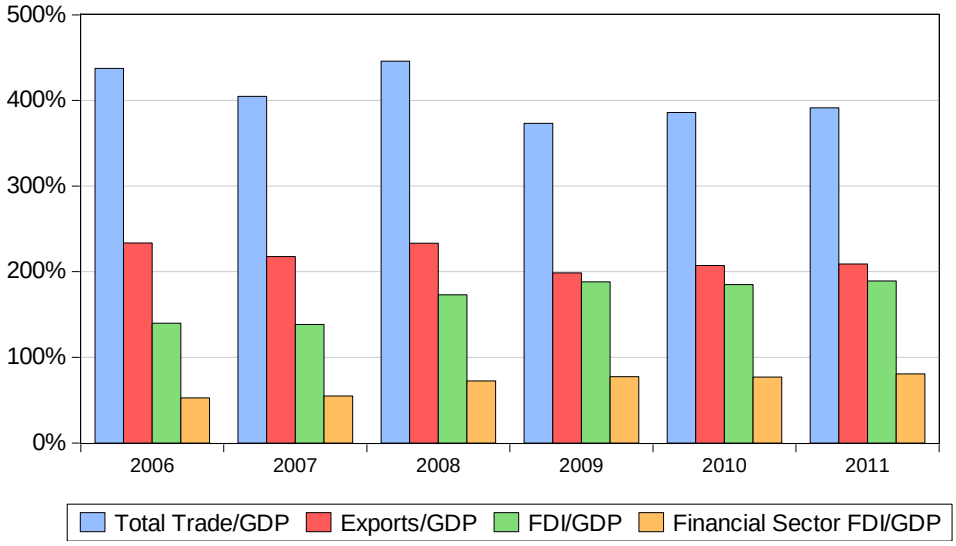

Figure 3.12 Investment-driven growth in Singapore

On a more concrete surface, the Monetary Authority of Singapore (MAS) implemented several original units into its policy mix in response to the Crisis. In late 2008, MAS joined the group of central banks which have established temporary reciprocal currency arrangements (swap lines) with the US Federal Reserve (Fed). The agreements were established to improve liquidity conditions in global financial markets and to smoothen the spread of hardships in obtaining US dollar financing in sound and well-maintained economies (MAS Annual Report 2008 and 2009). Furthermore, since 2006 the relatively new MAS Standing Facility has developed into MAS' main liquidity facility for financial institutions, allowing the Authority to successfully fulfill its dualistic mandate of controlling liquidity in the banking system and tuning market interest rate volatility. The Standing Facility helps improve the liquidity management of banks in Singapore by providing a channel for them to borrow from MAS directly.

Following the global move to regulate credit rating agencies, MAS also engaged a regulatory framework aimed at ensuring the quality of the credit ratings process and strengthening the integrity and independence of credit rating agencies. MAS will also adopt new changes to fund management regulation, targeted at raising the quality of players in the market and enhancing regulatory oversight. In the summer of 2010, MAS short-term bills were announced to be issued as part of the MAS' money market operations arm (MAS Annual Report 2011). The bills complemented the already existing tools: FX swaps, clean lending and borrowing, and SGS repos, which are currently used to control liquidity in the financial system. The introduction of MAS bills increased the diversity of regulatory assets available in the market, therefore allowing commercial banks to improve liquidity management practices in their everyday operations.

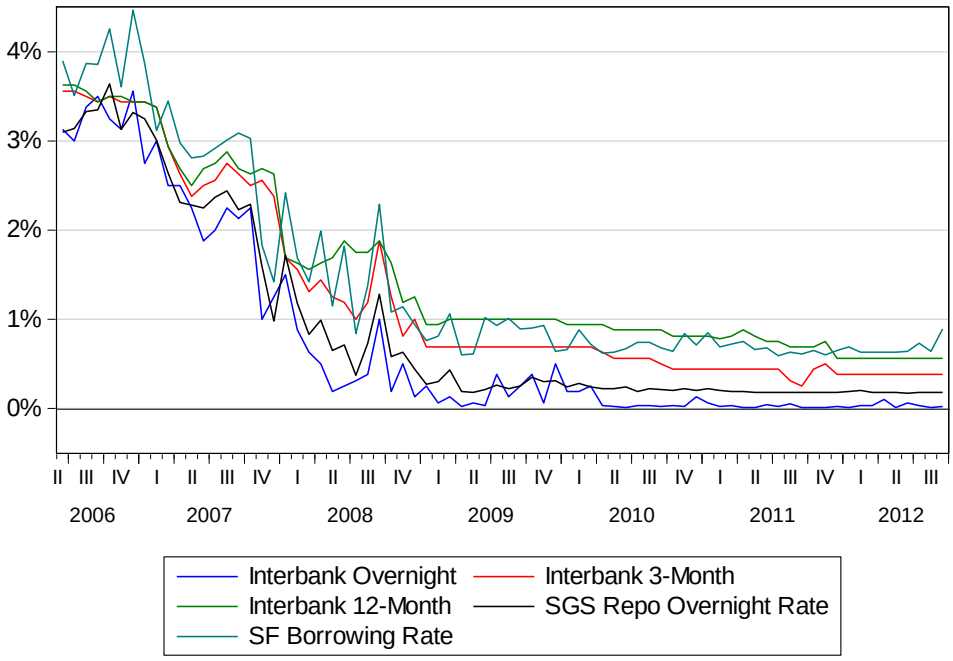

Figure 3.13 Singapore financial market interest rates

It's peculiar that the MAS have used the recent crisis as an important turning point for improving the already sound domestic financial system. Although the main the policy interest rate was lowered to provide more liquidity, the downward-sloped trend was already present before the crisis struck (Figure 3.13). In other words, Singapore is a case where the monetary policy response did not end on policy rate modifications but has consisted of a structural, somewhat institutional strategizing: concrete targeting of certain needs of the financial center. And the targeting was not always temporary, i.e. triggered by the crisis environment only to be switched off once the recession fades. The MAS' general policy responses to global developments have also been deliberately underpinned by the importance of maintaining a medium-term orientation and ensuring that the S$ remains an anchor of stability. The pragmatic tactics of the MAS reflect the degree of sophistication of Singapore's diversified economic structure.

In 2008, the S$NEER - a primary policy tool - has been eased to the lower half of the policy band, in line with weakening growth in the Singapore's economy. Singapore's comfortable exit from the worst phases of the crisis could be partially attributed to this loosened policy stance. However, the Singapore's NEER has generally appreciated by almost 20% in the past 5 years versus the basket of all currencies (MAS Annual Report 2011). This clearly reflects the rising role of S$ as a regional, perhaps even global, anchor of currency stability. Interestingly, the currency depreciated vis-à-vis the euro and the dollar, because probably on the margin the investments into Singapore from European and American partners became more risky or partial withdrawal of capital from the struggling Eurozone led to less demand for SGD. However, respective to the majority of currencies, SGD is very much a regional safety haven as well as the global magnet of financial flow. Today, Singapore's Forex market is the 4th largest globally.

A partial explanation of the transformation of SGD into a global currency is the ability of Singapore to attract wealth for asset management purposes. The Boston Consulting Group estimates that Singapore had $500 billion in offshore assets under management in 2011. Singapore has very

friendly, secretive banking laws which protect the privacy of account holders in Singaporean banks. The Eurozone and American directives are generally not recognized in Singapore, or at least not as much as in Switzerland. While Singapore is comfortably considered to be a monetary haven in the times of crisis, it still cannot compete with the massive comparative advantage of Switzerland. Recalling from the Swiss economic model, the Franc has appreciated significantly during the past years, but that effect can be explained from the proximity point of view: an oasis of confidence right in the middle of the struggling Eurozone. Meanwhile, in a more rapidly growing Asia, with the still escalating China, robustly rebounding Japan, and also Honk Gong and other Asian tigers, Singapore's emergence into a dominant global financial haven has been somewhat attenuated.

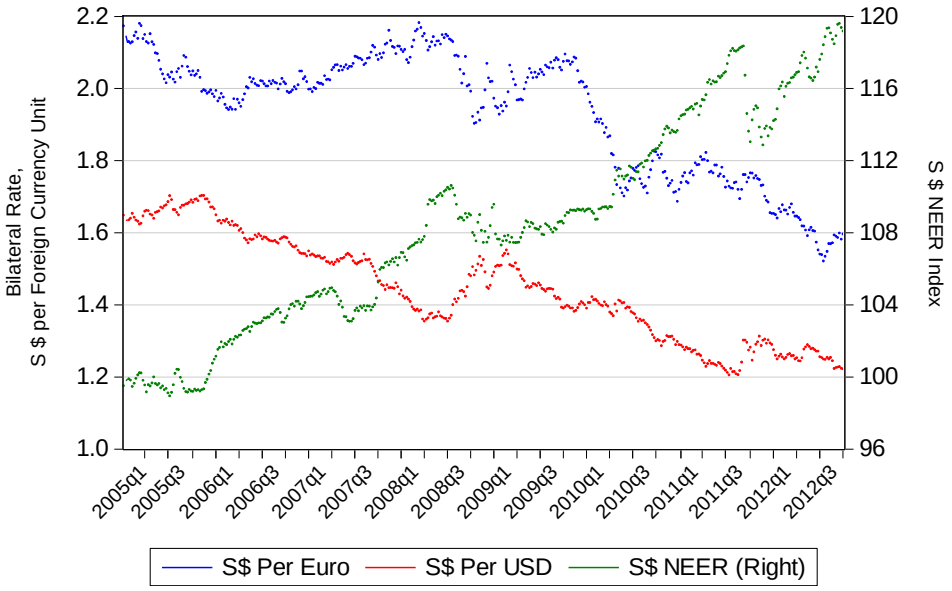

Figure 3.14 Singapore exchange rates

It should already be apparent that Singapore has weathered the financial storm pretty well while the international economy was hit badly. Not only is Singapore's economy very well diversified industrially, but within a particular area the risks associated with "putting all eggs in one basket" are minimized. Singapore is treated as a follower of an investment-driven economic model in this chapter. In theory, following our analysis of Azerbaijan, Switzerland, and Hungary the factor of dependence should have limited Singapore's survival through the crisis and the aftermath[20]. However, even within the supposedly unfortunate factor of economic over-dependence - foreign investment influx - Singapore's ties with the external economy are rather diversified (Table 3.5). Consider that Singapore has, on equal standings, attracted Foreign Direct Investment (FDI) from the neighboring Asian economies such as Japan, India, and China, as well as from North and South Americas, Europe, and the Oceania. Macro-geographically, we can't say that Singapore is overly dependent either on the East or the West. In addition, within a given continent, Singapore diversifies the country-sources of its investment inflows very well: Singapore has established financial relationships with every single important economic power. In general, it appears that risks of systemic collapse become minimized

[20] So far, we have concluded that excess dependence on oil, exportation, and external debt have negatively affected the paths of crisis resistance and monetary policy efficacy in Azerbaijan, Switzerland, and Hungary, respectively.

when a country spreads the weights of economic importance over a set of industries, and when within a given sector the dependence is also dispersed over several sub-areas.

Table 3.5 Singapore foreign direct investment by country of origin

Country/Region		2005	2006	2007	2008	2009	2010
Total		**323,821.1**	**370,494.7**	**465,475.6**	**508,318.3**	**573,271.0**	**618,576.3**
Asia		**78,253.9**	**82,485.0**	**104,591.6**	**117,925.6**	**144,397.7**	**152,380.2**
	China	910.0	1,689.5	2,314.1	4,423.7	9,725.7	11,515.4
	Hong Kong	4,701.5	6,317.5	6,454.9	11,495.4	17,556.4	18,331.5
	India	1,303.1	2,577.6	13,025.7	16,861.4	21,954.8	24,783.8
	Japan	44,812.5	44,970.5	47,540.2	50,163.0	50,391.5	53,938.1
	Malaysia	8,159.4	8,412.4	11,378.0	12,585.1	15,864.6	14,853.0
	Other	16,671.9	16,682.7	20,500.8	19,582.6	20,745.7	22,101.7
Europe		**139,987.4**	**174,058.3**	**197,976.8**	**203,866.3**	**221,944.3**	**227,026.8**
	Germany	8,189.2	7,591.6	9,226.9	11,227.0	11,136.4	11,716.6
	Netherlands	32,142.1	48,631.0	51,418.6	61,001.4	61,395.4	60,906.4
	Switzerland	22,273.1	27,113.7	27,453.4	23,504.9	26,851.5	24,405.2
	United Kingdom	49,593.0	55,263.7	62,527.3	50,072.0	49,499.4	50,042.0
	Other	21,174.6	27,214.6	33,785.4	37,161.8	37,968.5	43,836.5
United States		40,574.4	38,325.0	51,550.8	52,970.4	58,063.2	65,432.3
Canada		2,588.7	2,736.4	3,126.0	3,022.1	2,882.1	3,213.8
Australia and New Zealand		4,328.9	5,023.4	6,234.0	6,475.3	8,109.2	11,574.7
South and Central America		**50141.6**	**60,876.4**	**90,983.2**	**108,764.1**	**122,610.9**	**141,983.2**
Other Countries		7,946.2	6,990.2	11,013.1	15,294.5	15,263.5	16,965.3

Note: All figures are in SGD, Stock at end of year, current market prices.

Despite targeting and emphasizing medium-term price stability numerous times and in all of its reports and briefings between 2009 and 2011, MAS never did anything drastic to preserve it. I would explain it by the facts that the Singapore dollar remained quite strong and stable over the whole duration of the downturn, Singapore strengthened its inter-continental status as a financial safety haven, and there was never any grand investment and capital outflow except for, perhaps, some moments in 2009. But above all and most importantly - Singapore's industry is much more diversified than any other country analyzed in this chapter. Singapore's reliance on external trade and investment is large, but within foreign trade Singapore has diversified its partners remarkably well, thus minimizing risks associated with dealing with just one or several key players. In one of their annual reports, MAS authorities claimed that all of Singapore's economic sectors suffered from a recession rather harmoniously, unlike any previous case in history. However, it was Alan Greenspan himself who called the recent Financial Crisis the "one in a million credit meltdown" (The Economist Special Report, 2006).

The magnitude of the negative shock has naturally affected even the very diversified and healthy economic architecture of Singapore. But its diversified nature has ensured that a collapse of one industry could be compensated by a boom in some other sector. The crisis was not long-lasting, recovery was quick, and policy making was pragmatic and tactical. Singapore is not different from other economies in our analysis in the endogenous nature of its central bank's response to the crisis: if studied carefully, the chief focus of the MAS has always been on the preservation of Singapore's

status as a global financial center. And thus the constant emphasis on financial regulation, macro-prudential control, contacts with financial agents, etc.

3.4 Concluding remarks

All in all, the nexus between growth design and monetary policy appears to make economic sense. Growth design appears to work very well in describing how countries reacted to the recent crisis and how independent monetary policy-makers devised their response packages. The supposedly broad discussion on four very different economies converges into three major findings. First, narrow growth models are deemed to be bound for troubles. Any significant dependence on a single factor of growth puts economies in a big disadvantage come crisis time. However, the more diversified the economy grows, the more the risk associated with systemic collapse gets diluted. In general, it appears that economic diversification is an active solution against large, systemic negative shocks.

Second, central bank policies have often been formulated to protect the chosen model of economic development. In other words, in economies historically governed by some specific formula of development, where one or two factors of growth are considered to be necessary and paramount, policy-making becomes *de facto* endogenously dependent on the success of the dependence factor. In a sense, no monetary policy action in this study could have been labeled as "wrong" or "correct". Central banks often do what they can and should do, and the pattern of decisions is partially determined by what the given domestic growth formula demands at a given point in time. I re-emphasize that all four economies in the analysis possess the privilege of independent central banking, i.e. ability to print own money at will.

And third, exchange rate management arises as the most reoccurring policy instrument used by small open economies in mitigation of the adverse effects of the crisis and its prolonged aftermath. Azerbaijan, a resource-rich state, maintains a stable currency, which is constantly under appreciation pressures, in order to protect the incoming oil-Dollar money. Hungary, a debt-financed economy, is prioritizing Forint stability to ensure that domestic household debt, denominated in foreign currencies, doesn't escalate from a Forint depreciation. Switzerland, an export-oriented economy, suffered when the Swiss Franc, perceived as a safe haven during crisis times, appreciated to historical levels and the central bank was forced to establish an unprecedented exchange rate floor to assist the ailing national export sector. Singapore, an FDI and foreign capital driven city-state, was very careful with monetary stimulus during the crisis and had to gradually tighten its exchange rate policy arm already in 2010 in order to preserve medium-term price stability for a healthy climate in its highly commercialized, vibrant financial ecosystem.

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Chapter 4

THE FORECASTS ACCURACY DURING THE ECONOMIC CRISIS AND STRATEGIES TO IMPROVE IT

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THE FORECASTS ACCURACY DURING THE ECONOMIC CRISIS AND STRATEGIES TO IMPROVE IT

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Abstract

In crisis periods many malfunctions affect the economic environment. The forecasting process is also influence by the negative evolution of the macroeconomic variables. It is hard to predict the economic behavior of many indicators because of the lack of stability of the economic world. It is clear that the forecasts accuracy decreases during the crisis periods, this phenomenon being seen in the activity of international institutions specialized in providing macroeconomic forecasts for different countries or regions. Therefore, we try to solve this problem, by finding suitable strategies or ways of improving the predictions accuracy during the economic crisis. We will start from the forecasts made by international institutions.

Keywords: forecasts accuracy, economic crisis, inflation.

4.1 Introduction

A question that researchers seldom consider is how and why the accuracy is affected by macroeconomic conditions (crisis period and pre-crisis times). First of all, the uncertainty characterizes any evolution of an economic phenomenon, because there are always random factors that generate a deviation of the phenomenon from its rational and foreseeable evolution. These factors are present in pre-crisis periods, but also in crisis times. The political decisions, the options for a certain monetary or fiscal policy, the changes in international environment (even a war or a revolution) are some examples of factors that increase the uncertainty in the forecasting process and consequently diminish the predictions accuracy. In crisis periods some new factors can action and they create a turbulent macroeconomic environment. An important problem is that the experts do not know when the crisis would finish. Therefore, the uncertainty grows, because some of them will choose as hypothesis the continuation of the crisis and others its stop. Each macroeconomic indicator is seen in relation with other indicators. The changes in one variable will generate important changes in the others. The interdependences from the variables in the economy are one important reason for which the macroeconomic conditions influence the accuracy of the predictions. For example, European Central Bank (ECB) sets its official interest rate in accordance with the average inflation measured in the Euro area. The uncertainty specific to each economic process, that increases more in crisis times affects the forecasts accuracy. There is a high correlation between inflation and money, but this is valid only in the long run.

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On the other hand, the presence of the researcher in the macroeconomic system as an observatory and predictions developer is an element of uncertainty that could not be quantified, but it contributes to the accuracy reduction. So, macroeconomic conditions really affect the forecasting process and consequently the forecasts accuracy.

The inflation rate is a key macroeconomic indicator, its predictions being a priority for banks, government, companies and even for the consumers. The expectations regarding inflation are necessary for targeting inflation or establishing monetary policy. For financial environment the inflation rate forecasts are important in order to minimize risk factors. According to Buelens (2012) inflation forecasting must take into account the economic relationships, the data, the econometric tools, but we can add the macroeconomic conditions and the experts' expectations.

The most used criterion in choosing the best forecast is the accuracy of predictions. This is one dimension of the forecasts performance. If we have more alternative predictions for the same variable we will chose the one with the highest accuracy. We can even grow the accuracy of this forecast by applying a suitable strategy of improving it.

We propose to find out which institution succeeded in getting the most accurate predictions during the actual economic crisis. Some strategies of increasing the accuracy are applied in order to recommend a certain method suitable to an institution or to another one. This actual trend in improving the forecasting process is a very good starting point for the future predictions in crisis period.

4.2 The actual tendencies in assessing the forecasts accuracy

Recent studies are oriented in three directions: accuracy analysis when different models are used in making predictions, comparisons of forecasts made by different international institutions using the accuracy criterion, and analysis of forecasted values for the same macroeconomic indicators registered in several countries.

Many articles have dealt with the problem of comparing the measures of accuracy, contributions in the field being brought by: Leith and Tanner, 1990; Makridakis, 1993; Yokum and Armstrong, 1995; Tashman, 2000; Makridakis and Hibon, 2000; Koehler, Martin and Witt, 2002, Hyndman, 2006; Witt, 2002; Dovern and Weisser, 2011. Meese and Rogoff's paper, "Empirical exchange rate models of the seventies" from 1980, remains the starting point for many researches on the comparing of accuracy measures.

Most international institutions provide their own macroeconomic forecasts. It is interesting that many researchers compare the predictions of those institutions (Melander for European Commission, Vogel for OECD, Timmermann for IMF) with registered values and those of other international organizations, but it is omitted the comparison with official predictions of government.

Abreu (2011) evaluated the performance of macroeconomic forecasts made by IMF, European Commission and OECD and two private institutions (Consensus Economics and The Economist). The author analyzed the directional accuracy and the ability of predicting an eventual economic crisis. Österholm (2012) estimated the probability of USA recession using a Bayesian VAR model. A low value of the probability was gotten, even when the model was combined with experts' expectations. Allan (2012) obtained a good accuracy for the OECD forecasts combined with outturn values of GDP

growth for G7 countries between 1984 and 2010. The same author mentioned two groups of accuracy techniques used in assessing the predictions: quantitative forecasts accuracy statistics and qualitative accuracy methods. In our study we are interested by the first category of techniques that is used to evaluate the accuracy of an institution or to compare the accuracy of different predictions. Armstrong and Fildes (1995) showed that it is not sufficient to use a single measure of accuracy. In literature, there are several traditional ways of measurement. A complete classification is made by Hyndman and Koehler (2005) in a study called "Another Look at Measures of Forecast Accuracy ":

- Scale-dependent measures;
- Scale-independent errors;
- Free-scale error metrics.

Some measures are used to evaluate independently the forecasts accuracy and others are utilized to compare predictions in terms of accuracy. If we consider, $\hat{X}_t(k)$ the predicted value after k periods from the origin time t, then the error at future time (t+k) is: $e_t(t+k)$. This is the difference between the registered value and the predicted one.

The most utilized indicators for evaluating the forecasts accuracy are:

- Root Mean Squared Error (RMSE)

Equation 1 Formula for mean error

$$RMSE = \sqrt{\frac{1}{n}\sum_{j=1}^{n} e_X^2(T_0 + j, k)}$$

- Mean error (ME)

Equation 2 Formula for mean absolute error

$$ME = \frac{1}{n}\sum_{j=1}^{n} e_X(T_0 + j, k)$$

The sign of indicator value provides important information: if it has a positive value, then the current value of the variable was underestimated, which means expected average values too small. A negative value of the indicator shows expected values too high on average.

- Mean absolute error (MAE)

Equation 3 Formula for root mean squared error

$$MAE = \frac{1}{n}\sum_{j=1}^{n} \left| e_X(T_0 + j, k) \right|$$

These measures of accuracy have some disadvantages. For example, RMSE is affected by outliers. Armstrong and Collopy stresses that these measures are not independent of the unit of measurement, unless if they are expressed as percentage. If we have two forecasts with the same mean absolute error, RMSE penalizes the one with the biggest errors.

A common practice is to compare the forecast errors with those based on a random-walk. "Naïve model" method assumes that the variable value in the next period is equal to the one recorded

at actual moment. Theil proposed the calculation of U statistic that takes into account both changes in the negative and the positive sense of an indicator:

Equation 4 Formula for U Theil's statistic

$$U = \sqrt{\frac{\sum (X_{t+k} - \hat{X}_t(k))^2}{\sum X_{t+k}^2}}.$$

U Theil's statistic can be computed in two variants, specified also by the Australian Tresorery. The following notations are used:

a - the registered results;
p - the predicted results;
t - reference time;
e - the error (e=a-p);
n - number of time periods.

Equation 5 Formula for U1:

$$U_1 = \frac{\sqrt{\sum_{t=1}^{n} (a_t - p_t)^2}}{\sqrt{\sum_{t=1}^{n} a_t^2} + \sqrt{\sum_{t=1}^{n} p_t^2}}$$

A value close to zero for U_1 implies a higher accuracy.

Equation 6 Formula for U2:

$$U_2 = \sqrt{\frac{\sum_{t=1}^{n-1} \left(\frac{p_{t+1} - a_{t+1}}{a_t}\right)^2}{\sum_{t=1}^{n-1} \left(\frac{a_{t+1} - a_t}{a_t}\right)^2}}$$

If U_2 =1=> there are not differences in terms of accuracy between the two forecasts to compare

If U_2 <1=> the forecast to compare has a higher degree of accuracy than the naive one

If U_2 >1=> the forecast to compare has a lower degree of accuracy than the naive one

4.3 Assessing the accuracy of euro area forecasts for the inflation rate

Assessing the inflation forecasts accuracy is an important measure of the monetary policy credibility. The importance grows in period with large shocks. Since the autumn of 2008, large economic and financial shocks affect the Euro Area. The actual financial crisis, the Lehman bankruptcy and tensions on some sovereign debt markets amplified the uncertainty of inflation forecasting process.

In this study we evaluate the accuracy of inflation rate forecasts in Euro Area made by Economic Consensus, OECD, European Commission and Survey of Professional Forecasters, in

2004-2011. From mid-2003 to mid-2007 there was a period of the stability of the inflation rate, the predictions provided by the institutions being close to 2%. Excepting energy and food, the prices evolution was quite stable and normal conditions of forecasting were considered. Since mid-2007, the uncertainty coming from the macroeconomic environment increased, the crisis started in 2008 generating a continuous amplification of it. The banks from Euro area borrowed too much in pre-crisis periods, counting on an expected rise of assets prices. But when the assets price fell the banks tried to reduce the leverage, fact really difficult when many financial institutions sought to sell risky assets at the same time. This problem increased the banks' lack of solvency. Practically, the financial crisis brought the problem of insolvency and in Euro Area the governments of the members had to increase fiscal deficits and offer guarantees to banks, taking over the problem of insolvency. According to Boone and Johnson (2011), for some countries in the Euro Area the situations seems to be that of an emerging country with debts in the foreign currency. In crisis periods the institutions, according to Buelens (2012*),* introduce a large degree of uncertainty in their expectations regarding the future evolution of macroeconomic indicators.

As we have seen, these macroeconomic conditions influence the inflation rate in the Euro Area. On the other hand, the inflation the money is a cause of inflation on long run and the official interest rate is set in accordance with the inflation evolution. These dependences between variables in the economic system determine us to evaluate the accuracy of inflation forecasts taking into account the macroeconomic environment. Actually, in evaluating the predictions accuracy two periods are considered: the period before the crisis (2004-2007) and the period during the crisis (2008-2011). Data are available on the website of the European Central Bank.

For the first four years in the forecasting horizon accuracy indicators are assessed. To select the institution that provided the best forecasts on the horizon 2004-2007 taking into account at the same time all computed measures of accuracy, two methods of multi-criteria ranking (ranks method and the method of relative distance with respect to the maximal performance) are used.

Ranks method application supposes several steps:

1. Ranks are assigned to each value of an accuracy indicator (the value that indicates the best accuracy receives the rank 1);
   The statistical units are the four institutions that made forecasts. The rank for each institution is denoted by: $(r_{i_{ind_j}})$, i=1,2,3,4 and ind_j –accuracy indicator j. We chose 5 indicators: mean error, mean absolute error, root mean squared error, U1 and U2.
2. If the ranks assigned to each institution are sum up, the score to each of them is computed.
   Equation 7 Formula for the sum of ranks:

$$S_{i=\sum_{j=1}^{5}(r_{i_{ind_j}})}, \text{ i =1, 2, 3, 4}$$

3. The institution with the lowest score has the highest performance and it will get the final rank 1.

The method of relative distance with respect to the maximal performance is the second way of ranking.

For each accuracy indicator the distance of each statistical unit (institution) with respect to the one with the best performance is computed. The distance is calculated as a relative indicator of coordination:

Equation 8 Formula for the relative distance:

$$d_{i\,ind_j} = \frac{ind_i^j}{\{\min ind_i^j\}_{i=1,..,4}}, \text{ i = 1, 2, 3, 4 and j = 1, 2, .., 5}$$

The relative distance computed for each institution is a ratio, where the denominator is the best value for the accuracy indicator for all institutions.

The geometric mean for the distances of each institution is calculated, its significance being the average relative distance for institution i.

Equation 9 Formula for the average relative distance:

$$\overline{d_i} = \sqrt[5]{\prod_{j=1}^{5} d_{i\,ind_j}}, \text{ i = 1, 2, 3, 4}$$

According to the values of average relative distances, the final ranks are assigned. The institution with the lowest average relative distance will take the rank 1. The position (location) of each institution with respect to the one with the best performance is computed as: its average relative distance over the lowest average relative distance.

Equation 10 Formula for the position of each statistical unit in the hierarchy

$$loc_i^{\%} = \frac{\overline{d}_i}{\min(d_i)_{i=\overline{1,4}}} \cdot 100$$

Table 4.1 Measures of forecasts accuracy for the inflation rate of Euro area before the crisis period (2004-2007)

Accuracy Indicator	Consensus Economics	European Commission	OECD	SPF
ME	0.225	0.150	0.250	0.175
MAE	0.325	0.300	0.350	0.275
RMSE	0.350	0.308	0.367	0.287
U1	0.025098	0.024635	0.037882	0.024804
U2	1.702	1.492	1.801	1.402

Note: Author's computations using Excel

The best predictions are provided by the European Commission, followed by SPF and Consensus Economics, due to the lower values of U1. All the predictions are less accurate than the naïve ones, because U2 is greater than 1.

The two methods of multi-criteria ranking are applied in order to take into account all the values of the computed accuracy indicators.

For both ranking methods the same results were gotten. So, if we take into consideration all the mentioned accuracy measures at the same time, the following ranking resulted: SPF, European Commission, Consensus Economics and OCDE. The first and the second position are swapped if we consider only the U1 indicator.

According to U1 indicator, used in making comparisons, the best forecasts are those made by SPF, followed by European Commission, Consensus Economics and OCDE. Excepting the SPF predictions, all are better than the naïve forecasts.

Table 4.2 Ranks of institutions according to the accuracy measures (ranking method) before the crisis period (2004-2007)

Criteria	Consensus Economics	European Commission	OECD	SPF
ME	3	1	4	2
MAE	3	2	4	1
RMSE	3	2	4	1
U1	3	1	4	2
U2	3	2	4	1
Sum of ranks	15	8	20	7
Final ranks	3	2	4	1

Note: Author's computations using Excel

Table 4.3 Ranks of institutions according to the accuracy measures (method of relative distance with respect to the best institution) before the crisis period (2004-2007)

Criteria	Consensus Economics	European Commission	OECD	SPF
ME	1.50000	1.00000	1.66667	1.16667
MAE	1.18182	1.09091	1.27273	1.00000
RMSE	1.21854	1.07309	1.27920	1.00000
U1	1.01881	1.00000	1.53776	1.00687
U2	1.21419	1.06421	1.28528	1.00000
Average relative distance	1.21723	1.04494	1.39921	1.03272
Ranks	3	2	4	1
Location (%)	117.86597	101.18278	135.48741	100.00000

Note: Author's computations using Excel

Indeed, the accuracy of forecasts during the crisis decreased for all institutions. The highest decrease was registered by the Consensus Economics (a decrease with 226.72%) and the lowest decrease was computed for SPF (a decrease of only 69.33%). So, SPF improved the most its forecasting activity, being the one that provided the most realistic estimations during the crisis.

The forecasts accuracy is assessed during the crisis period, for a horizon of another 4 years (2008-2011).

Table 4.4 Measures of forecasts accuracy for the inflation rate of Euro area during the crisis period (2008-2011)

Accuracy indicator	Consensus Economics	European Commission	OECD	SPF
ME	0.225	0.175	0.325	-2.875
MAE	0.275	0.225	0.525	3.425
RMSE	0.371	0.278	0.733	6.216
U1	0.082	0.057	0.165	0.042
U2	0.124	0.163	0.295	9.151

Note: Author's computations using Excel

It is interesting that Consensus Economics kept the same value of the mean error for crisis period as for pre-crisis time (the same length of forecasting horizon). For the other institutions the mean error grew, the highest decrease being registered for SPF with 1542.87 percentage points in absolute value. Surprisingly, for Consensus Economics and European Commission the mean absolute error decreased in crisis period with respect to last pre-crisis years. European Commission is the single institution for which RMSE registered a decrease in 2008-2011. Consensus Economics, OECD and European Commission forecasts were better than the naïve ones in crisis years in contrast to ante-crisis years. The U1 indicators used in making comparisons shows a lower degree of accuracy for all institutions during the crisis with respect to the previous period. This conclusion is a proof of the supplementary uncertainty that characterizes the economy in crisis period. Actually, the uncertainty includes the rise of Euro Area debt and an anticipated increase in global prices of energy generated by political tensions. The high sovereign debt associated with the fragility of financial system, the turmoil on the financial market are tendencies that add a shadow in forecasting process, the experts could not had a better appreciation of the future evolution of the inflation rate in Euro Area. This uncertainty is reflected well by our methods from quantitative point of view, because higher values were registered for U1 statistics.

The two methods of multi-criteria ranking are applied to search the hierarchy of institution using as criterion the accuracy of forecasts during the crisis period.

Table 4.5 Ranks of institutions according to the accuracy measures (ranking method) during the crisis period (2008-2011)

Criteria	Consensus Economics	European Commission	OCDE	SPF
ME	2	1	3	4
MAE	2	1	3	4
RMSE	2	1	3	4
U1	3	2	4	1
U2	2	3	1	4
Sum of ranks	11	8	14	17
Final ranks	2	1	3	4

Note: Author's computations using Excel

According to ranking method, the best forecasts during the crisis are made by European Commission. The hierarchy continues with Consensus Economics, OCDE and SPF.

The same hierarchy is gotten using the method of relative distance with respect to the best institution. Actually, the SPF which was the first according to U1 criterion comes on the last position when multi-criteria ranking are applied.

To make comparisons between forecasts we propose a new methodology that was not mentioned before in literature. This method is based on logistic regression.

Logistic regression measured the impact of more independent (exogenous) characteristics that appear simultaneously in order to predict membership of one or other category of the two dependent characteristics. The dependent variable is categorical and the exogenous ones are categorical or a mix of continuous and categorical.

Table 4.6 Ranks of institutions according to the accuracy measures (method of relative distance with respect to the best institution) during the crisis period (2008-2011)

Criteria	Consensus Economics	European Commission	OECD	SPF
ME	1.28571	1.00000	1.85714	16.42857
MAE	0.08029	0.06569	0.15328	1.00000
RMSE	0.05966	0.04479	0.11795	1.00000
U1	1.42366	1.00000	2.87789	0.73296
U2	0.01352	0.01786	0.03224	1.00000
Average relative distance	0.16398	0.13936	0.31529	1.64489
Ranks	2	1	3	4
Location (%)	9.96924	8.47224	19.16773	100.00000

Note: Author's computations using Excel

There some important advantages of the logistic or multinomial regression: some assumptions are not taken into consideration (the errors non-correlation, the normality or homoscedasticity of the independent variables). However, the maximum likelihood estimation method is used instead of ordinary least squares.

The dependent variable takes values between 0 and 1 and the independent one (X) takes real values. With p is denoted the probability that a case is in a certain category. The odds ratio of an event (likelihood ratio) are p/(1-p). The log of the odds ratio is $ln\frac{p}{1-p} = b_0 + b_1X + \varepsilon$. The parameters that should be estimated are $b_0\ and\ b_1$. The error is denoted by ε.

The p is determined as: $p = \frac{e^{b_0+b_1X+\varepsilon}}{1+e^{b_0+b_1X+\varepsilon}}$. The estimated of the parameters are: $\widehat{b_0}\ and\ \widehat{b_1}$.

An odds ratio (OR) equaled to one shows that if X increase by an unit, the odds remain the same. In other words, X does not influence the dependent variable Y.

An OR higher than 1 implies the following: an increase by one unit in the exogenous variable determines a growth by $e^{\widehat{b_1}}$ in the level of the dependent variable. If OR is lower than 1, we will have a decrease by $e^{\widehat{b_1}}$ in the dependent variable.

We calculate the absolute errors for each year in the forecasting horizon. We test is each error differs significantly from a fixed value. We choose a threshold of 0.2, which is the minimum value in the errors data series. A binary variable is created:

$$\text{error\_significance} = \begin{cases} 1, & significant\ error \\ 0, & non-significant\ error \end{cases}$$

A logistic regression is built starting from this binary variable and the predictions made by an institution. For each forecasted value of the inflation rate we associated the significance of the error.

The regression equation is done by the table from SPSS outputs called: "Variables in the Equation". The tables from SPSS are presented in *Appendix 1*. We got the following equations for the period under the crisis:

Table 4.7 Logistic regression models for the four institutions before the crisis

Institution	Equation
Consensus Economics	$\ln(ODDS_{Consensus}) = -0.936 + 1.584 \cdot er1\_s$
European Commission	$\ln(ODDS_{Commission}) = -0.745 + 1.259 \cdot er1\_s$
OECD	$\ln(ODDS_{OCDE}) = -0.926 + 1.653 \cdot er1\_s$
SPF	$\ln(ODDS_{SPF}) = -0.873 + 1.349 \cdot er1\_s$

Note: Author's computations using SPSS software

Table 4.8 Logistic regression models for the four institutions during the crisis

Institution	Equation
Consensus Economics	$\ln(ODDS_{Consensus}) = -0.766 + 2.667 \cdot er1\_s$
European Commission	$\ln(ODDS_{Commission}) = -0.694 + 2.359 \cdot er1\_s$
OECD	$\ln(ODDS_{OCDE}) = -0.496 + 3.04 \cdot er1\_s$
SPF	$\ln(ODDS_{SPF}) = -0.594 + 2.368 \cdot er1\_s$

Note: Author's computations using SPSS software

The models are used to predict the odds that a certain institution will get a non-significant error. The odds of having significant errors for the Consensus Economics predictions are 2.483 times higher than the odds of having non-significant errors. Ordering the institutions according to the odds values, the following hierarchy is presented: European Commission, SPF, Consensus Economics and OECD. This is the same classification as that determined using as criterion the values of U1 statistic.

The SPF chances of getting significant errors grow with 259,8% during the crisis, the odds being the lowest. For OECD the odds of significant errors increase by 4,237 times with respect to the case of non-significant errors. The hierarchy is the same with the one proposed by applying U1 criterion.

All the applied methods conduct us to the same conclusion: the global economic conditions of crisis are reflected also in forecasting process by a decrease of inflation rate forecasts accuracy for all mentioned institutions. The financial instabilities in Euro Area introduced the highest uncertainty in SPF forecasts. In normal crisis this institution surprised the best the future evolution of inflation rate in Euro Area, but sovereign debt and the shocks that generated a permanent instability of the economic and financial environment affected in the highest degree the forecasting process. The SPF experts' expectations seemed to be quite far from the future reality. Therefore, a very good revision of the forecasting methods is required for this institution to take into account more realistic assumptions regarding the evolution of the inflation in Euro Area.

4.4 Strategies to improve the accuracy of euro area forecasts for the inflation rate in the actual crisis period

Heilemann and Stekler (2007) explain why macroeconomic forecasts accuracy in the last 50 years in G7 has not improved. The first explanation refers to the critic brought to macro-econometrics models and to forecasting models, and the second one is related to the unrealistic expectations of forecast accuracy. Problems related to the forecasts bias, data quality, the forecast process, predicted indicators, the relationship between forecast accuracy and forecast horizon are analyzed.

The researchers were not interested in proposing strategies to improve the accuracy of different institutions. We consider this a priority, especially in times of crisis. A certain strategy that provided very good results in last years could be used for the following predictions.

Many studies in literature refer to the combining of two methods based on the same model (such as e.g. bayesian mediation model), but French and Insura point out that a combination between model predictions and expert assessments was rarely proposed.

Bratu (2012) utilized some strategies to improve the forecasts accuracy (combined predictions, regressions models, historical errors method, application of filters and exponential smoothing techniques).

We will build new predictions for the crisis period, keeping the values of the accuracy indicators registered in the previous period (2004-2007). The formulas for calculating new forecasted values are presented by Bratu (2012):

Equation 11 Formulae for new predicted values keeping the historical values of forecasts accuracy:

$$ME = X_{t+1} - X_t \Rightarrow X_{t+1} = ME + X_t$$
$$MAE1 = X_{t+1} - X_t \Rightarrow X_{t+1} = MAE1 + X_t$$
$$MAE2 = -X_{t+1} + X_t \Rightarrow X_{t+1} = -MAE2 + X_t$$
$$RMSE^2 = X_{t+1} - X_t \Rightarrow X_{t+1} = RMSE^2 + X_t$$

The combined forecasts are another possible strategy of getting more accurate predictions. The most utilized combination approaches are:

- optimal combination (OPT);
- equal-weights-scheme (EW);
- inverse MSE weighting scheme (INV).

Bates and Granger (1969) started from two forecasts f1;t and f2;t, for the same variable Xt, derived h periods ago. If the forecasts are unbiased, the error is calculated as: $e_{i,t} = X_{i,t} - f_{i,t}$. The errors follow a normal distribution of parameters 0 and σ_i^2. If ρ is the correlation between the errors, then their covariance is $\sigma_{12} = \rho \cdot \sigma_1 \cdot \sigma_2$. The linear combination of the two predictions is a weighted average: $c_t = m \cdot f_{1t} + (1-m) \cdot f_{2t}$.The error of the combined forecast is: $e_{c,t} = m \cdot e_{1t} + (1-m) \cdot e_{2t}$ .The mean of the combined forecast is zero and the variance is: $\sigma_c^2 = m^2 \cdot \sigma_1^2 + (1-m)^2 \cdot \sigma_{2t}^2 + 2 \cdot m \cdot (1-m) \cdot \sigma_{12}$. By minimizing the error variance, the optimal value for *m* is determined (m_{opt}):

Equation 12 Formula for the optimal value of *m*:

$$m_{opt} = \frac{\sigma_2^2 - \sigma_{12}}{\sigma_1^2 + \sigma_2^2 - 2 \cdot \sigma_{12}}$$

The individual forecasts are inversely weighted to their relative mean squared forecast error (MSE) resulting INV. In this case, the inverse weight (m_{inv}) is:

Equation 13 Formula for the inverse weight:

$$m_{inv} = \frac{\sigma_2^2}{\sigma_1^2 + \sigma_2^2}$$

Equally weighted combined predictions (EW) are gotten when the same weights are given to all models. The weigh "m" is determined by calculating the variances and covariance with a simple analyze of covariance provided by statistical software, for example EViews program.

Another technique used by Bratu (Simionescu) (2013) to improve the forecasts accuracy is the application of filters to the predicted data. The author recommends also the use of exponential smoothing methods like Holts Winters. The Hodrick–Prescott (HP) filter is very used in macroeconomics to extract the trend of the data series and separate the cyclical component of the time series. The smoothed data gotten are more sensitive to long term changes. Razzak **(**1997) proved that the Hodrick-Prescott filter acts as true `filter' at the end of the sample and as a `smoother' over the sample. The output gap from the true filter generates better out-of-sample predictions of inflation. Another econometric filter is Band-Pass filter. Christiano & Fitzgerald (2003) explained that Band-Pass filter is used to determine that component of the chronological series that is situated within a specific band of frequencies. Christiano-Fitzegerald filter (CF filter) is an asymmetric one and it converges on long run to an optimal filter. It has a steep frequency response function at the limits of the band.

Holt-Winters Simple exponential smoothing method is recommended for data series with linear trend and without seasonal variations, the forecast being determined as: We will get new predictions applying the proposed strategies of improving the forecasts accuracy. We will check this assumption by computing U1 and U2 statistics used in making comparisons. The new one-step-ahead forecasts for each year of economic crisis based on historical errors method are presented in the following tables:

Table 4.9 Predictions based on historical errors method for 2008 (in %)

Criteria	Consensus Economics	European Commission	OECD	SPF
ME	3.6	3.1	3.76667	3.26667
MAE1	3.28182	3.19091	3.37273	3.1
MAE2	0.91818	1.00909	0.82727	1.1
RMSE	3.584839732	3.251522148	3.736353	3.1

Note: Author's computations using Excel

For 2008 the predictions based on MAE2 are the lowest for all institutions, the other methods providing inflation rates between 3.1 and approximately 3.77%.

For 2009 the historical error method shows clearly an increase in the inflation rate, a good anticipation in crisis period. OECD prediction based on mean error indicator was the largest. MAE2 provided again the lowest values of the inflation rate, but a little higher than the values predicted for 2008.

Table 4.10 Predictions based on historical errors method for 2009 (in %)

Criteria	Consensus Economics	European Commission	OECD	SPF
ME	4.8	4.3	4.96667	4.46667
MAE1	4.48182	4.39091	4.57273	4.3
MAE2	2.11818	2.20909	2.02727	2.3
RMSE	4.784839732	4.451522148	4.936353	4.3

Note: Author's computations using Excel

Table 4.11 Predictions based on historical errors method for 2010 (in %)

Criteria	Consensus Economics	European Commission	OECD	SPF
ME	1.8	1.3	1.96667	1.46667
MAE1	1.48182	1.39091	1.57273	1.3
MAE2	0.88182	0.79091	0.97273	0.7
RMSE	1.784839732	1.451522148	1.936353	1.3

Note: Author's computations using Excel

For 2011 the historical errors method generated a decrease of predicted inflation for all institutions. The values for this year are lower than those predicted for 2008. So, this method anticipated the improvement of the economic situation, fact that proved not to be in accordance with the real economic conditions.

Table 4.12 Predictions based on historical errors method for 2011

Criteria	Consensus Economics	European Commission	OECD	SPF
ME	3.1	2.6	3.26667	2.76667
MAE1	2.78182	2.69091	2.87273	2.6
MAE2	0.41818	0.50909	0.32727	0.6
RMSE	3.084839732	2.751522148	3.236353	2.6

Note: Author's computations using Excel

U1 and U2 statistics are computed in order to compare these predictions with the ones published by the four institutions for the crisis period.

Table 4.13 U1 values for the predictions during the crisis

Criteria	Consensus Economics	European Commission	OECD	SPF
ME	0.0346	0.0094	0.0477	0.0061
MAE1	0.0075	0.0008	0.0155	0.0094
MAE2	0.3227	0.3056	0.3398	0.2887
RMSE	0.0334	0.0047	0.0454	0.0094

Note: Author's computations using Excel

The most accurate predictions during the crisis are those made using the historical MAE1 indicator starting from European Commission expectations with a value of only 0,0008 for U1. On the

other hand, MAE2 method provided the less accurate forecasts, OECD predictions using this technique being the worst.

Table 4.14 U2 values for the predictions during the crisis

Criteria	Consensus Economics	European Commission	OECD	SPF
ME	0.3420	0.3488	0.4240	0.2965
MAE1	0.2940	0.3151	0.2884	0.3488
MAE2	0.6771	0.7233	0.6352	0.7729
RMSE	0.3360	0.2994	0.4074	0.3488

Note: Author's computations using Excel

We got improvements in accuracy for three of the institutions for certain accuracy measures: European Commission (ME, MAE1, RMSE), OCDE (MAE1), and SPF (all indicators). All the new forecasts made starting from SPF expectations are better than the naïve ones. It is certain that the historical error method is a very good strategy for improving SPF forecasts.

The forecasts belonging to the four institutions will be denoted by f1 (Consensus Economic forecast), f2 (European Commission forecast), f3 (OECD forecast) and f4 (SPF forecast). The U1 and U2 statistics for combined forecasts built using the three schemes are presented in the following tables.

Table 4.15 U1 values for the predictions based on OPT scheme before and during the crisis

Forecasting horizon	f1+f2	f1+f3	f1+f4	f2+f3	f2+f4	f3+f4
2004-2007	0.1026	0.0956	0.0961	0.0997	0.0944	0.1081
2008-2011	0.1755	0.0783	0.0806	0.0973	0.0575	0.1577

Note: Author's computations using Excel

All the combined predictions are better than the naïve forecasts, but when OPT scheme was applied the accuracy did not increase before the crisis. Some predictions during the crisis are better than those proposed by Consensus Economics and OECD. These are the following combined forecasts: f1+f3, f2+f4, which are better than Consensus Economics expectations and f1+f3, f1+f4, f2+f3, f2+f4 and f3+f4 that are more accurate than OECD estimations.

The historical errors method generated better predictions than all the combined ones during the crisis, excepting the MAE2 method.

Table 4.16 U1 values for the predictions based on INV scheme before and during the crisis

Forecasting horizon	f1+f2	f1+f3	f1+f4	f2+f3	f2+f4	f3+f4
2004-2007	0.0953	0.1019	0.0961	0.1013	0.0944	0.1083
2008-2011	0.0702	0.1201	0.0807	0.1097	0.0576	0.1599

Note: Author's computations using Excel

The combined forecasts based on INV scheme before the crisis is not better than the four institutions estimations. All the combined predictions during the crisis are more accurate than OECD results. Only some types of combined forecasts are better than the inflation values published by Consensus Economics (f1+f2, f1+f4, f2+f4).

Table 4.17 U1 values for the predictions based on EW scheme before and during the crisis

Forecasting horizon	f1+f2	f1+f3	f1+f4	f2+f3	f2+f4	f3+f4
2004-2007	0.0948	0.1053	0.0955	0.1050	0.0947	0.1016
2008-2011	0.0638	0.1427	0.0565	0.1374	0.0492	0.0824

Note: Author's computations using Excel

If the EW scheme is applied the accuracy is not improved before the crisis. A considerable improvement can be seen during the crisis period. Some predictions (f1+f2, f1+f4, f2+f4) outperformed Consensus Economics forecasts. All the combined predictions are better than the OECD estimations.

Table 4.18 U2 values for the predictions based on OPT scheme before and during the crisis

Forecasting horizon	f1+f2	f1+f3	f1+f4	f2+f3	f2+f4	f3+f4
2004-2007	0.2665	0.4323	0.4323	0.4723	0.4917	0.4359
2008-2011	0.2838	0.1173	0.2331	0.2104	0.2931	0.2870

Note: Author's computations using Excel

The values of U2 show us that all the combined predictions are better than the naïve ones before and during the crisis, if the OPT scheme is applied.

Table 4.19 U2 values for the predictions based on INV scheme before and during the crisis

Forecasting horizon	f1+f2	f1+f3	f1+f4	f2+f3	f2+f4	f3+f4
2004-2007	0.4613	0.4341	0.4323	0.4655	0.4927	0.4359
2008-2011	0.1382	0.2006	0.2149	0.2254	0.1670	0.2135

Note: Author's computations using Excel

If the INV scheme is chosen, all the combined forecasts are better than the naïve ones, but the estimations during the crisis are even better than those before 2008.

Table 4.20 U2 values for the predictions based on EW scheme before and during the crisis

Forecasting horizon	f1+f2	f1+f3	f1+f4	f2+f3	f2+f4	f3+f4
2004-2007	0.4779	0.4351	0.4311	0.4507	0.4610	0.4329
2008-2011	0.1499	0.2475	4.6717	0.2598	4.6517	4.6243

Note: Author's computations using Excel

The combined forecasts based on EW scheme from 2004-2007 outperform the predictions based on random walk. During the crisis only some combined predictions are more accurate than the naïve ones (f1+f2, f1+f3 and f2+f3).

The combined predictions and those based on the historical errors method succeeded in providing better forecasts than the naïve ones for all institutions.

New predictions were gotten applying Hodrick-Prescott (HP), Baxter-King (BK) and Christiano-Fitzegerald (CF) filters. On the other hand, other forecasts were built by using Holt-Winters smoothing technique. The four new predictions will be denoted by p1, p2, p3 and p4. U1 and U2 statistics are computed for these forecasts during the crisis period.

Table 4.21 U1 and U2 values for the transformed predictions using filters and Holt-Winters technique in crisis period

P1	Consensus Economics	European Commission	OECD	SPF
U1	0.1286	0.1214	0.1720	0.2189
U2	0.2475	0.2554	0.2729	2.6534
P2	Consensus Economics	European Commission	OECD	SPF
U1	0.3888	0.3542	0.4164	0.4346
U2	1.1174	1.1984	1.1001	5.0614
P3	Consensus Economics	European Commission	OECD	SPF
U1	0.2884	0.3542	0.3378	0.3126
U2	0.8143	1.1984	0.8520	6.2126
P4	Consensus Economics	European Commission	OECD	SPF
U1	0.1525	0.1512	0.2258	0.1240
U2	0.2244	0.2300	0.3618	1.7242

Note: Author's computations using Excel

The filters and Holt-Winters appliance to the initial predictions provided by the four institutions did not improve the accuracy. However, some of the new forecasts are better than the naïve ones: transformed Consensus Economics, European Commission and OECD forecasts when HP, CF and Holt-Winters methods are used. For SPF the Holt-Winters technique forecasts outperform the predictions based on filters. For the other institutions HP filter provided the most accurate predictions in the category of forecasts based on filters and Holt-Winters method. The results are rational, the failure of SPF forecasts being caused by difficulties of anticipating the crisis in its real dimension and some seasonal factors specific to the economic downturn.

4.5 Conclusion

In making decisions related to government policies we must take into account the macroeconomic forecasts. Therefore, the accuracy evaluation of more forecasts made for the same macroeconomic indicator by more institutions and the choice of the best of these are an important step that condition the choice of the best government policy.

The macroeconomic conditions do influence the forecasts accuracy, because the economy phases are affected by a higher or lower degree of uncertainty. The stability that characterizes the economy in periods of growth reduces the uncertainty and this implies a higher accuracy in predicting an economic phenomenon. On the other hand, in crisis periods the further evolution is not too clear, the uncertainty increases, some of the experts are pessimistic while others are optimist. It is clear stated that during the actual crisis, for 2008-2011 the forecasts accuracy for the inflation rate in Euro Area provided by four international institutions decreased with respect to the previous pre-crisis years (2004-2007). However, some institutions succeeded in improving some of the accuracy indicators during the crisis, but the overall result translates into a growth of uncertainty in forecasting macroeconomic variables during the economic and financial crisis.

Some new methodologies of comparing the forecasts accuracy were proposed, these methods never being specified in literature in the context of accuracy assessment. The multi-criteria ranking is a good way of measure the accuracy when more measures are taking into account. The

binary logistic regression gave the same results as U1 indicators regarding the institutions hierarchy for the forecasts accuracy.

The diversity of the methodologies applied to draw the same conclusion is a technique that comes to emphasize a very important aspect. If all the applied methods conduct us to the same conclusion it is clear that the behavior of the phenomenon is specific to that period. All the methods put in evidence the decrease of the overall accuracy during the crisis, fact that determine us to conclude that indeed the economic conditions influence the forecasting process by a decrease of accuracy in crisis periods.

After our research we can conclude that some strategies of improving the forecasts accuracy gave very good results for annual inflation rate in Euro Area. Combined predictions is a good strategy only for crisis period for Consensus Economics when OPT, INV and EW schemes are applied and for OECD when OPT and INV approaches are utilized.

For SPF predictions the best method of improving the accuracy is the historical accuracy method, when classical types of errors are used (ME, MAE1, MAE2 and RMSE). We got improvements in accuracy for three of the institutions for certain accuracy measures: European Commission (ME, MAE1, RMSE), OCDE (MAE1), and SPF (all indicators).

The application of filters or Holt-Winters technique did not give good results for the improvement of accuracy. A cause of this situation might be that the uncertainty affects even the tendency evolution of the indicator.

For USA, Bratu (2012) established that the historical errors method is the best strategy to improve the macroeconomic forecasts accuracy. This hypothesis seems to be checked also fir Euro Area inflation during the crisis period. A good explication could be that differences from a year to another vary in a reasonable range. So, if we take into account the recent accuracy indicators to make short run predictions we have more chance to get better predictions than in the case when we combine two forecasts, both of them affected by unknown degree of uncertainty. The filters methods might be good only if the tendency of evolution is kept, especially in growth periods. In crisis year it is clear that the tendency modifies, so the elimination of the seasonal and cyclical components will not solve the problem. The trend is extracted, but it is the most affected by uncertainty component. Therefore, the filters or the Holt Winters technique application do not provide good results in crisis periods.

In conclusion, macroeconomic forecasts evaluation is necessary to inform the public about the way in which different institutions predicted the economic phenomenon. Further, according a certain degree of confidence by studying the results, in the future the public attention will focus on a particular institution in accord with the criterion followed, accuracy or efficiency, whereas the forecasts are generally biased at national and internationally level because of the difficulty to anticipate the structural shocks. In our study we chose the accuracy as criterion of making comparisons between forecasts provided by different institutions. The diversity of the applied methodologies is the support of the empirical conclusions regarding the actual trends in economy and the forecasting process. It is clearly stated that the actual financial and economic crisis has consequences to all levels, one of these referring to the process of developing macroeconomic forecasts (for example, inflation forecasts) in order to establish monetary or government policies and to improve the decisional process at the macroeconomic level. This problem interests directly not only the researchers or

experts in forecasting, but also the banks, the government and the individual economic agents that make their business plans taking into account the threats from the external environment, the predicted macroeconomic evolution of important variables, such as inflation or others.

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Appendix

Table 4.22 Results of logistic regression in SPSS

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1	er1_s	1.584	.447	29.578	1	0.003	2.483
	Constant	-.936	.760	32.632	1	0.002	.395
		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1	er2_s	1.259	.490	29.629	1	0.002	2.233
	Constant	-.745	.659	31.530	1	0.001	.255
		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1	er3_s	1.653	.392	28.894	1	0.033	2.564
	Constant	-.926	.694	32.749	1	0.012	.265
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1	er4_s	1.349	.431	29.388	1	0.021	2.383
	Constant	-.873	.719	32.439	1	0.001	.278

Note: Variables in the equation

Chapter 5

A NEW GLOBAL GOVERNANCE FRAMEWORK FOR THE WORLD IN CRISIS

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A NEW GLOBAL GOVERNANCE FRAMEWORK FOR THE WORLD IN CRISIS

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Abstract

The current financial crisis saw numerous organizations' plans to handle international finance and create conditions for strong, sustainable and balanced growth, with G20 at the centre point of this process. The crisis spill-over has clearly demonstrated a rising level of interdependence in the world economy. This chapter aims at evaluating a new global regulatory scheme since the 2008 Washington summit of G20, through reviewing shifts in political responses and changing agendas. Despite of a certain level of success in deliberating and direction setting on issues of global concern, the implementation of the summits' conclusions has proved uneven, pointing to significant differences of the major actors' agendas and priorities. From that aspect, the global economy still has to wait for new regulatory arrangements to emerge. Even though, the G20 through its agenda might have a unique opportunity to pool resources, confront views and opinions and press for a higher level of compliance with internationally agreed goals and principles that might induce longer term and beneficial effects for the world economy and finance.

Keywords: crisis, global economy, G20, international cooperation, international regulation

5.1 Introduction

The current crisis had not only resulted in enormous economic and financial losses on the global scale but has also brought to the forefront a series of limitations and challenges the world economy faces today. The Westphalian system of states is still the central concept in international relations despite the fact that a progressively increasing level of global interdependence has long ago started seriously to undermine state supremacy and sovereignty. The second limitation to the present world economy directly derives from the first one: national measures have dominated efforts to cope with the crisis despite the crisis global impact disseminated through a world web of interlinked national economies/national actors. Thirdly, almost all of the international relations issues (including of course those related to the current crisis) are not dealt with through a centralized system or an institution but through a multi-layer political interplay with multiple levels of discussions/negotiations and numerous actors from various domains. Therefore, issue linkages from the domains of economics, finance, development, energy, social inclusion, ecology and food security are another challenge the world economy faces today to a degree probably not witnessed before. This list of challenges and limitations is certainly not exhaustive but might serve as an illustration for conditions under which major actors in the global economy (unjustifiably but widely called 'international community') have started a political process aimed at designing new, global economic rules.

Among the most contentious issues, international financial regulation and economic-policy coordination have been placed very high on the actors' agendas. At the first glance, one might conclude that they had agreed on a unified course of action in 2008: stabilization the financial world

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and designing of new mechanisms which could prevent future turbulences on the global economic/financial scale. They would cooperate and implement measures and actions which would enable the world economy to resume its pre-crisis level of operation. Nevertheless, declarations produced at various intergovernmental forums and official statements did not in any way pointed out to regulatory/legal framework through which such global actions would or could be implemented. When the Greek crisis erupted in December 2011, the actors suddenly shifted their focus away from the global cooperation in economic and financial regulation. Since then, the global agenda seems to break in several directions: the EU dealing with the sovereign debt problem, the US coping with own President-Congress stalemate and budget cutting, emerging new powers pressing for a new redistribution of voting powers, developing countries trying to manage their own economic hardship, etc.

The crisis has clearly underscored the need to devise a framework for global economic/financial policy or at least a mechanism for better coordination of national policies. Among numerous international for organizations, the work done by and within the Group of Twenty (G20) since the onset of the crisis might shed more light onto the possibilities of having such a framework built in the foreseeable future.

5.2 Changing scenery of international regulation

The severity and outreach of the present crisis not only have seriously affected most of national economies but has also proved to be an opportunity to question/test/change basic principles of the dominant neo--liberalism and even capitalism itself.

Since the crisis outbreak in September 2008, a plethora of diverse political ideas, plans, statements and declaration were made on the causes, effects and prospects of the current crisis. Actions have been implemented to support individual institutions (the so-called 'too--big--to--fail' institutions), capital injections have been made to enhance banks' capital, guarantees were extended, banks nationalized and reference rates cut. International financial institutions have also stepped in to provide additional lending at more favorable conditions, especially for developing countries (Fabio Panetta 2009). In 2011, new measures were introduced in a great number of economies, aiming at the reduction of government and private debt, raising new finance, cutting budgets, etc. In 2012, the majority of governments and intergovernmental organizations have admitted that the crisis will continue for several more years and those certain structural changes in global economic/financial order might be necessary.

Vivid national and international political debates about the crisis causes and consequences were more and more focusing the issues of interdependence and global linkages. Regardless of different views and proposals brought forward by this multi-layer process, the intensity of such a political interplay and widening of its scope might point out that a new global/transnational social space is coming into being. Such a supra-territorial social space seems not to be bound by territory, distance or legal systems, and structural change occurs independently of agency, frequently used by political leaders to justify their decisions as inevitable (Jan A. Scholte 2002, 7).

Today, numerous and interlinked processes create global economic/social landscape: internationalization of production and finance, transnationalisation of both state and private

companies, translocalisation of universalistic culture and ideas, and so on. Furthermore, actors may choose between different, multiple equilibriums and a number of potential outcomes because structural changes today allow actors' strategic and tactical choices to interact with such changes. Contrary to authors that characterize globalization as a process of increasing homogeneity, Cerny (Phillip Cerny 1998) emphasizes that this new scenery is defined by growing complexity and circularity. Complexity results in a growing number of component parts, as well as their linkages, while circularity implies that relationships among such numerous parts/actors develop along many routes which may change over time, thus adding to the system/structure dynamics. Various domains cross-cut each other and issues are becoming increasingly overlapped. In addition, a multitude of actors emerge on the supranational scene which had previously been strictly reserved for governmental actors, what Cerny calls multinodal politics (Philip Cerny 2007, 2) and Underhill and Zhang describe as a relative disarmament of public authorities (Geoffrey Underhill and Xiaoke Zhang 2006, 29). Cohen (2010) goes further and describes the structural changes as favorable conditions for the emergence of public-private hybrid regulatory regimes. Even though non-governmental actors have gained in importance, the extent and consequences of the current crisis have proved to be an excellent opportunity for the authorities to invest in regaining the strength of their 'arms'. One needs not to do extensive analysis to find arguments in support of this thesis: financial rescue of numerous private banks by state authorities, an increase in the importance of government lending and guaranteeing, unprecedented expansion of macroeconomic/fiscal monitoring within the EU, etc.

For some, the extent and depth of the current crisis indicate that an irreversible 'terminal' phase of the dominant neoliberal economic order has begun, and yet others think that today the level of world 'fluidness' requires its total remake (John G. Ruggie 1993, 2). What certainly is beyond doubt is the fact that global capital today presents one of the major areas of concern for the world economy as a whole and there is a pressing demand for new/updated regulatory arrangements to be made (Georg Sorensen 2006, 7-9). Still, the very notion of regulation deserves a brief explanation because it has always been regarded as belonging to the (national) state domain. As Jordana and Levi-Faur describe (2004), recent global economic developments have emphasized a growing use of the notion in its broadest sense as all mechanisms of social control (in contrast to a narrow understanding of the term as specific forms of governance with authoritative rules, monitoring and compliance enforcement). From this aspect, new regulation for global problems is characterized by partially voluntary agreements, lack of strong monitoring and enforcement rules and obvious disregard for the concept of national sovereignty. The rise of new regulatory arrangements in today's world Kobrin (2002) attributes to 'patchwork' political structures: in an interdependent world, actors stretch across fluid boundaries, adapt themselves and liaise with other actors in order to achieve their goals. The higher interdependence, larger needs to coordinate actions across states and regions and hence the larger the need for international regulation.

5.3 The G20 and the crisis

The G20 has emerged as a result of the Group of Seven's (G7) desire to institute a broader dialogue related to main economic and financial challenges for the global economy, primarily those regarding international financial stability. Since 1999, the new international group has evolved in many

aspects: organizational structure, modes of operations, agenda widening, etc. Particularly from 2008, the G20 has invested significant efforts to place itself at the center of world-wide debates and actions in order to design (and implement) a new global financial/economic order. This new global order should reflect the new reality, new risks and dangers, as well as the changed scenery described above. Therefore, according to Ocampo and Griffith-Jones (2010, 1), such an order should rely on regulation of all financial and capital markets world-wide, provide emergency financing, be able to control and manage excessive indebtedness (particularly public debt), provide guidance to national economic policies in order to reach global stability, and implement a fair and effective international monetary system, particularly regarding exchange rates.

International political deliberations under the G20's umbrella have been centered around several summits: Washington (2008), London and Pittsburgh (2009), Toronto and Seoul (2010), Cannes (2011) and Los Cabos, Mexico (2012). The underlying idea (and probably one of the most important direct purposes) of the summits was to help an increase in investors' confidence. There was a strong need to show a unified stand of the international community and its capabilities to perform orchestrated actions, mitigate the effects of the crisis and restore favorable economic climate worldwide. In spite of that, an analysis of the seven summits reveals a somewhat different outcome: a series of compromises between the different agendas stemming from the Anglo-Saxon position and the continental-European view, on the one hand, and the industrialized economies vs. the fast emerging economies, on the other hand. The remaining developing countries of the group and their proposals had largely been left outside the picture, at least until the last summit in Mexico when the G20 agenda was significantly widened to include various developmental topics. Once again, the actors' overlapping but different agendas have pointed out that contemporary politics is one of detachment, 'cool loyalties' and 'thin' patterns of solidarity (Friedrich Kratochwil 2007, 5).

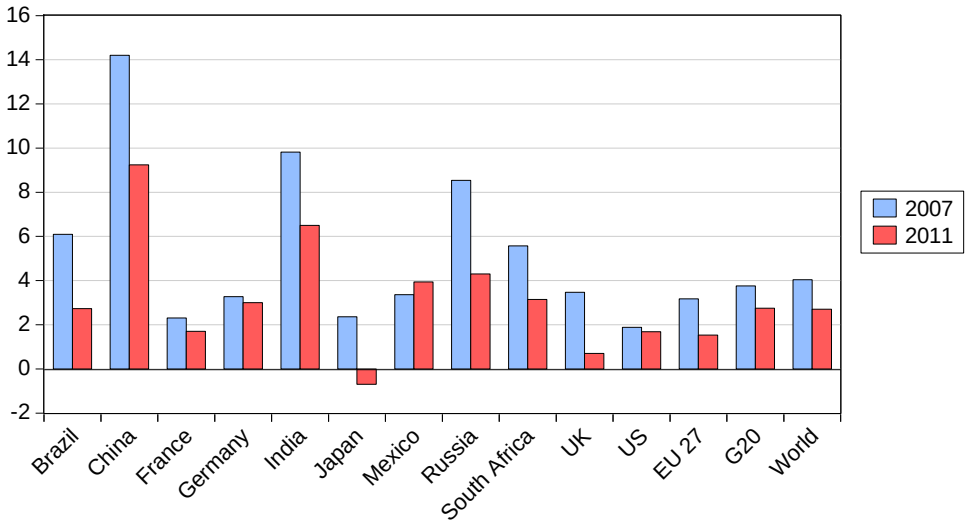

*Figure 5.1 G20 - Real GDP growth, selected members, 2007-2011**

Note: *Annual average growth rates

Source: http://unctadstat.unctad.org/TableViewer/tableView.aspx (retrieved 09.11.2012)

However, before analyzing the groups' efforts and achievements, it is worth presenting a brief overview of the G20's economic standing before and during the crisis. This may help us understand changes that have happened within the group, as well as some of the issues related to the G20's agenda evolution.

At the end of 2012, the role of the G20 in the world economy is indisputable: it produces 90 % of the world's GNP, it accounts for 80 % of global trade and 2/3 of the planet's population live the G20 countries. The group consists of 'systemically important' economies but their capacity to withstand the systemic crisis has varied significantly.

Almost all G20 members have experienced significant economic decline in the period 2007-2011 (except Mexico and Germany) but China, India and Russian Federation still maintain very high growth rates. In case of China, it has recorded an economic growth 3.5 times higher than the G20 average in 2011, despite its own GDP decline of almost 5 percentage points over 2007. Contrary to that, all European G20 members have recorded negative growth rates in 2009 and, except for Germany in 2011, much slower recovery. German recovery was in line with the G20 average, much ahead of the EU27 and the US but still considerably lagging behind the output rise in the majority of BRICS countries (Brazil, Russia, India, China and South Africa).

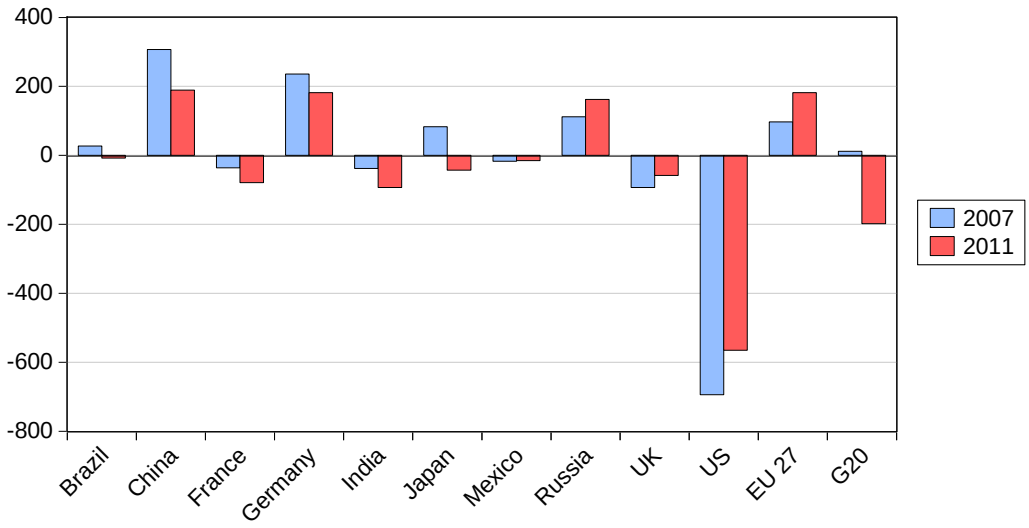

Figure 5.2 G20 - Trade balance, selected members, 2007, $ billions

Source: http://unctadstat.unctad.org/TableViewer/tableView.aspx (retrieved 09.11.2012)

As evident from Figure 5.2, the crisis hit was particularly hard for international trade balances of the G20 as a whole and for some of its members. Though China and Germany still maintain the positive balance of cross border trade, their surpluses have been reduced. International trade of Russia and the EU27 seem to have benefited from the crisis - they have increased their net exports. The US has also managed to reduce its trade deficit by almost 130 million dollars in the period 2007 to 2011.

Regarding the group's position in the world export, it has almost maintained the same position during the 2007-2011 period but the importance of some of its members to the world market has undoubtedly changed: only China has recorded a steady rise in the world exports, while the position of all EU members of the G20 have deteriorated, most notably that of Germany. The US has only slightly improved its share in the world exports in 2011 in comparison to 2007, but it was enough to pass over Germany as the leading European exporter.

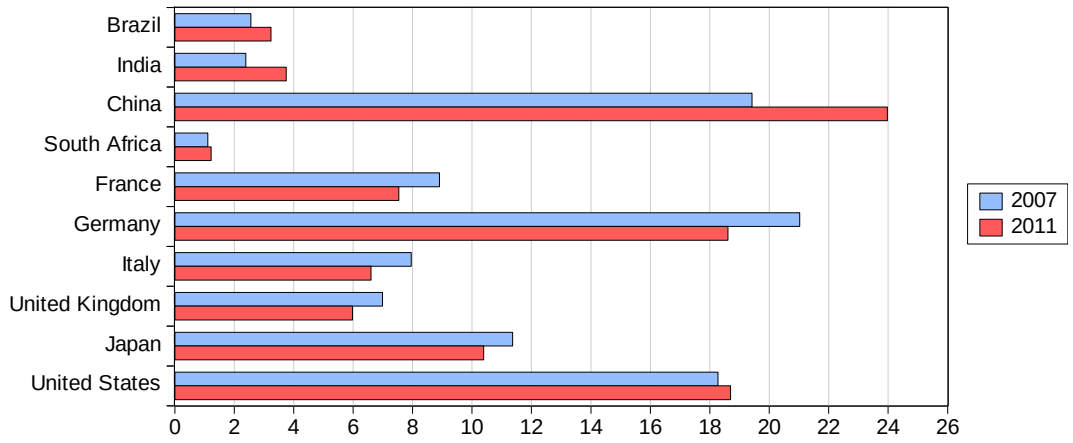

*Figure 5.3 G20 and the world exports, selected countries, 2007/2011**

Note: *percentage of world exports

Source: http://unctadstat.unctad.org/TableViewer/tableView.aspx (retrieved 12. 07. 2012)

The economies of G20 are still the most attractive destination for foreign investments and that has not changed in the period under survey: in 2011 the group has attracted more than 58% of the world investment. However, the level of attractiveness varies among the G20 members. The US has maintained its position as the most favorite destination for foreign investors. China has doubled its share of foreign investment while the attractiveness of the European G20 economies declined, most evidently in the UK where the level of inward FDI more than halved in 2011 in comparison to 2007. Apart from China, other BRICS countries have also recorded a rise in inward investment, except South Africa. If the overall macroeconomic stability and prospects for growth are analyzed, the European G20 members have yielded results better than those of BRICS (except South Africa) but worse than Japan and similarly to the US.

Despite worldwide effects of the crisis, current economic and financial turbulence have not produced equal effects on all G20 members. It is clear that the economies of China, Brazil and India (as well as Russia recently) are much more able to cope with the deterioration of global economic climate and even to grasp certain growth opportunities. On the other side of this group of 'systemically important economies' the records show us poor economic performance and prospects of the European part of the G20 and for entire EU as whole. For the period 2010/2017, it has been estimated (IMF, April 2012) that the EU will contribute to the world incremental GDP with only 12%, China will contribute with 22% while the US share will be 17%. Current economic trends, and the prospects even more, have nevertheless not been reflected in the process of creating and implementing agenda for a new economic order on the global scale.

5.4 Summits geography

A number of action plans, as well as numerous proposals and measures to counter the current crisis were adopted at the summits. The analysis that follows aims at presenting the evolution of the G20 agenda as the crisis effects widened in scope and depth. The transformation involved not only a change of the agenda issues (e.g. from private actors' risk taking to sovereign financing) or their ranking (e.g. top ranking of employment in 2011 versus the highest rank of financial regulation in 2008), but also changes related to the agenda comprehensiveness (from financial regulation in 2008

to monetary and fiscal coordination in 2011), its geographical focus (from the US in 2008 to Europe and the East in 2011) and changing modes of the group's functioning (from the top-leaders meetings to specific ministerial meetings).

The summits held in Washington, London and Pittsburgh (during 2008 and 2009) were held at time when the crisis was in full force and even expanding rapidly. The issues deliberated at these summits reflected the group's extreme concern with viability and functioning of financial markets, both national and global. Therefore, a motto that connects these three summits was 'cooperation and coordination in financial regulation'.

At the 2008 Washington Summit leaders acknowledged that urgent national measures to cope with the crisis would not suffice because the challenges were too comprehensive for any country to act independently. The causes of the crisis were extensively discussed and they reached conclusions that a substantial financial regulatory reform was needed, together with better coordination of macroeconomic policies in the short and medium term. The final document of the summit[23] included an Action Plan with several objectives: regulatory transparency improvement, higher accountability of regulators, sound regulation development, promotion of financial markets' integrity, international cooperation strengthened and international financial organizations reform. It was concluded that the global economy would benefit from a stronger support to market principles, open trade and investment regimes, and sound financial regulation. The initial motive for the first G20 summit had been to introduce regulatory changes which would prevent excessive risk-taking. However, it was soon realized that such changes, regardless of their depth and scope, could not suffice. A part of the official Statement from the G20 Summit is very illustrative in this respect: 'Major underlying factors to the current situation were, among others, inconsistent and insufficiently coordinated macroeconomic policies, inadequate structural reforms, which led to unsustainable global macroeconomic outcomes'[24].

The G20 London Summit in April 2009 came after extensive and numerous formal and informal meetings within and outside the group. The summit produced three declarations: on the recovery plan, the financial system and resources to implement the plan[25]. Global Plan for Recovery and Reform emphasized two sets of values that should lead further cooperation: fairness and equality in enjoying indivisible growth for all, as well as the imperative of supporting the principles of sustainable growth. In order to support the values, two general 'building blocks' were agreed: one was an effectively regulated market economy and strong, reformed supranational institutions. It has to be mentioned that the first block - principles of market economy - had already been questioned by both industrialized economies, e.g. France and Germany ('new world, new capitalism'), and developing countries, especially China (Filipovic, 2011). Interestingly enough, the issues of global trade and reduction of protectionism fell well behind the goals of confidence building, growth, employment and lending, but ahead of an inclusive, green and sustainable recovery. An explicit, financially measurable commitment was made to implement a $1.1 trillion program in support credit markets, growth and employment in the world economy. So, several months after the first summit, the leaders managed to hammer out a commitment that went beyond theoretical/political opinions and statements. But most

[23] Full text of the document available at http://www.g20.org/images/stories/docs/eng/washington.pdf
[24] http://www.nytimes.com/2008/11/16/washington/summit-text.html?pagewanted=all
[25] Official text of the documents available at http://www.number10.gov.uk/Page18914

importantly, a new four-layered set of norms that would guide further actions and measures was agreed. The document identified four different types of norms: a) global standards applicable to all countries, in the domain of accounting; b) internationally agreed norms for financial system regulation, which would be dealt with through separate international agreements; c) recommended norms of good practice, applicable to credit rating agencies, and d) the most flexible norms which would arise from a consistent approach among the group members and would form the basis for the essence of regulation – core principles of national financial regulation (for example, the coverage, boundaries, etc). A new international body should be established - Financial Stability Board, for the purpose of securing a much greater consistency and systematic co-operation. It would encompass a wider membership and work closely with the IMF to provide early warning of macroeconomic and financial risks.

The G20 Summit in Pittsburgh resulted in several important developments. It was concluded that the G20 should take over the leading role from the G8 and become a central forum for the creation of new international economic and financial architecture. It was also acknowledged that intergovernmental financial institutions should be reformed in a way that more accurately reflects the changed global reality of interdependence: more voting power should be given to dynamic emerging economies. In this way, it was thought, the probability of a successful future implementation of global norms would be enhanced. Still, one of the most significant accomplishments of the summit was a consensus reached on the issue of incorporating macro-prudential concerns about system wide risks into international regulation. One year after the first gathering in Washington, the G20 leaders could not escape the conclusion that without macroeconomic changes the previously agreed cooperation in financial regulation would not produce durable effects.

The summits held in Toronto and Seoul during 2010 had also a common denominator: a shift from reactive behavior - responding to the crisis, toward a proactive stand - monitoring and steering macroeconomic situation.

At the time of the Toronto Summit in 2010, the first cleavages appeared in the more/less unified stand of the group regarding its actions to cope with growing world economic problems. The European Union's sovereign debt crisis and the (artificial) dilemma whether to save or to spend especially affected the EU-US relations. China and India supported the US in favor of larger spending that would probably increase the demand for their own goods, while Europe/Germany-France stood firmly by their plans to carry out significant cuts and reduce spending. There were signs that the UK had already started to reevaluate its own position in the EU and did not support further spending reduction, not to mention further financial centralization in Brussels. Once again, the Anglo-Saxon ideas were confronted to those of the continental Europe, primarily Germany and France.

Widening of the group's agenda was reflected in the fact that it focused on both monetary and fiscal policy, as equally critical components of any macroeconomic policy. For the first time, the issues of fiscal sustainability (reduction of medium-term fiscal deficits and debt reduction) rose high on the agenda. Despite very high hopes attached to these issues in terms of economic recovery and contrary to their high agenda placement, they have later proved unachievable and/or politically unsustainable. Such a development, regardless of a significant economic potential of fiscal coordination to avert the crisis effects, might define the ultimate border in expansion of the group's joint or at least coordinated policies. After all, budget and fiscal policy are still considered the aorta of any state and the last one to

'surrender' to another authority (e.g. the fierce debates about further EU fiscal consolidation). Nevertheless, it was agreed that financial supervision should improve its effectiveness, specific resolution mechanisms for financial institutions should be developed and systemically important financial institutions (SIFIs) should require additional attention. In addition, further commitments were made to enlarge resources of multilateral development banks and reform the World Bank's voting system. It must be emphasized that the Toronto Summit agenda was also widened to include issues outside the financial domain, such as climate change, development and the elimination of subsidies for fossil fuels.

The fifth G20 summit in Seoul was the first summit to be held in Asia and hosted by a newly industrialized country. The fact that it was organized together with the Asia Pacific Economic Cooperation (APEC) further accentuated the venue importance. At the time of the summit, global economic/financial climate was far from favorable: Europe was facing the possibility of another financial crisis, economic recovery was uneven among the G20 members, currency management in major centers (most notably in China) was starting to deviate from previously agreed principles, etc. Large debt held by several members of the Euro zone (Greece, Portugal and Ireland) had become the major issue to define the EU future and the anxiety had already started to affect financial markets.

The G20 Seoul agenda included more developmental issues than any other summit before, specifically those regarding growth revival, employment and social protection[26]. The urgent need to accelerate growth in low income countries was move much higher on the agenda, due to rising inequalities and an unbalanced growth. It is of a particular importance that the leaders committed themselves to developing a common view to global economic problems. This new common view should have macroeconomic policy as its center, especially fiscal policy and debt reduction, as well as market-based currency policy. Such a commitment stood in strong contrast to the conclusions from the previous summits when they sought to develop particular norms/practical standards to handle the crisis, and point to a new, proactive position of the group. In conjunction with this new common view, mutual assessment of the group members should be enhanced. The US and Canada (followed later by China) rejected the calls for more resources to be allocated for the troubled Euro zone. Such a development has only intensified already strong German and French efforts in building a European monetary fund and consolidating the EU banking/finance/fiscal domains.

The Seoul Summit has also resulted in developing the group's global governance structure. Several institutions around the G20 were created (e.g. regional consultative groups for the Financial Stability Board), in order to include developing countries' problems and issues on a more comprehensive basis. It was declared that in the future other types of actors, such as corporate sector, civil society and academic experts, would be called to contribute to the agenda. This development (which will be later expanded to institutionalize the business sector influence through B20) supports the argument of Cerny (2007) that multinodal politics inevitably intensifies under the present globalization pressures.

Kirton described the Seoul Summit as a successful one due to the group's evolving potential to bring together different/conflicting views and agendas, by using its 'globally predominant, internally equalizing capabilities among members of the group' (Kirton, 2010, 7). This assessment might be supported if advancements in national financial regulation and safety nets are reviewed but it does not

[26] Full text of the final document available at http://www.g20.org/images/stories/docs/eng/seoul.pdf

hold if international financial organizations' reforms at the time (or the lack of them) are analyzed. Nevertheless, such evolving capacities and the accomplishments of the G20 uphold the arguments of Higgot (2004), and Mueller and Lederer (2003) that discursive organizations (and not decisional organizations) such as the G20 might open a new path of multilateralism or at least minilateralism (Grevi, 2010).

In the autumn of 2011, when the G20 summit was held in Cannes, general economic and political conditions were not conducive for the group's main task of becoming 'premier economic forum' for a new global economic architecture. The recession of the EU economy was deepening, market confidence was at its lowest levels, prospect of the Euro zone was jeopardized by the Greek debt, Russia and China refused to finance Europe's recovery while the US was slowly detaching itself from the 'europeization' of the G20 agenda. The final declaration of the Cannes Summit[27], besides reiterating concerns about the slow recovery, high unemployment and rising sovereign risks in the Euro area, focused on a 'renewed' collective action for the 'common future'. This might point to certain changes of the group's objectives: regulating finance and harmonizing rules might be critical for future crisis prevention but are far from being sufficient for the global economic revival in today's interdependent world. Further institutional development of the group was initiated: the G20 Task-Force on Employment was formed while other multilateral organizations (e.g. IMF. ILO, World Bank) were invited to assess impact of the G20's actions on job creation. In addition, first meetings of new bodies (Agricultural Ministerial and Development Ministerial) were held.

The second highest rank on the agenda, after the employment, was given to international monetary stability; with special emphasis on currency management and (procyclical) capital flows. It was concluded that excessive currency reserves (e.g. China) must be reduced as they present one of the major factors of imbalanced global liquidity and capital flows volatility. Despite keeping the 2008 Washington objectives in the domain of financial regulation (an internationally-consistent and non-discriminatory regulation of all markets and participants), another regulatory category of market participants has been introduced - global systemically important financial institutions or G-SIFIs. In accordance with their overall impact, those institutions will have additional safety net as of 2016. In this way, 'too-big-to-fail' principle, advocated from the first summit and much criticized for its discretionary implementation, has not been abandoned but its scope has been broadened across national boundaries. Referring to the London agreed set of norms to guide future actions, the Cannes Summit did not prove very successful in supporting submission of national rules to internationally agreed ones. For example, (only) a framework for national macro-prudential policies would be developed but a single set of mandatory accounting standards was planned to be introduced.

Most importantly, the Cannes Summit revealed the group's rapidly increasing openness to other actors and international organizations on the global economic/political scene. The final document produced in Cannes includes numerous references to a great number of international organizations, such as IMF, World Bank, ILO, OECD, IOSCO, BIS, etc. One might understand this as a new 'reality-check' for the G20: although it has positioned itself as a global economic-policy center and controls 90% of the world GDP, present global issues might be too complex for such an informal, minilateral group (Grevi 2010, 3).

[27] Available at http://www.g20.org/images/stories/docs/eng/cannes.pdf

In preparation of the G20 summit in June 2012 in Los Cabos (Mexico), a strategic vision for the group's 2012 agenda was drafted, based on previous work of the group but also taking into account challenges and issues derived from global economic prospects for the year. The Mexican Presidency of the G20 outlined five priority areas, including economic stabilization and reforms, the financial system strengthening and financial inclusion, enhancing the international financial architecture, improving food security and reducing the volatility of commodity prices, and promotion of sustainable development, green growth as well as sound environmental policies. In addition to significant agenda development, actions were taken to broaden the dialogue with many other groups of actors: the UN, international organizations (already evident at the Seoul summit), business sector (B20), experts, civil society, youth organizations, etc. (Discussion Paper of the Mexican Presidency of the G20, 2012).

Maybe most importantly, notable institutional developments of the group itself have become evident. The work before and during the summit was generally divided into two tracks: the Finance Track and the Sherpa's Track. The Finance Track, composed of all G20 finance ministers and governors of the central banks, is oriented to dealing with financial and economic problems and issues (e.g. financial regulation, conditions for strong and sustainable growth, international financial architecture, etc), in close cooperation with the relevant international organizations. The Sherpa's Track represents the work - planning, negotiations and implementation - done by personal representatives of the G20 leaders outside the domains of financial issues (e.g. employment, agriculture, energy, the fight against corruption, development, etc.). They provide critical inputs into political negotiations among the group members and contribute to achieving consensus among the leaders on various sensitive issues. Both tracks involve numerous groups and subgroups that focus on particular issues or aspects of them. In this way, the G20 gradually develops a rather elaborated internal structure that has started to resemble that of other, permanent international organizations. The process of opening the G20 to cooperation/coordination with other actors and its institutional development, if taken together, might serve to support the arguments of rising complexity and circularity of the new global scenery (Cerny, 1998) and the 'patchwork' political structures of the present world (Kobrin, 2002).

The Los Cabos Summit final declaration[28] differs from the previous ones from many aspects, for example, widening of the agenda domains, growing number of issues dealt with, agenda prioritization of issues, etc. As the crisis had fundamentally affected the real sector worldwide, growth and employment became the group's top priority and diverse but strong commitments were made in that respect. External and financial imbalances, as well as further fiscal consolidation ranked immediately after the growth and employment issues. Particular emphasis was placed on fiscal responsibility and its impact on creating conditions for growth revival, confidence restoration and employment increase. The stability and integrity of the Euro area ranked as the third priority, passing over the goals of creating more resilient financial systems. The last two priority domains on the Los Cabos agenda included the development of multilateralism and more favorable conditions for the development of low income countries. In contrast to the final declaration of the 2008 Washington Summit, the leaders pledged that their "… policy actions will improve living conditions across the globe and protect the most vulnerable. In particular, by stabilizing global markets and promoting

[28] Final declaration available at http://www.g20.utoronto.ca/2012/2012-0619-loscabos.html

stronger growth, we will generate significant positive effects on development and poverty reduction across the globe."[29] Two important notes have to be made regarding the G20's agenda at the summit. First, it has become evident that the Euro zone problems and their comprehensive effects on the global economy have become the focal point of deliberations and recommendations. In that respect, the Fiscal Compact, banking integration across the EU and preservation of the Euro zone integrity were seen as critical paths to be taken. Secondly, after four years, environmental issues have been permanently placed on the G20's agenda, including the concept of inclusive green growth, the need to increase fuel efficiency, the elimination of fossil fuel subsidies, etc.

5.5 Assessing the impact of the G20

An assessment of the G20 impact can be done using various criteria and from different perspectives, such as the group's success in carry out global governance functions, the members compliance with the commitments made at the summits, effectiveness of the group's work towards managing the crisis and creating a new economic/financial architecture, results achieved in specific issue areas, the G20 institutional development, etc.

Larionova (2011) provides a detail analysis of the G20's effectiveness to reach the aim of becoming a global governance steering board. The analysis is based on three sets of criteria: global governance functions and compliance, global governance agenda development and links/partnership with other international organizations. Global governance functions include activities regarding deliberation, direction setting, decision-making, domestic political management, delivery (results) and those related to the development of global governance (functions of building a new international economic architecture). The G20 has proved its capability to perform well the first three functions of global governance but has been much less effective in delivering results and ensuring compliance of the members. As for the global governance development, the group was positively assessed due to a number of specific measures undertaken to create a new economic/financial architecture (establishment of the Financial Stability Board, strengthening of international cooperation in financial regulation, reforming the IMF and development banks, etc.). The group's efforts to expand cooperation with other organizations (notably after the Seoul summit) were assessed as significantly contributing to its global governance effectiveness. The G20 proved to be effective in developing a (new) global agenda that more accurately reflected changing needs of the world economy, especially in the present time of crisis – for example, more that 60% of the G20 priorities in the period 2008-2011 were related to finance though this trend was declining in favor of economic priorities (Larionova, 2011, 12, 15). This conclusion contrasts the views of Haley (2012) who points out that widening of the agenda actually reduces the level of the G20 legitimacy because it diverts the process from global economic problems, and "… allows all members to claim success on an issue of their interest or to 'commit' to actions they would going to do in any event" (Haley, 2012, 21).

Concerning the compliance function of global governance, a detail insight can be gained from the work done by a group of researchers from the University of Toronto and National Research University, Higher School of Economics from Moscow[30]. In 2009, the researchers undertook a task to

[29] Ibid.

[30] The G20 Research Group at the Trinity College at the Munk School of Global Affairs, University of Toronto and the International Organizations Research Institute of National Research University Higher School of Economics in Moscow

quantitatively assess progress in implementing main commitments made at each G20 summit. This research has been done by closely following publicly available information, documents and media reports from each G20 member and the latest report was made in June 2012, including the analysis of the Cannes Summit (Montpetit *et al*., 2012).

The report quantifies deliverables against the G20 commitments (compliance is understood as actions deriving from or being relevant to a commitment) for issue-specific areas and for each member of the group. The methodology is based on a scale from -1 to +1, where +1 indicates full compliance with commitment, -1 is evidence of a compliance failure or a counterproductive action, and 0 indicates partial compliance or work in progress. In this way, compliance progress of the members and in specific issue areas can be compared. Also, different analyses can be made combining issue-specific and member-specific scores.

More than 280 commitments can be drawn from the official G20 Cannes Summit Leaders' Declaration and the official documents. On that basis, 16 issue areas can be identified including macroeconomics (exchange rates, fiscal consolidation, financial market resilience), finance (Basel III and OTC derivatives regulation, regulation of systemically important financial institutions SIFIs), development, trade, reform of international financial institutions, employment and growth, international cooperation, institutional development, food and agricultural issues (export restrictions and price volatility) etc. Most commitments belong to the area of macroeconomics (market-determined exchange rate systems and credible medium-term fiscal consolidation), finance (bank capital, risks, sound regulation, important financial institutions) and development (assistance to poorest countries and mobilization of domestic resources). Much less promises have been made regarding the summit institutionalization, international cooperation and environment (apart from clean energy).

An analysis of the period between the Seoul and the Cannes summits proves that the level of compliance varied considerably among the issues, despite the growing number of commitments and strong wording, as presented in Figure 5.4.

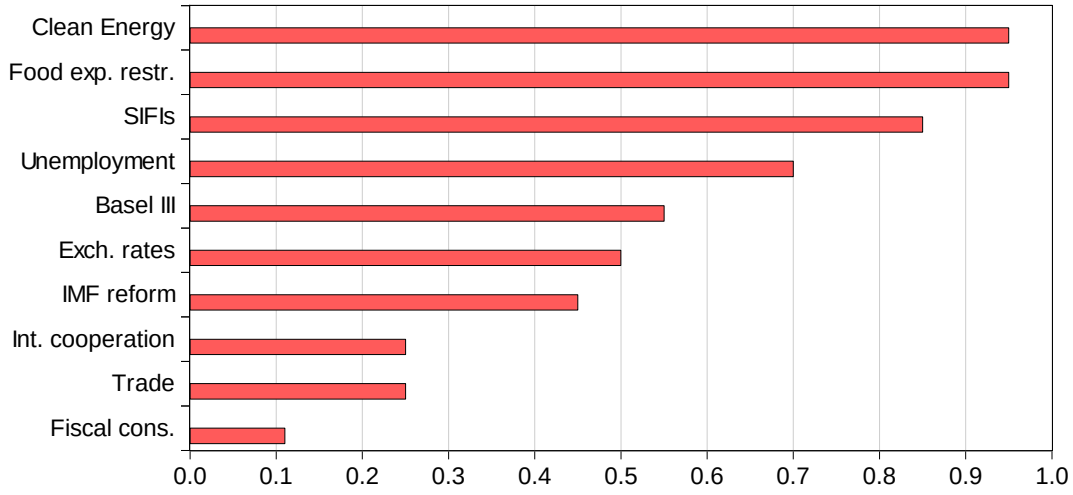

Figure 5.4 G20 Cannes summit final compliance score

Note: score 1= full compliance, -1= failure, 0 = partial compliance
Source: Montpetit *et al*., 2012.

A significant progress has been achieved in the areas of clean energy implementation (which was actually the highest compliance score achieved after all summits), reduction of food export

restraints and regulation and supervision of systemically important financial institutions. Financial issues that had dominated the G20 agenda during and after the first few summits recorded a lower level of compliance, particularly those regarding the IMF reform. International cooperation (partnership with international and regional organizations, the UN, civil society and other actors) and trade (completion of Doha round) were the issues even less complied with. Still, the issues related to fiscal consolidation recorded the lowest level of compliance: only the UK, Canada and Australia fully complied with the commitments; France, Italy and Japan took counteractions (-1); the US and South Korea were in partial compliance, while information for the other members was not available.

In order to assess an overall contribution of the G20 to the building of a new economic and financial architecture in the world economy, one must analyze the commitments and compliance since the first summit in 2008. When the overall compliance level is analyzed (Figure 5.5), the Washington Summit resulted in the highest level of compliance with the commitments. That summit was later assessed as being the most successful one following which no counterproductive actions were taken. It has to be mentioned though that the issues deliberated on the Washington Summit were almost all focusing on financial regulation and immediate measures to be implemented against the crisis. Since then, the general level of compliance started to decline and was more than halved at the time the London, Pittsburgh and Toronto summits (during the turbulent times in 2009 and the first half of 2010). The Seoul Summit resulted in much more commitment-related actions, despite of the agenda broadening, and the same trend continued after the Cannes Summit.

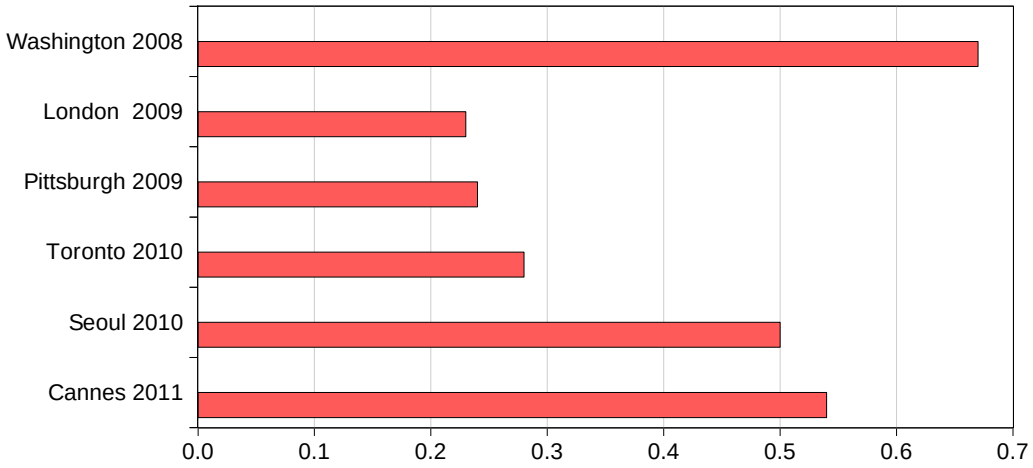

Figure 5.5 Average compliance of the G20 members to the summits commitments, 2008-2011
Note: score 1= full compliance, -1= failure, 0 = partial compliance
Source: Montpetit *et al.,* 2012.

The analysis of average compliance level of the major group members in the three-year period between the Washington and the Cannes summits (Figure 5.6) point to significant differences among the EU members and the rest, especially the fast growing market economies.

The EU as a whole and the EU members of the G20 (the UK, France, Germany and Italy) implemented the highest portion of the commitments made, especially the UK and Italy whose compliance ranked well above the group's average. On the other side, countries with the lowest level of compliance, at least when the Cannes commitments are analyzed, included Argentina (average 0), Indonesia (0.14), Turkey and South Africa. The US recorded an average score of 0.53, but has fully

acted in line with the commitments regarding the fight against unemployment, measures to have market-driven exchange rates, clean energy, food export restrictions and limitations to the use of fossil fuels. However, the US has not fully committed to support the reform of the IMF. The divergence of compliance levels among the members may well serve as evidence that, regardless of the G20 agenda widening, it has gradually become more and more centered around the Euro zone and the EU in general, resulting with a rising level of dissatisfaction of the less developed group members.

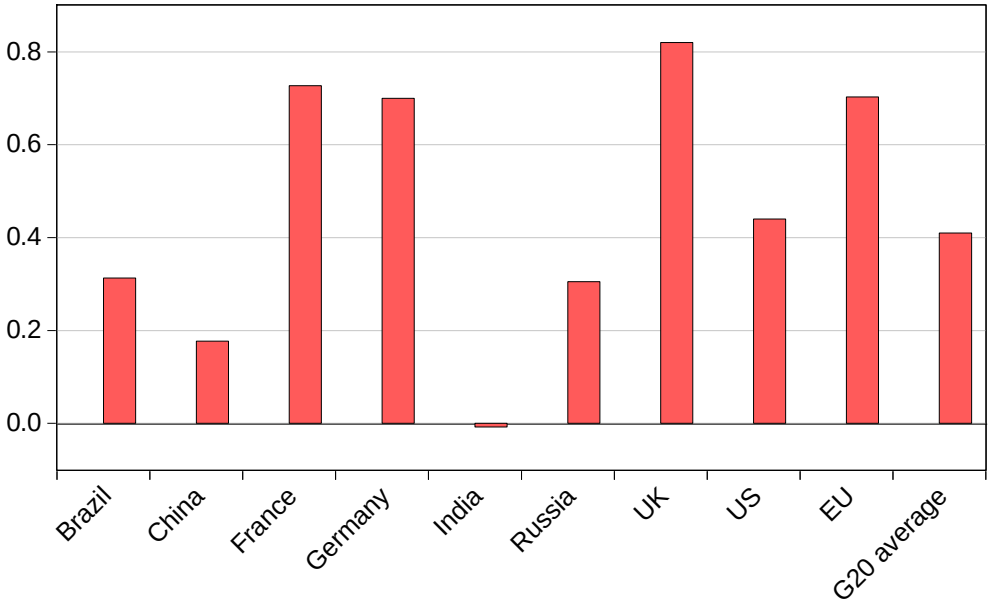

Figure 5.6 Average level of compliance to the G20 commitments, selected members, 2008-2011 summits

Note: score 1= full compliance, -1= failure, 0 = partial compliance

Source: Montpetit *et al.,* 2012.

A varying degree of compliance is also evident when analysis focuses on individual members' actions after each summits, reflecting not only their particular agendas but also different capabilities of coping with the crisis, as shown in section 3. Figure 5.7 presents a comparison of the attitudes of the selected G20 members, in the period 2008-2011. After a general decline of compliance to the commitments in the beginning of 2009, some members quickly showed rising willingness to act in accordance with the group's recommendations and promises - the UK, Germany, France, while it took some time for the others to join. BRIC countries actually undertook counterproductive actions after the Pittsburgh and Toronto summits.

An analysis done by Heinbecker (2011) emphasizes that the G20 was effective regarding a number of current, pressing issues, such as orchestrating the members' actions to stabilize the financial markets, coordination of regulatory changes and provision of economic stimuli to the real sector. The effects of those measures significantly contributed to averting the most serious dangers of the crisis, i.e. the world slipping into a longer term depression, thus supporting the argument that the G20 has indeed met its original role of a crisis management board but still far away from the role of a crisis steering board (Larionova, 2011). Furthermore, the group managed to address highly political issues of trade and budget imbalances, as well as exchange rate mechanisms. In this way, the 'spill over' effects of national policies into international arena (another example of irreversible transnational linkages) were openly acknowledged by the leaders. Therefore, the group is seen as effectively providing the members with "… a chance to balance the external and internal benefit or loss of

different policy choices" (Huang, 2011, 42) However, if the G20 is to proceed with its intention of creating a new global economic architecture, it needs to address many challenges: to ensure delivery against the commitments (e.g. the implementation of Basel III regulation), strengthen its own internal structure (e.g. the role and resources of FSB, enhance the mutual assessment process) and clarify its relations to other international organizations, such as the IMF, the UN, the G8, etc. The G20 "… has yet to graduate fully from crisis response to agenda setting and from financial engineering to global economic governance" (Heinbecker, 2011, 5).

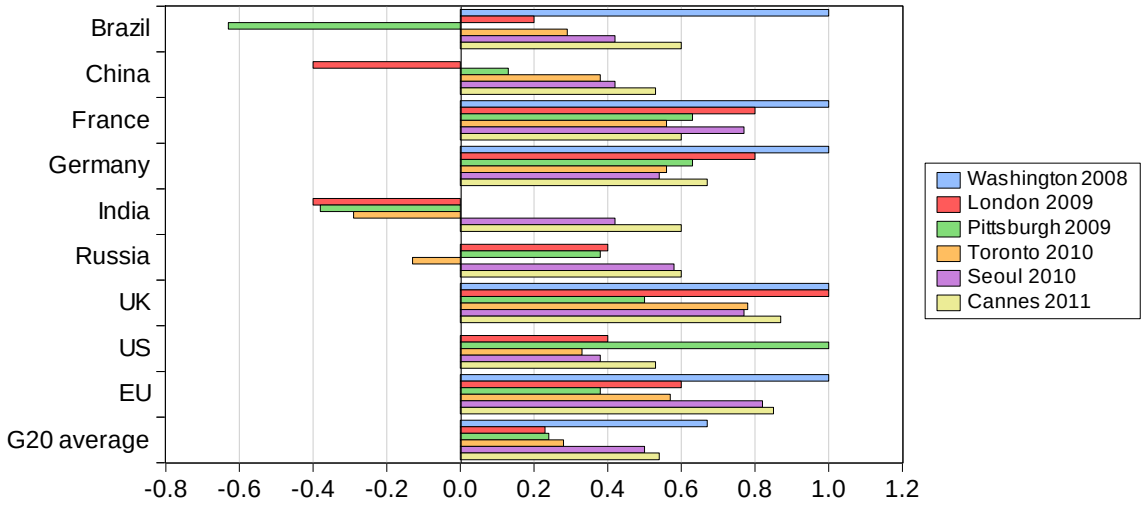

Figure 5.7 Level of compliance to the G20 summits commitments, selected members, 2008-2011 summits

Note: score 1= full compliance, -1= failure, 0 = partial compliance

Source: Montpetit *et al.,* 2012.

From another perspective, Ocampo and Griffith-Jones (2010) conclude that effects of the G20 summits have not been that profound when specific issue-areas are analyzed. Some progress has indeed been made in the areas of national financial regulation, in terms of bank supervision and capital foundation, and emergency financing that would complement central bank financing in crisis. In addition, a certain level of progress has been achieved in the area of national economic policies coordination, at least regarding the policies with adverse and harmful effects on other countries. But, again, this might be more a result of deterioration of trade and capital flows and less related to developing a common view on the global economy among the G20 members. Adequate attention has neither been paid to substantial reforms of the existing monetary system nor to proposals for creating an international debt resolution mechanism. The group members were neither ready to start coordinating the core of any macroeconomic policy, i.e. its fiscal mechanism. However, the issue was brought to the top of the EU agenda by drafting a new fiscal agreement to be ratified by 25 EU member states and six-pack regulation (fiscal and macroeconomic surveillance) entered into force in December 2011. But, most importantly, the issues of development and more appropriate inclusion of small and medium-sized developing countries are the areas where the least advancement has been made. Recent G20 meetings have, nevertheless, widened the scope of deliberations by (only) emphasizing economic issues other than the financial ones, e.g. development, trade, environmental costs, employment, agriculture, etc.

Wahl (2012) takes a critical look at the G20 achievements, comparing them with high hopes raised at the first summit in 2008. Although, certain positive effects of the group's work could be

detected (primarily in the area of controlling the contagion effect of the crisis, and not leaving the crisis resolution to the market, as in 1929). The author points to numerous shortcomings and deficiencies. First, the actions taken in fighting the crisis, especially in the first two years of the summits, were not comprehensive enough and were too much oriented to support the financial sector at the expense of the real economy. Second, the G20 had missed an opportunity to start (at least deliberating on) structural reforms, for example regarding the role of the financial sector and its relations to the real sector. Third, despite much debate, the group has not reached a consensus on the exit strategy. Fourth, even though the summits had been initiated to devise new international financial architecture, financial reforms have been too slow – for example, certain parts of the Basel III regulation have a grace period until 2018. Fifth, the group's legitimacy as a premier global economic forum might be questionable because it lacks representativeness and is very heterogeneous. Finally, its work and actions might cause marginalization of the UN as a unique global organization – for example, the G20's green growth concept promoted at the Los Cabos summit might be seen as competitive to the green economy framework advocated at the Rio+20 conference.

5.6 Conclusion

In November 2012, the effects of the current crisis are still felt across the global economy so it may not be completely justifiable to make definite conclusions on the role and impact of the G20 in taming the crisis and building a new global economic/financial infrastructure. Nevertheless, it has been widely accepted that coordinated actions of this new group have significantly contributed to (at least) reducing immediate economic and financial consequences of the crisis. When the design of a new economic and financial order is concerned, the effects of the G20 actions are very differently assessed – from being the basis for the new architecture, to being only superficial changes in favor of the financial markets and the most developed economies. When the group's impact in particular issue areas is analyzed, the results also vary to a great extent: the commitments were made and much complied with regarding, for example clean energy, but the majority of commitments related to fiscal consolidation, trade and international cooperation remained only on paper.

Despite of its contentious policy effects, the G20 has made certain impact on improving global governance with regard to its own institutional development, direction setting and global guidance, as well as larger involvement of some developing countries. At the Pittsburgh Summit, the G20 unequivocally expressed the goal of becoming the premier forum for global economic cooperation. At the London Summit, Special Drawing Rights (SDR) mechanism has been somewhat revived to draw on some developing countries' resources. New bodies (FSB) and new ways of operation (specific ministerial meetings, working groups, different summit tracks) have been created.

Notwithstanding the criticism expressed by some of its members and international organizations, the G20 impact on global agenda development must not be underestimated. The group's proposals for economic measures to be undertaken were quite comprehensive and focused on issues beyond 'classical' monetary /fiscal policy approach to macroeconomic stability. The comprehensiveness of the G20 proposals also derives from linking various issues, such as poverty reduction, social inclusion, emerging and low income countries, aid flows, climate change and cooperation with the private sector. The current status the G20 as a discursive organization is

contrasted in this way with the more strongly decisional types of other intergovernmental actors, such as the IMF (Richard Higott 2004) and might shed more light on the future of multilateralism. Following the arguments of Muller and Lederer (2003), the power and activities of the G20 might point to a new developing form of global affairs management, with specific actors, instruments and practices. Hence, this organization might be the centre point from which new, soft-law instruments of international financial and economic regulation would appear.

In 2008, all of the major actors gathered in Washington with their own agendas they have been pushing forward then since. Not only they had their own set of goals but those particular agendas have been changing and transforming since the first summit (Filipovic, 2011). For instance, the EU was pressing for new rules for a new capitalism, which should create conditions for an increase of its endangered competitiveness. Four years after the first summit, the EU agenda has changed dramatically and includes contentious issues of the fiscal unity and states' bail-outs. The US has been pushing forward for allocating more responsibility to other members of the group. BRIC countries have taken the G20 summit road with plans to press for structural changes of the international monetary system and the world economy that would give more rights and opportunities to the developing world. Other factors influencing changes of the global agenda or those of the major actors might be growing regionalism, shift of the US towards the East, continuing economic strifes in Europe, rising economic and financial strength of the BRIC countries, still unknown consequences of the 'Arab spring', etc.

As the analysis of the London Summit documents shows, the participating states have basically agreed to have binding norms only in the field of accounting principles. Other important aspects of international financial and economic regulation were left out, waiting for future, separate agreements to be negotiated and designed. This clearly reflects that, beyond joint pictures taken and statements made, the G20 leaders have set a particular 'scale' of submitting their own policies and principles to global harmonization. Unless the norms and the policies in which they manifest themselves are perceived by the group as authoritative and can be justified in terms of shared beliefs (Underhill and Zhang, 10), there is still a long way for new, global governance in the field of economy to emerge. Nevertheless, a rising level of compliance might point to certain possibilities in creating economic regulatory framework in the future. As the globalization progresses, the challenges significantly influence domestic politics. Failure to recognize the overlap and trade-offs between domestic and international/global policies certainly result in the welfare losses for the whole world economy (Freytag *et al.,* 2011).

The 2008 Washington Summit focused only on a limited set of particular issues directly related to global financial trends: stronger (national) supervision, hedge funds, tax heavens, bankers' remuneration, and so on. In 2009 and particularly in 2010, the G20 summits were directed towards a number of issue areas: macroeconomics, development, finance, trade, energy, intergovernmental cooperation, the group institutionalization and cooperation with other international organizations, etc. Still, one commitment was running through all the summits: in the present world, cooperation and orchestrated efforts are sine qua non for the revival of global economy. What have not been agreed upon are the crisis causes and hence its remedies – it that building a completely new world economic system, based on non-neoliberal principles, or a change of leadership/world currency would suffice; is that creating a new social order ('new' capitalism) that should be based on social welfare, strong state

presence and ownership or a critical re-modeling of the governance concept is needed for this interlinked world? What lies ahead, after the pledged resources are spent, is maybe a long process of building a set of shared values that might create a basis for legitimate and efficient governance.

It has to be acknowledged that the G20 has managed to induce numerous and somewhat coordinated national policy responses to the crisis. There are many possible reasons behind this. One of the reasons might be the severity and outreach of the crisis in today's world of rising interdependence but also in the world of less efficient Bretton Woods institutions. Another factor might be related to the institutional development of the group itself in terms of better profiling of its role. Additionally, the G20 might be using the opportunities for collaboration, relying more on strengthened pressure and reputation of the actors. 'If the G20 can continue to improve its performance on delivering on its promises, it can validate its claim for legitimacy as a global governance institution' (Ellis *et al.*, 2011: 8). But, having in mind different 'scale' of readiness of individual governments to accept global standards, it is very much unclear how such an extension of supranational regulation will be designed and put in practice, as it is not possible to understand an economy (especially the global economy of today) or explain its functioning without consideration of the rules that were politically laid down (Waltz, 1979, 141).

Future research related to the international financial and economic governance should focus on three major areas: political processes to allow a convergence of various agendas, implementation of the agreed norms and structures, and the developments in global economic flows. Irreversibly transterritorial economic activities have started to exert such a significant pressure to heads of states that some sort of hierarchical compromise might be expected in years to come. The G20 might have a unique opportunity to use the prerogatives of an officialdom it strives to become, and create conditions for a new global framework to emerge. Contrary to numerous critiques, the G20 might well be in a position to (at least, partially) provide a new forum to discuss and confront complex issues of today's world economy – a remedy for the shortcomings of the Bretton-Woods institutions which have been too issue-oriented and specific in their operations (Freytag *et al.,* 2011). Also, the G20 might serve as an example of new forms of 'informal minilateralism' that could complement the larger multilateral system and enhances the effectiveness of its responses to an increasing global interdependence (Grevi 2010, 3). Bearing in mind that an order's legitimacy strongly depends on the body of shared beliefs, what remains to be seen is to which of the today's multiple agendas (input side) new or adapted global rules and norms (output side) will be closer. In support of the argument that the present level of globalization is actually a process of interaction of differences based on simultaneous convergence and divergence (Cerny 1998), the challenges G20 faces will probably be more effectively dealt with if it manages to control the members' divergence - in the short run, while developing its agenda to motivate convergence in the long run.

Acknowledgement

This chapter has been done as a part of the research project No. 47009 (European integration and social and economic changes in the Serbian economy on the road to the EU) financed by the Ministry of Education and Science of the Republic of Serbia.

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Chapter 6

CHALLENGES OF REAL ESTATE SECTOR DEVELOPMENT IN CENTRAL EUROPEAN COUNTRIES IN THE POST-CRISIS PERIOD

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CHALLENGES OF REAL ESTATE SECTOR DEVELOPMENT IN CENTRAL EUROPEAN COUNTRIES IN THE POST-CRISIS PERIOD

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Abstract

The real estate sector represents the important part of the economy, since it creates the preconditions for the economic development. The structural reforms and substantial foreign direct investments in Central and Eastern European countries during the transition period had enabled to develop the booming real estate markets. At first it seemed that the global economic crisis will not have any impact on the region, however at the end of 2008 the situation has reversed dramatically. Since the region is not homogenous and economic fundamentals are distinct in the particular countries, the impact of crisis and the post crisis situation varies throughout the region, which is investigated in this chapter. According to our opinion the future development of the real estate sector in CEE countries will depend on several external factors, such as the results of the introduction of the new banking regulation, the growing role of the private equity funds and the solution of Eurozone crisis. The internal factor such as the healthy public finance and further economic recovery will be important as well.

Keywords: estate sector, economic crisis, European Union.

6.1 The importance of real estate sector in economy

The real estate sector represented by built environment plays an important role in the society. The sector is the basis for majority of economic and entrepreneurial activities, employing itself the large number of the people and accounts for almost 20% of economic activity in Europe. The commercial property sector alone directly contributed EUR 285bn in 2011, which represents about 2.5% of the total European economy, which is more than the joint contribution of European automotive industry and telecommunications sectors. European real estate sector directly employs more than 4 million people (EPRA, 2012) who are active in construction and repair, upkeep, management and care of buildings. Smaller number of people is employed in investment, fund and portfolio management.

The size of the sector is tremendous. The market value of European commercial real estate in 2011 was approximately EUR 5 trillion the total value of housing, was about EUR 22.5 trillion. (EPRA, 2012) The real estate is also very important source of diversified income in the portfolios of European savers and pensioners. Property in its various forms represents €715bn – over 6% – of European

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pension funds and insurance companies' total investments (EPRA, 2012). The investments into real estate are both direct and indirect (through listed companies and real estate investment trusts).

6.2 Real estate market in Central and Eastern Europe

The proper functioning of real estate sector is very important for the Central and Eastern European countries that have undergone the difficult transformation from planned economy to market. The institutional changes enabled the creation of real estate markets that were during last 15 years totally transformed and developed. For instance in 1995 there were almost no modern office and shopping centers in the region. The multinationals that started businesses in CEE rented the gloomy offices in the transformed housing or industrial premises. The modern logistic spaces were also very scarce. It was the gold mine for the investors who benefited from the large demand reaching the double-digit yields. The real estate business was not easy to conduct, because the qualified service providers were absent. The real estate business was very much dependent on decisions of local politicians. The situation was ameliorated as a result of joining of some of the CEE countries into NATO, WTO, OECD and later to EU.

New properties benefited from continuing demand, investors' yields were very high at the beginning, but little regard was given to their long-term viability. Gradually the investors' yields dropped to single digits at 21 century and the sector was booming especially in Visegrad countries[33] until the collapse of Lehmans' brothers. The real estate came out of the crisis in relatively good shape in the Visegrad countries maybe with exception of Hungary.

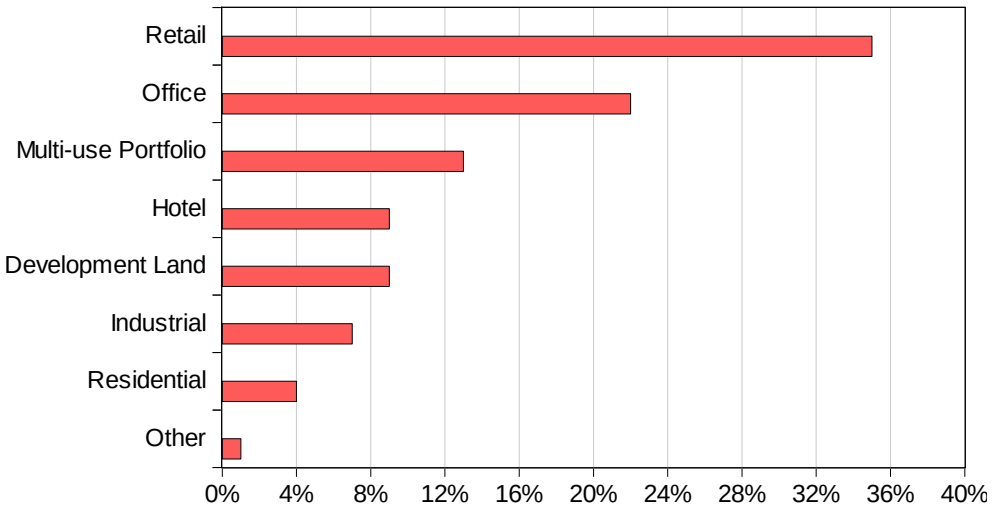

Figure 6.1 Eastern Europe - investment volume by sector in year 2011

Source: Colliers International, 2012 Eastern Europe Real Estate Review

During the boom period preceding the crisis the living standards in Visegrad countries have approached to the western standards and the real estate markets have matured. Increased real estate market transparency in Central and Eastern Europe may be also demonstrated by a growing number of research reports that international real estate consultancy companies are publishing (Jones Lang LaSalle, 2012). At present the service providers and tenants are the same as those in Western

[33] The Visegrad countries comprise Czech Republic, Slovakia, Poland , Hungary

Europe, or at least resemble them (Reiskin & Klinksiek, 2012). Office supply in the central Europe represents now about 5 percent, which is close to Western Europe. The level of real estate risk in the region is closer to that of established western markets than ever before. Economies of Visegrad countries are Europeanized with the rule of stability; markets are institutionalized and dominated by the western European ways of doing the business. There are the new investment opportunities in whole CEE region, but they are less obvious and more granular. Less saturated market the investors can find only in South-Eastern Europe and in Russia.

The real estate investments from big investors are oriented on the sectors, where they expect the largest return and where is the solvable demand. Retail and office sector were the most frequent destination of investment in CEE in 2011 (Colliers International, 2012) (see Fig. 6.1).

6.3 Real estate development in Central and Eastern Europe

The Central and Eastern European region is strongly heterogeneous (Central Europe, Baltic States, South East and the Balkans, Commonwealth of Independent States) and the impact of the global crisis differs. The reforms that enabled to transform the former centrally planned economies into market economies relied on macroeconomic stabilization, liberalization and privatization and institutional change. After very difficult first decade of transition when GDP contracted, unprofitable state-owned enterprises collapsed and unemployment has grown (Loréal, 2010), the second decade brought substantial amelioration of economic situation driven by the growing productivity, foreign direct investments and economic integration.

Between 2002 and 2007, the CEE region attracted an incredible amount of $515bn in net private capital inflows, the second highest only to emerging Asia. Around 46% of cumulative net inflows consisted of cross-border loans to banks and the non-bank sector (“other investment” in the balance of payments statistics), 47% were foreign direct investments, and 7% net portfolio (equity and bond) investments. (Mihaljek, 2009). The large inflows created macroeconomic and financial sector vulnerabilities - larger current account deficits, rapid credit growth, worsened fiscal positions, and heavier indebtedness (often in foreign currencies) of households in a large part of the region.

The abundance of lending by foreign establishments resulted in an increase in external debt, which by the end of 2008 had reached 136% of GDP in Hungary and was above 100% of GDP in Latvia, Estonia and Bulgaria. The large share of foreign currency loans in 2008 reached 34% in Poland, 57% in Romania and Bulgaria, 65% in Hungary and Lithuania, and around 90% in Estonia and Latvia (Vincent, 2011). Also massive inflow of capital has led to overheat (e.g. Bulgarian inflation reached 12% in 2008) and real estate price bubble in some of the countries. This was true for real estate markets, particularly in the Baltic states, but also in Poland in 2005-2006 (with growth of more than 30% in nominal house prices) and in Bulgaria between mid-2007 and mid-2008 (Vincent, 2011).

When the subprime crisis started in US, most of the analysts believed that the Central and Eastern European (CEE) countries will not be affected by it. In reality, the crisis hit CEE countries very strongly in the second half of 2008. Some of the analysts even feared that CEE countries were hurtling toward a regional crash similar to the East Asian crisis of the late 1990s. Fortunately by the end of 2009 CEE export began to grow gradually, and in 2010 the economic growth was resumed.

The influx of foreign direct capital in the second transitory decade did not only spur the economic development of the region, but also significantly contributed to asset price and real estate bubbles. It also acted as the conduit for the contagion for the crisis from abroad. The credit crunch thus had much more severe effect on transition economies than on other emerging countries, which on average had positive current account positions in the period prior to the crisis. Not surprisingly, transition countries were disproportionably represented in the list of recipients of financial assistance by the IMF (Brezigar-Masten, Coricelli, & Masten, 2009).

6.3.1. Former socialist countries of Central Europe (CE countries)

Poland, Hungary, Czech Republic, Slovakia and Slovenia are the transition countries of Central and Eastern Europe with the highest GDP per capita, the smallest state share and highest share of foreign investors both in the industrial and the banking sectors, as well as the highest degree of financial intermediation. These countries have benefitted most from foreign direct investments entrance to the European Union.

After the turn of century the gross domestic product in V4 countries was rapidly growing. The major factors that enabled the growth were: the gradual integration into European Union, radical economic restructuring and the booming World economy. The impact of the crisis on CE region was strong, but in comparison with some other CEE countries milder. This could be explained by relatively good macroeconomic fundamentals characterized by not excessive financial imbalances and their stable funding (although more problematic situation is in Hungary).

Slovak Republic is the smallest and most opened economy from CE countries. Although the restructuring of Slovak economy in Nineties lagged behind other V4 countries, the situation has changed in the turn of the century as the country became more attractive for the foreign investors. The growing volume of FDI was directed into privatization projects in banking, utilities and to real economics, such as automotive and electrical industries, which enabled to reduce the unemployment level. The multinational companies raised their production in Slovak Republic, which exerted the substantial impact on the growth of export and GDP. The foreign direct investments helped to reindustrialize the country after its deindustrialization in Nineties. So unlike the situation in Baltic countries were the FDI flew primarily to real estate, banking and purchase of foreign goods, the FDI in Slovakia helped to develop the real economics producing the internationally competitive products.

Czech Republic before crisis has benefited from the improved fiscal performance, low inflation and interest rates, liquid and conservative banking sector. During the crisis the economic position of Germany had deteriorated, and as the result of that Czech Republic has experienced substantial drop of the export to his main trade partners but Czech banking sector has weathered the global financial turmoil relatively well. The crisis led to a sharp widening of the overall deficit in 2009, a rapid accumulation of debt, and an increase in interest rate spreads.

The situation in Hungary was more complicated. The country needed the fiscal consolidation before the crisis and did not have sufficient capacity to prepare the anti-crisis measures. The economic growth slowed down gradually, and Hungary moved into stagnation in 2007, while the other European economies were still booming. After the outbreak of the global financial crisis Hungary was forced to seek the assistance of the IMF in autumn 2008. The impact of global recession on Hungary

in 2009 was a slump in real GDP of 6.3% in the hardest among the V4 countries, confirming the trend slowing economy from the previous year. At the end of 2010 Fitch downgraded rating of Hungary to BBB- with negative outlook, which meant that the country will have the problem with refining its debt (Durden, 2010).

In the early 2000s, declining international interest rates had encouraged borrowing in foreign currencies where exchange rates were favorable. Nearly 90% of Hungarian mortgages were denominated in Swiss francs since 2006. This has become the trap when interest rates on Swiss Francs grew and the capital flight has caused the drop of the Hungarian forint. Such mortgages were originated in Baltic States, as well as in Romania and Bulgaria, and to lesser extend in Poland. In all of these countries they are source of repayment troubles.

The stock of non-performing loans (NPLs) at Hungarian banks stood at HUF 1,200bn– HUF 1,300bn in August 2010. The stock included almost HUF 500bn in retail loans taken out by nearly 100,000 households (Austrian central bank governor acknowledges forex lending risk in Hungary but sees no dramatic rise in defaults, 2010).

Overall the non-performing loans ratio for the CEE region as a whole stabilized at slightly below 7% in 2011. However the CEE banking sectors has rather modest size representing 9% of the total loan stock in the Eurozone. SEE (South Eastern European) countries and Hungary and Slovenia did not manage in to stabilize asset quality. Overall NPL stock in CEE is representing only half of the NPL of Spain (Raiffeisen research, 2012). In spite of this, the most important banking markets in CEE (Russia, Poland, Czech Republic, Slovakia, Romania, Serbia and Albania) representing 80% of total CEE banking market, registered the healthy growth of mortgage and corporate credits of 14% year to year in 2011. Such economic development signals that there are no signs of the credit crunch in CEE, and banking sector is working rather well in existing tough conditions.

Poland and Albania were the only countries that had the positive GDP growth in whole Europe in 2009. During five year period preceding 2008, Poland experienced rapid growth of more than 5 % on average. This enabled in 2007, to reduce its budget deficit below 2%. Moreover, the Polish economy is more closed compared to the other EU member states and it means that she is less dependent on the global trade. The depreciation of Polish zloty enabled to adjust Polish economy to external shocks very quickly by raising its competitiveness. Poland was also successful in correct utilization of the foreign and domestic investments, in spite of the underutilization of the production capacities. At the same time the access to credit for unproductive investments was tightened. Fiscal support of the households enabled to maintain the private consumption. Also the Polish banks were not involved in the high risk speculations in the large extent.

With the outbreak of the crisis in 2009 the Slovenian government adopted several packages of short term anti-crisis measures to cushion the shock experienced by the economy. These measures enabled the preservation of numerous jobs and prevented the growth of poverty, but in the long term neither the economy nor the country can survive in this way. The latest crisis has exposed numerous weak points in existing systems, so the recovery of Slovenia required radical structural changes (Slovenian exit strategy 2010-2013, 2010). Unfortunately the implemented changes were not too successful, and at the end of 2012 and this south alpine Republic have to deal with the possibility of economic bailout (Reuters, 2012).

6.3.2 Baltic states

The three Baltic States, Latvia, Lithuania and Estonia have suffered a dramatic reversal of fortune in recent years. Latvia was Europe's fastest growing economy in the mid-2000s, posting 10-12% yearly growth rates. Estonia and Lithuania grew in the high single digits during the pre-crisis period. During the crisis the Baltic States did not devalue their currencies, which would help them to make the faster adjustment to crisis and raise their competitiveness. Instead, they have cut wages and spending in austerity packages to achieve the same end.

Latvia also had to take a €7.5bn bailout, lent by the International Monetary Fund and the European Commission (Latvian house prices rising, GDP growth positive, 2010). Estonia managed to keep its budget deficit low, in spite of the economic problems; with the goal of entry to Eurozone (she succeeded to become the 11th member of Eurozone on January 1, 2011). In Latvia, public wage bills have been cut by 23.7%, pensions by 10%. Together with increases in the value added tax (VAT) rate from 18 to 21%, these were the conditions to which the Latvian government had to agree in order to get the second tranche of the IMF package. In Estonia and Lithuania, a 20% cut in public wages and a reduction in social benefits was enforced.

The combination of large current account deficits, excessive credit growth, and mounting housing bubbles had led to an economic crash. Estonia and Latvia were already registering negative GDP growth in 2008, and endured output falls of 14.0 and 18.0% respectively in 2009 (Economic Growth Prospects in Central and Eastern Europe, 2010). The Lithuanian economy contracted by 18.5% in 2009, the steepest GDP decline of any European country and one of the biggest in the world. Baltic countries introduced the very strong austerity measures oriented on budgets cuts and raising the revenues. The realization of these measures, unthinkable in many European countries, enabled to renew the growth in 2011 (Collier, 2012). The problem is that the pre-crisis level of the economy was not yet achieved. During the period of recovery Latvia also lost a large part of young population because of migration. Generally the economic crisis had probably the most disastrous effect in the World on the three Baltic States and Ukraine.

6.3.3 Slavic countries of former Soviet Union

Market reforms were slower and less comprehensive in Russia, Belarus, and Ukraine. The political instability in Ukraine in last years and distrust of the population to political leadership slowed down the transformation of the country and was one of the sources of the economic problems. On the other hand Russia has benefited from the high prices of the oil and gas, which was the main source of its rising prosperity during the boom period, but was not able to restructure its economy towards knowledge based society. Belarus remained a planned economy for the most part, but like the other CIS countries, its banking sector has experienced the tremendous growth in recent years. The high current account deficit had forced the Belarus to sign agreement for $3.5bn stand-by loan with IMF in 2009. The important moment in the economic development of SEE countries was the establishment of Customs Union by three countries: Kazakhstan, Russia and Belarus, which is aimed at intensifying cooperation between the three states by removing trade barriers within the Union. It is expected that important milestone for more profound integration of above mentioned countries will bring the establishment of Eurasian Economic Union on January 1, 2015.

The Russian economy before crisis was in very good condition. The nine consecutive years till August 2009 the Russian economy grew on average annual rate of 7%. The real incomes of the population have grown substantially, and the country as a whole was running a sizeable surplus on the current account, government external debt was at a very low level; the volume of foreign direct investment was increasing. Russia seemed to be prepared to withstand the crisis without major impact. The real Achilles heel of Russian economy was however the continued dependence on natural resource exports, particularly oil and gas (Connory, 2010) (Loréal, 2010). In 2009, the federal government's budget ran an unprecedented deficit of 2.3 trillion rubles ($75.5bn), or 5.9 % of GDP.

One of the major constraints to Russia's economic recovery is the fact that many Russian companies had accumulated excessive debt positions just before the crisis. The lack of available lending instruments forced construction companies to cut their activities long before the beginning of the crisis in autumn 2008. In particular, growth in residential construction fell from 20.6% annual growth in 2007 to 4.6% in 2008 (Colliers International, 2009). This modest level of growth turned into a 6.7% decline in growth in 2009. As a result, investment growth fell from the pre-crisis level of 22.7% to 16.2% in 2009. At the end of 2009, Russian banks reported that levels of overdue loans had reached roughly 6-7% (Orlova, 2011).

The crisis of 2008-2009 changed considerably the power relations in Russian real estate sector. Since many property and development companies were unable to service their debts, the Russian banks became de facto and often de jure owners of these companies. In most cases they later prolonged the loans and restructured them with the aim to meet the requirements of the Central Bank concerning reserves for bad loans and loss recognition. (KPMG, 2012)

Ukraine's property market has been in crisis since 2008. GDP collapsed in 2009, falling 14%, and the country has suffered a fiscal crisis, somewhat relieved by a massive IMF bailout. Transactions have plunged; construction activities almost stopped. This led to bursting of housing bubble in Kiev, which was not a really surprise taking into account the fact that from 2002 to 2007, the house prices in Kiev skyrocketed attaining 562% (peak average price attained $533 per square meter, the housing price growth from 2005 till 2008 was 50%, 51%, 44%, and 17.6% respectively). Ukraine's housing boom was fuelled partly by foreign buyers, but also by strong economic growth (7% GDP growth per annum 2002-2007) and interest rate differentials. (Global Property Guide, 2010)

The shortage of acceptable housing is serious problem in Ukraine as well as other post-Soviet countries. The augmentation of the housing supply is in spite of astounding price increases often restrained by the complicated regulatory systems, difficulties with obtaining the construction permits, political instability, existence of local monopolies, and even corruption practices.

There is also the serious problem with mortgage credits. More than 75% Ukrainians do not qualify for bank loans and, at the same time, developers cannot secure loans on favorable terms to continue construction. As a result of the difficulties in accessing credits, many construction projects are frozen. The housing market is also swamped by properties sold by cash-strapped buyers. The mortgage market does not work properly because of the high inflation that attained 22.3% in 2008, 12.3% in 2009, 9.8% in 2010 (Colliers International, 2010).

6.3.4 South-Eastern European transforming states

The impact of the crisis on the Western Balkan (WB) countries was in general milder than in other new European states. This may be explained by following arguments (Duvalic, 2010).

- Majority of WB countries were less integrated with the EU than the new EU member states. Foreign direct investments were rather low, WB are still quite closed economies, less opened than most new EU member states, and many old EU member states;
- There were, however, also similarities of WB countries with new EU countries: Foreign banks in WB hold 78-98% of banking assets, lending policies of easy credit led to the credit boom, many loans were in foreign currency (60% in both Croatia and Serbia), the credit crunch in 2009 brought increasing credit defaults in 2009;
- But there were also important differences: financial markets in WB were less developed, and used less sophisticated financial instruments. The lower integration of WB with EU has also meant a lower exposure to the effects of the global crisis.

Later, however, during the post crisis period the unemployment in WB countries extremely grew attaining 28 percent to 43.5 percent of the population depending on country in 2012 (Filipovic, 2012). Such situation bears the serious risk of the social upheavals and the destabilization of the whole region. The problem is that during the boom period the investments were targeted mostly to construction and real estate sectors, while the industries stagnated and thus became uncompetitive. The situation is slightly better in Croatia, the country which will join the European Union on July 2013.

The real estate sectors in Bulgaria and Romania have witnessed the strong construction and real estate boom before the crisis. These countries were preparing for accession to European Union, which came into effect in 2007. This event motivated the international real estate investors to look for the numerous business opportunities with high yields in the region. For instance Bulgaria emerged as the new shining star for investors in office development. Bulgaria offered to investors the lower prices, higher returns and relative security. Unfortunately the recession put the end to real estate boom. Moreover the situation in post crisis period is bleak; the local real estate markets stayed depressed for another four years. For instance there were quite low real estate investments in Romania and Bulgaria in 2011 compared to other CEE countries (Colliers International, 2012), which is shown on Figure 6.2.

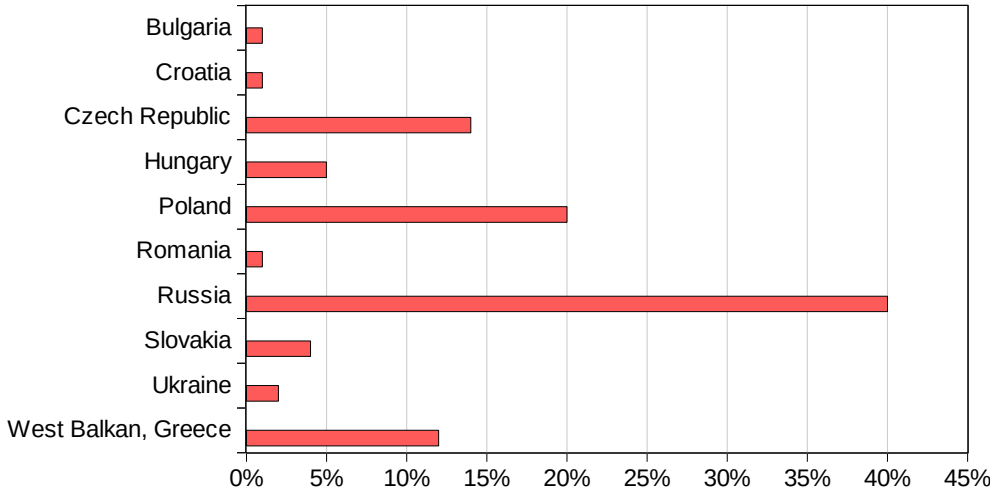

Figure 6.2 Eastern Europe - real estate investments volume by country in year 2011

Source: Colliers International, 2012 Eastern Europe Real Estate Review

6.4 Real estate financing - current problems

Before the crisis the banks actively financed real estate and the construction sectors. Later they substantially reduced their activities in these sectors, which negatively influenced the real estate development as well as the economy as the whole. This is because the real estate and construction sectors employ large quantity of people and produce non-negligible part of the GDP. Therefore from the future perspective the funding needs of these sectors need to be addressed. For instance the housing market normally generates quite strong demand in the economy and it impacts the consumer confidence and spending in wider economy (CBI, 2012).

In spite of the positive banking growth in 2011, banks reported the reduced willingness to finance the real estate in 2012. The banks in the CEE region are generally less enthusiastic about the short terms prospects of the sector, being convinced that the recovery in the real estate sector will be longer than in other economic sectors. Such assessment of the situation is especially pronounced for the Baltic States and Romania, while the real estate projects still have the strategic importance for Czech Republic and Bulgaria (KPMG CEE, 2012). The necessity to manage in many cases the significant number of the non-performing real estate loans reduces the inclination of banks in the region to be very active in new real estate funding. This is also reflected in rising loan interest risk premiums.

The prevailing interest is to finance the income generating projects rather than development project. Restricted new real estate development will gradually lead to reduction of the vacancy rates on office and commercial properties and sales of the empty new housing units that the developers finished to build soon after the break of crisis, hoping to meet the speculative demand that quickly evaporated. That may happen in different countries of CEE sooner or later depending on the macroeconomic situation. The stagnating incomes and high unemployment rates combined with the low foreign direct investment will, however, prolong the transition to such state.

Generally European economic outlook is also under the influence of austerity cuts to public budgets. This has the effect on the reduced number of civil service workers. Also in some countries as for instance Italy some publicly owned buildings will be sold to market, thus raising the leasable stock as well as the vacancy rates. (Rreef, 2012) Retail developers find at present only limited the opportunities in the region, with the exception of Poland and Russia. “The CEE region is facing flat retail sales growth due to the lack of a strong consumer base, which is holding back retailers’ expansion plans”. (KPMG, 2012)

Overall the CEE region is now less active in terms of the development of new office space (except for Russia and to lesser extend the Czech Republic and Poland). Although the economic growth in Slovakia in 2010-2012 was one of the highest in Europe, the low level of urbanization and saturated office market does not provide a lot of space for further development at present. Bratislava had already more office space per capita than Prague or Warsaw at the end of the first decade of 21 century. (Budasch, 2010)

Low activity in office sector development is due to high vacancy rates, reduced rental levels and, problems coming from Euro crisis. Banks react on this situation by restrictive financing conditions and a reluctance to start new projects. (KPMG, 2012)

6.5 Impact of new financial markets regulation on real estate sector

The financial crisis has revealed the substantial weaknesses of existing banking regulation and supervision. The banking problems were the result of the insufficient risk management and excessive risk appetite. Thus the crisis has accelerated further work on existing regulatory measures and their implementation.

The resilience of European banks (Liikanen, 2012) has been undermined especially by poor risk management especially when trading highly-complex instruments or real estate-related lending, lack of oversight of the banks, increasing reliance on the wholesale markets, increasing size, scope and complexity of banks, with the consequent difficulties for the boards to control and monitor the bank activities, increase of leverage at a much faster pace than their capital and deposit base, overreliance on market discipline, the fact that the newer trading activities were inadequately captured in regulatory capital requirements, increased interconnectedness, systemic risk and limited resolvability.

The financial markets in Europe were furthermore distorted by implicit public support. Majority of the failing banks in Europe obtained the public money thus distorting the competitive environment. This has thus limited efficient entry and exit from the market. Moreover the EU law enabled the banks the expansion of the cross-border activities, yet the institutional arrangements remained largely national.

Based on the revealed banking vulnerabilities, it was decided to introduce the new regulations. It is a quite probable that they will have the profound impact on functioning of the real estate markets (Rreef, 2012).

The most important regulations are as follows:

1. *AIFM directive.* AIFM is the abbreviation of Alternative Investment Fund Manager. The directive regulates the managers of funds. The Directive will impact European Union (EU) and non-EU AIFM, but also EU and non-EU domiciled Alternative Investment Funds (AIF), service providers to these funds and their investors.

The Directive covers all alternative sectors such as hedge funds, real estate and private equity, but also traditional sectors where the funds are not registered as UCITS (Undertakings for Collective Investments in Transferable Securities). It applies to funds and certain corporate collective investment vehicles. Such products are generally for professional investors, but may also be sold to retail investors (Ernst & Young, 2012a).

AIFM formulates relatively rigorous requirements regarding risk and liquidity management, appraisal frequency, reporting etc., but it also introduces a “European passport” allowing the asset manager licensed in one country to operate across the whole of the European Union. It is expected that removing of the restrictions for AIFM will lead to increased competition on real estate market, which will bring more attractive terms for the investors; it will attract additional capital and more liquidity.

2. *Basel III.* Basel III agreements bring significant challenges to banks. It sets the liquidity coverage ratio standard (which is higher than it was before), it requires the dynamic analysis and granular reporting, and special consumer protection, which is quite difficult to realize. The over the-counter (OTC) reforms require that margin be held for trades that were previously uncovered and that Central Counterparty Clearing Houses (CCPs) maintain capital cushions (Ernst & Young, 2012b).

At present the banks are exerting a lot of effort to meet the new requirements. Almost everything must be modified – strategic planning, governance, risk management, controls, data and IT infrastructure, compensation structures and overall business models. The banks estimate that the market risk and positions are going to be at least three times as costly in terms of capital. The new regulations will most likely discourage many former investment banking and trading strategies.

It is expected that Basel III will lead to stricter lending standards. Under these conditions the banks may not be willing to finance more risky real estate projects, which they did in past. According to the survey of DTZ 70% of respondents is convinced that BASEL III will affect real estate very negatively. (Almond, 2012) At present the banks provide three quarters of real estate financing and more stringent lending requirement will bring the significant bottleneck for the property investments. We can therefore expect that the increasing amount of financing will come in future from alternative sources of capital providers, such as debt funds, pension funds, and maybe from insurance companies (if not too restricted by requirements from Solvency II regulation).

The bank regulations mean also looking for more collateral as the security against more funding from investors. It is thus expected that the high–quality of collateral will be very much in demand. (McKinsey&Company, 2011) According to Basel III reforms, banks will be obliged to hold sufficient easy-to-sell assets to protect against a 30-day market crisis from 2015. (Atkins, Stafford, & Masters, 2012) There is the danger that it will bring the „collateral crunch", so that will not be enough of collateral for the banks that could attract the capital of investors. This will in turn restrict the amount of available capital for lending to customers and businesses. Such situation may undermine the growth prospects of the national economies as well as for real estate sector.

3. *Solvency II.* The aim is to provide better protection for insured and beneficiaries with simultaneous support of market stability, especially by higher quality of risks evaluation and effective allocation of capital. Solvency II framework has three main pillars:

- quantitative requirements (for example, the amount of capital an insurer should hold);
- requirements for the governance and risk management of insurers, as well as for the effective supervision of insurers;
- requirements on disclosure and transparency.

It is likely that Solvency II will have a negative impact on the readiness of insurance companies to allocate capital to real estate. This regulation requires that these investments have equity backing of 25 percent. This requirement is considered by experts to be controversial. The insurance companies may be inclined after the new regulation to direct their capital to other segments of the market, while until now they belonged to major investors at the real estate markets. Although at present the investment of the insurance companies to real estate in CEE countries are not very large, in future they may become more important.

6.6 Bank deleveraging and private equity companies

The present real estate market conditions are characterized by lower prices of real estate. Moreover the growing supply of the distressed properties in the market represents the business opportunity for the private equity real estate funds. These funds are the collective investment schemes, which pool the capital from investors. The falling property prices enable to acquire assets at significant discounts. Such strategy of private equity fund represents the opportunistic strategy, which

may on one hand bring up to 20% of return. On the other hand it is risky, since the investors may lose the money in the badly managed fund as well. Thus it is the high risk/high return strategy.

The potentially acquired properties may require a high degree of enhancement. This strategy may also involve investments in development, raw land, and niche property sectors. For many opportunistic private equity funds the banking crisis, recession and real estate downturn has created exceptional conditions to source and execute investments with highly attractive absolute and risk-adjusted return potential" (Patron sets European distressed goal with €880m equity raise, €3bn target, 2012). Some of them are thus focusing their attention on distressed property loans that are very abundant in Europe.

For example two bailed-out banks by the UK government, such as Royal Bank of Scotland or Lloyds were under strong political pressure to shed-out their portfolio of distressed property loans. Both banks have succeeded to sell £2.3bn of non-performing loans in the market. The buyers were US equity companies Blackstone and Lone Star, who waited for the right market conditions to buy these loans cheaply enough expecting lofty returns from these transactions. The loans were secured against thousands of properties, from city offices, to pubs, care-homes and suburban garden centers. Also two other American banks Wells Fargo and JPMorgan Chase, bought a portion of a $9.5bn portfolio of commercial real estate loans in 2011 sold by Anglo Irish, the nationalized Irish bank (Alloway & Braithwaite, 2012).

Such transactions are clearly signaling the change of the power relations in the real estate industry. Often the equity companies are willing to pay higher prices than are the present market prices, in order to have the access to the future buying of the distressed properties. Such attitude of the private equity companies is also motivated by the access to more property in future. The private equity funds are expected to augment their position on the property market as a result of divesting the banking portfolios (Hammond, 2012). This process is likely to accelerate with more banking regulation implemented. Such regulations will raise the size of capital necessary to be held in banks in order to provide the property loans.

The interest of the equity companies are, however, in odds with the European economic policies. The deleveraging process often leads to significant reductions in lending to the real economy and to fire sales of assets. After crisis the banks are usually reluctant to tap equity markets, as valuations are depressed and investors are particularly risk-averse. Also there is likely to be more assets for sale as the acquirers of the assets. Hence the buyers will have ability to reduce the prices. Hasty sale of good quality liquid assets, which could depress prices, may trigger negative spirals. Supervisory authorities try to counteract these tendencies and to push for measures aimed at increasing capital of banks.

There were also the fears of the massive deleveraging in Central and Eastern Europe. Overall deleveraging of banks in CEE6 (Croatia, Czech Republic, Hungary, Poland, Romania and Slovakia) was so far rather moderate except for Hungary. Lending by banks in CEE countries was reduced by 3.1% of expected 2012 GDP in the same period, less than half of the deleveraging in France, 1/3 of Italy or 1/5 of UK (ERSTE Bank, 2012).

The situation was moreover quite delicate because of financial problems of foreign banks that dominate the CEE region. Some of them might have been inclined to transfer the funds from the CEE subsidiaries into the headquarters, or sell the subsidiaries in CEE countries and in such a way to solve

their financial problems. Fortunately this happened in orderly way, nevertheless the deleveraging of the foreign banks subsidiaries caused that some money were transferred to headquarters of foreign banks, and they are not expected to come back soon. Based on Vienna Initiative of 2009 the regulators and international financial institutions agreed a pact to prevent the western European banks from withdrawing the region. Overall the objectives of the pact were mostly met. The ERBD together with other partners has initiated the Vienna plus activities that should enable to avoid a recurrence of past risks. These include, among others, issues of foreign currency-based lending, adequate speed of credit growth and related micro- and macro-prudential issues. (ERBD, 2012)

The most important decision of Vienna plus initiative has been to allocate €30bn for the economic development of the South and Eastern Europe that is only slowly recovering from the crisis. This should not only promote growth, but also to accelerate the structural reforms. (Bergloff, 2012) The more banking liquidity may also help to promote the recovery of the real estate markets in CEE countries.

Although it is difficult to collect the data on distressed properties in CEE, the company Real Estate Analytics (REA) has been able to collect the data related to these topics for the year 2010. Although the data are incomplete they provide certain insight on studied problem. REA has classified the real estate loans to four categories: (Real Estate Analytics, 2012)

- Troubled: where there is a default, bankruptcy, or foreclosure pending, or some kind of lender forbearance or other restructuring of a loan;
- Lender REO: where a lender has taken property via foreclosure;
- Restructured/Extension: to classify deals where ownership or debt terms have changed but a long term solution to the cause of distress may not have been reached. Types of ownership restructurings include a mezzanine lender stepping into the equity position or a debt for equity swap. On the debt side, the most common types of restructuring include modifications to the interest rate, loan balance, interest-only period and/or other terms. In almost all cases, at least two of the three stakeholder groups (borrower, 1st mortgage lender, mezzanine lender) most often involved in real estate transactions will retain either an equity or debt stake in the property or portfolio at the completion of the restructuring;
- Resolved: Represents properties that have moved out of distress via refinancing or through a sale to a financially stable third party.

The data on distressed property loans in the selected countries of CEE in 2010 are shown on Figure 6.3 and Figure 6.4.

As the banks shrink their balance sheets and retreat from the market, private equity groups, the insurance companies, mezzanine lenders and other investors with flexible capital are stepping in and are also taking a larger role in financing the real estate developments. They are also buying the accumulated debt from banks. This can already be illustrated on the following numbers. The net property debt funding gap in Europe has fallen by 20% to $86bn over the six months in 2012 (Lending diversity shrinks Europe's property debt gap to $ 86bn, 2012). This happened thanks the development of non-banking lending. According to DTZ the non-banking financing has raised over in 6 months of 2012 by 45% to a capacity of $104bn. Gross debt gap has shrank from $190bn to a net $86bn. It is estimated that there will be $225bn in non-bank finance available across Europe over the period 2013-15 (Lending diversity shrinks Europe's property debt gap to $ 86bn, 2012).

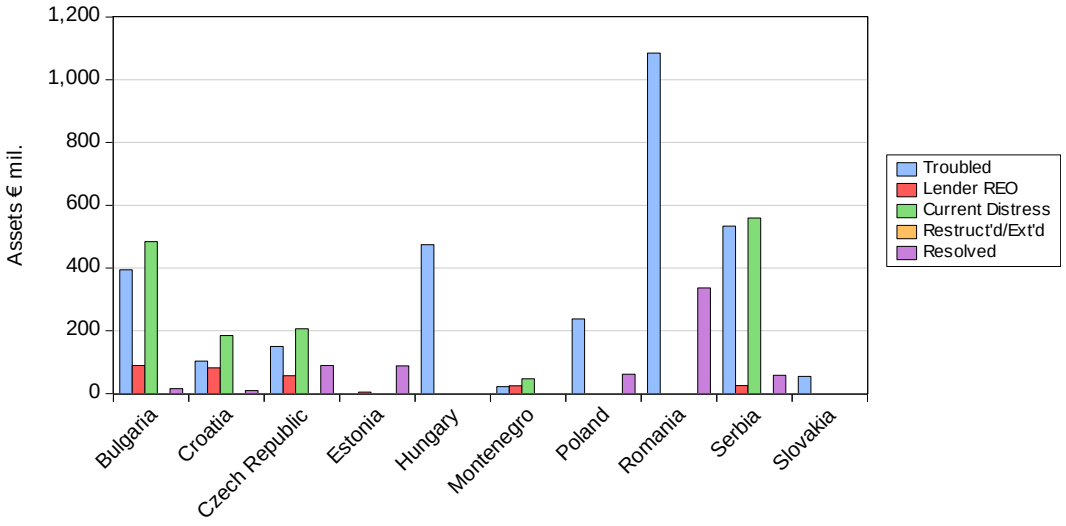

Figure 6.3 Distressed property loans in selected CEE countries in 2010 in € mil.

Source: Real Estate Analytics 2010

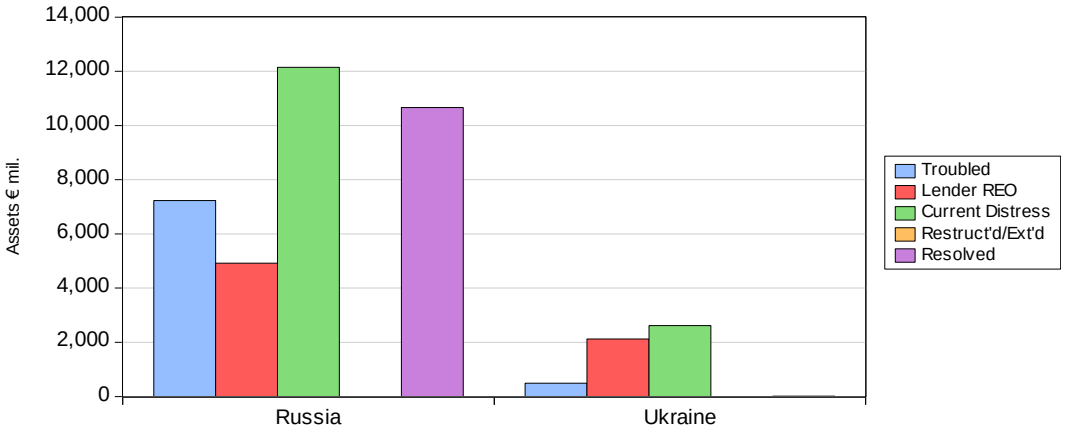

Figure 6.4 Distressed property loans in Russia and Ukraine in 2010 in € mil.

Source: Real Estate Analytics 2010

We are also witnessing the growing activity of debt funds on the real estate markets. Debt fund is "an investment pool, such as a mutual fund or exchange-traded fund, in which core holdings are fixed income investments. A debt fund may invest in short-term or long-term bonds, securitized products, money market instruments or floating rate debt. The fee ratios on debt funds are lower, on average, than equity funds because the overall management costs are lower" (Investopedia, 2012).

According to the knowledge of IVG research lab (IVG Research LAB 10/2012, 2012), the debt funds in Europe were trying to collect more than €8bn for the investment purposes in 2012. It is not yet clear, how the activity of the debt funds will influence the financing of real estate in CEE countries, since these funds are often quite conservative. Yet the high returns coming from investing into distressed properties might act as the important incentive. The debt funds in Europe operate in different economic environments, which certainly influence their risk/return profiles. The risk depends on the character of real estate debt bought (tenant risk: default/rent reduction; liquidity risk: disposal at discount; borrower insolvency; risk of early repayment; risks in implementation of strategy, such as

fund liquidation; legal risks: problems enforcing liens). Based on the expected risks and returns the strategies of the debt funds are developed. As the benchmark they use the governmental bonds, i.e. the debt with the low risk. The higher risk is then typical for senior loans, mixed loans (mixed strategy that means combining for instance the junior and mezzanine loans). The most risky are distressed loans. If debt funds buy the distressed loans, they expect also the highest returns (see Figure 6.5).

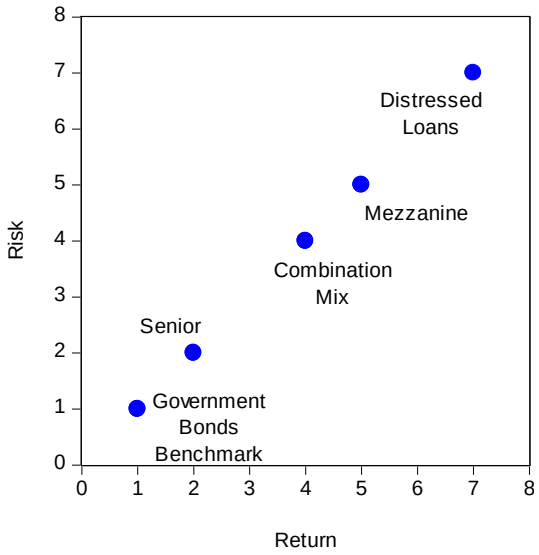

Figure 6.5 Risk/Return profiles of debt funds

Source: IVG Research LAB 10/2012

There is potentially growing real estate market where the debt funds can operate. The study realized by IVG shows that the investors and developers must provide much higher equity if they want to realize transactions on the real estate markets in comparison with the past (see Figure 6.6).

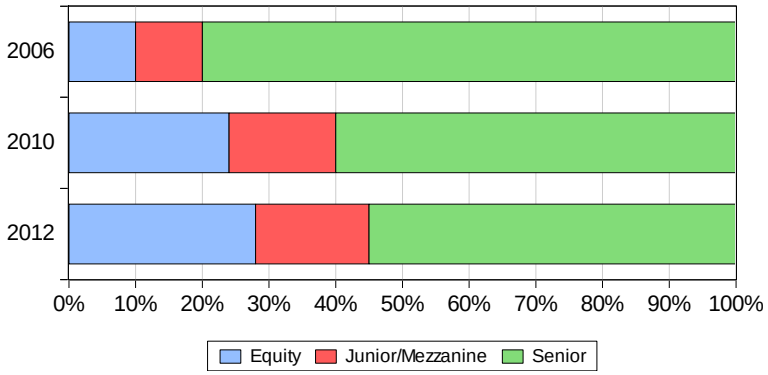

Figure 6.6 Typical real estate financing structure

Source: IVG Research LAB 10/2012

6.7 Impact of Eurozone crisis on real estate markets

The present Eurozone problems have the significant impact on the real estate sector too. Although the principal flaw of the monetary construction of Eurozone - the currency Union without political Union, was known to experts for many years, the present crisis has shown transparently why their opinion was correct. The political issues of the Eurozone, the large debts of South –European countries are not expected to be solved quickly. That also means the reduced capacity of banks to fund the real estate investments and more prudence in evaluating the real estate risks. Moreover the

austerity measures that were necessary to be implemented in many European countries, with the goal of reducing the deficits of public finance, might further curtail the real estate development.

On the other hand some investors from the countries with high sovereign debt are looking the safety haven for the allocation of their money. For example for wealthy Greeks, Arabs, Russians as well as other nationalities, London real estate is considered to be a very good option to invest their money. Solid fundamentals and attractiveness of such key cities as are London and Paris attract growing number of foreign buyers. "The euro crisis has induced greater caution among real estate investors, leading to constrained activity in increasingly polarized markets in Europe with a strong focus on investment in larger, liquid, core markets perceived as 'safe havens". (CBRE, 2012)

The continued uncertainty in Europe resulted in significant decreases in the volume of investment transactions reported during the first half of 2012, compared with the corresponding period in 2011 (KPMG, 2012). European real estate transaction volumes fell 19.4% in first half of 2012 to €46.8bn from 1H11 (Knight Frank, 2012) due to continued uncertainty surrounding the future of the Eurozone and a weak economic outlook. Investors were really concerned about the possibility of a Eurozone break-up, which is reflected by sharp fall in activity in the European peripheral markets (Knight Frank, 2012). European Central Bank's "outright monetary transactions" program realized in 2012 as well as introduction of the European Stability Mechanism (ESM), has enabled to reduce the risk of the Eurozone breakup substantially.

But in spite of the existing measures the substance of the Eurozone problems is not solved. Foreign investors flee the Eurozone periphery and seek safety in the core. Private and public debt levels are high and possibly unsustainable. The loss of competitiveness that led to large external deficits remains largely unaddressed, while adverse demographic trends, weak productivity gains, and slow implementation of structural reforms depress potential growth (Roubini, 2012). It is expected that the solution of Eurozone crisis lay in the stronger political integration of member countries, which represent the uneasy political process.

6.8 Conclusion

Central and Eastern European (CEE) countries had undergone the transition to market economy, which enabled them to create the booming real estate markets in the 21st century although not in all real estate sectors. This enabled to modernize the office, retail and logistics sectors and in such a way to diminish the gap between the Western and Eastern Europe. The foreign direct investments and the integration processes were the important catalysts of such development. Yet the global financial crisis substantially decelerated the activity on formerly booming real estate markets in the region although in the varying extent. It revealed the vulnerabilities of their economic growth models, the institutions, public finance and banking systems. The growing unemployment and reduced or even negative GDP growth had the negative impact on real estate vacancy rate, real estate returns and economics of the CEE countries as the whole. The serious decline of the real estate activities and investments can be observed in Balkans, Ukraine and Baltic States. The best real estate market performers are however in Czech Republic, Poland and Russia where we can also detect the highest activities. However in the case of Russia, the commercial and retail sector is much less developed than in Central Europe. In spite of that the Moscow real estate market belongs to the

most liquid in Europe. The region as the whole is today more heterogeneous than ever before. While 20 years ago the differences were not very large, today the particular countries differ from each other substantially by their economic policies, character of growth, etc.

The global financial crisis had revealed the serious problems in functioning of the financial markets, such as the inadequate oversight, and banking regulations. The international community and European Union prepared three important regulations: Alternative Investment Fund Manager Directive, Basel III, Solvency II. The objective of the implementation of these regulations is to prevent the risky behavior of the banks, make the financial system healthier, reduce the bank vulnerability, etc. In spite of that the funding gap remains the issue in Europe.

The impact of the regulation on the real estate markets is very restricting. Some of the banks stopped financing the real estate; others implemented very restrictive criteria for the provision of the real estate credits. At the same time banks have to resolve the problems of distressed loans. This is the opportunity for the debt companies, private equity groups, the sovereign wealth funds, the insurance companies, mezzanine lenders and other investors with flexible capital to stepping into the market and to take the larger role in financing the real estate developments. These companies, however, prefer stabilized real estate markets, offering good return, or low risk return, which is not so frequent in Central and Eastern Europe. Such cities as Prague, St. Petersburg, Moscow, and Warsaw are able to provide such opportunities.

The consequence of restrictions on the provisions of banking property credits opens the new business opportunities in real estate sector for insurance companies, debt funds, off shore funds, mezzanine funds, private equity funds, etc. This tendency could be well observed in the most developed countries, although it is less obvious in CEE region. Nevertheless we may expect that the structure of the real estate funding will be changed in CEE countries in similar way, since many of these countries are well integrated in Europe.

The serious problem is still the Eurozone crisis, and high public debt. Many investors had fled from the European periphery into the EU core. The measures undertaken by the European Central bank, European Union had enabled to lower the risk of the Eurozone breakup, yet the real economic problems and competitiveness issues of the European periphery, including the CEE countries, are not resolved and may cause the serious problems in the future, impacting the liquidity of the real estate markets in the region. There are, however, important initiatives, such as Vienna plus that might help the faster recovery of the CEE economies as well as their real estate sectors.

Recovery of real estate markets in the region is under the way, but it can be hardly expected that the activity of the real estate markets will achieve the same scope as in the pre-crisis period in the short perspective. Most probably the debt will stay expensive and the condition for its provision restrictive. Moreover the maturity of the real estate markets in different countries is heterogeneous. While in East and South the markets have to still immature, which means that there are potentially many opportunities to invest, when the economy will take-off, the situation in Visegrad countries is different, and many project successful elsewhere would be problematic in central Europe, since the markets are more mature. Thus the real estate and construction sector development in CEE countries will depend on attained maturity of real estate markets, economic activities in other sectors as well as on important institutional reforms, especially in banking, economy, and European Union.

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Chapter 7

FINANCIAL CRISIS AND PRESERVATION OF FIRMS' VALUE

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FINANCIAL CRISIS AND PRESERVATION OF FIRMS' VALUE

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Abstract

Economies are accompanied by periodic cycles to a certain extent. Depressions always precede recessions, but a depression doesn't need to necessarily follow a recession. A depression cannot be overcome without regulation and state intervention (sometimes even by associations of states). This problem reaches beyond the company financial management with which we are dealing here. Enterprises should deal with recessions on their own, because such action demands destructuralization and changes in business behavior which can lead to positive effects on economy and businesses. Crisis management and crisis scenarios must be a part of a long-term corporate strategy. Prerequisite and a key factor in successful overcoming of recession within economy is sufficient financial efficiency of business. The one of many indicators in measurement of the financial efficiency is the final value of a firm. In a process of financial planning, the main goal is to estimate qualitative and quantitative parameters of efficiency, so that the value of firm at the end of the planning period is higher than at the beginning of this period. Under recession conditions however the firm, in consequence to the redefinition of the firm's expectations, should be content with the fact that there will not be a reduction of value. In company with poor efficiency without a crisis scenario, the situation results in the slump in financial parameters due to the drop in sales.

Ex post solutions in the form of the sale of the property, reduction of the number of employees and chaotic cost reduction leads finally to the loss of market position and overall efficiency. For a fast growing and long prospering company with good financial performance a short-term reduction of final value levers should be a solution for overcoming the crisis. A crisis scenario presupposes the possibility of a short-term loss of business value and this fact is perceived as an investment to overcome the crisis and start expansion of the company after the crisis.

Keywords: financial planning process; value of firm; intrinsic value; economic value added; value based management; controlling.

7.1 Introduction

Economies are accompanied to a certain extent by periodic cycles which are, on the one hand expansive, which is caused by economic euphoria, and on the other hand, the cycles bring economic recessions, which can grow into depressions characterized by high unemployment, low volume of production and investment, weakened confidence in the market, drop in prices and widespread bankruptcy. Depressions always proceed recessions, but a depression doesn't need to necessarily follow a recession. Enterprises should deal with recessions on their own because of the possible positive effects on the economy, and on the businesses themselves, because such action demands destructuralization and changes in business behavior. This has the effect of increasing the supply and demand on the market, thus granting the surviving firms a qualitatively new existence in the changed conditions. A depression cannot be overcome without regulation and state intervention (sometimes

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even by associations of states), and this problem is bigger than the issue of company financial management, which we are dealing with here. The main sign of an economic recession at microeconomic level is reduced financial liquidity among businesses as well as among consumers, which leads to decreased demand from producers resulting in less sales and lowered cash flow to businesses with the consequent insufficient resources for financing the firm's needs. One consequence of the unavailability of external funds, and in combination with the unsuitable capital structure, is that firms face collapse, and, in the case of long-term intense influence of the aforementioned factors, firms will cease to exist completely. All recessions have their embryos in the euphoria which accompanies expansion. Therefore we propose following:

- *Hypothesis 1:* The main question is, whether the firm's management is capable of protecting the shareholder's value from the negative influences of recession on their own, or whether the intervention of the state is always unavoidable.
- *Hypothesis 2:* Supposing the management is capable of this, what are the tools that can help to achieve it?
- *Hypothesis 3:* The third question is, whether the lower than projected economic parameters achieved by the firm always indicates a loss in shareholder's value under the conditions of recession.

According to the complexity and multidimensionality of the problem at hand, that is the creation of a firm's value under the conditions of the recession, it is impossible to define unequivocally all of the influences and their intensity of their impact on the achieved parameters of firm's efficiency in time, as it is also impossible to use exact statistical methods. Therefore as an ideal approach, we use inductive analysis by studying and defining the problem and creative synthesis as primary methods of identifying and formulating consequences of analyzed problem. The testing of the hypotheses is illustrated in the appendix of this chapter based on the value based management tools, especially on the financial analysis.

7.2 Literature overview

Value is the central point of economic activity. Everyone - businesses and consumers - wants to get the greatest value they can for their earned money. The ultimate goal of a firm is to maximize the wealth of stake holders, and therefore the firm´s value. Value is not always tangible. The most visible intangible value is in the concept of stakeholder´s value, even though stakeholders participating on activity of a firm have different and sometimes conflicting objectives. Stakeholder´s management leads to improvement in the creation of shareholder´s value (Hillman – Keim, 2001). In some circumstances, final value of a firm may include only residual income (Kruschwitz, 2011). A value creating based on efficiency is a decisive factor for a successful firm. Prerequisite of efficiency is competitive advantage over the rivals on the market. The main problem is that origin and sources of core competitiveness is the subject of various studies within the "theory of the firm." The problem of competitive advantage in terms of the theory of resources and competences is developed by the authors Prahalad and Hamel (1996), Grant (1996), Leonard-Barton (1995), and Teece and Pisano (1994). One of the most famous authors is Porter (1980) with his theory of five factors that accelerate

competitive advantage. According to Porter, company that achieves the highest return on invested capital within a given market segment has a competitive advantage.

Firms try to identify, control, and measure factors that improve efficiency and final value. Companies all over the world use value based management as a main concept of identifying, measuring and driving of value drivers. Financial health and financial performance is a prerequisite for maximizing the value of the company, which is generated by cash flows during the existence of the company. (Erhardt - Brigham, 2011)

Current management practice consistent with economic theory uses Stern - Stewart concept Economic Value Added (EVA) as a management tool, because the goal of the firm is to add to the value of the owners' wealth (Faulkner - Campbell, 2003). Indicator EVA expresses the expectation of shareholders as a maximum compensation for the cost of invested capital. Critical success factors in creating of the economic value added are variables affecting revenues and company costs. For example Turner (1998) has identified eight value drivers - sales growth rate, operating profit margin, income tax rate, incremental investment in working capital, incremental investment in fixed capital, replacement of fixed capital, cost of financing (cost of capital) and forecast duration (the planning period).

Maximizing the value through the profitability and maintaining of competitiveness advantage in the conditions of economics boom is possible through the expansion on the market through increasing the market share. The company is able to maintain a competitive advantage in the conditions of recession, only if the scope for cost reduction exists, which allows for reduction of the final price of the product, but only under the condition that the utility parameters of the current offer of the product are better than those offered by its competitors.

The basic task of the company's strategy during the recession remains the problem of minimizing the negative impact on the final value. What strategy can companies use for managing the value drivers to maintain and protect the final value? The companies that only cut costs heavily during the recession are not able to start expansion after the recession ends (Gulati, 2011). Protecting the company's core competencies is more important than only cutting costs. That together with the business optimizing the decisive factor can help overcome the crisis. Protecting the core competencies of the company as a prerequisite of competitive advantage includes protecting the best customers, employees, products and logistics of production and delivery.

7.3 Methodology and results

Every rational investor tries to increase the value of his available capital and invest it in such a way as to bring the greatest possible profit. On the developed financial markets, one of the main decisive criteria is that of the Market Value (MV) of firms, which is given through price of the shares and the number of shares issued according to the relation:

$$MV = P * a \tag{7.1}$$

where:

a – amount of issued shares,

P – actual share price.

The basic aim of the business is to maximize its market value through the minimum growth of its capital input, which we express like so:

$$MV / BV = MV / E \tag{7.2}$$

where:

MV – Market Value of firm,
BV – Booked Value of Equity,
E – Shareholder´s Equity.

The relationship MV/BV is an expression of market value added, and it can be written as a share of the market value of the firm along with its own capital, as can be seen in the following relation:

$$MV/E = (P*a)/E \tag{7.3}$$

Share price P can be written with the help of the indicator P/E (price - earnings ratio) expressing the risk of a concrete share, as a component (relation) of the already mentioned risk and profit of the given share in the following way (Arzac, 2008):

$$P = E * (P/EPS) \tag{7.4}$$

where:

EPS – earnings per share,
P – actual share price,
P/E – price-earnings ratio.

Algebraically amending this by putting P=E* (P/EPS) into the equation MV/E=(P*a)/E, we conclude that the market value added MV/E is equal to:

$$MV/E = E * (P/EPS) * (a / E) = E * (a / E) * (P / EPS) \tag{7.5}$$

assuming that the profit component per share and the number of issued shares equal clear profit after tax for the given business according to the relation:

$$EPS*a=EAT \tag{7.6}$$

where:

EPS – earnings per share,
a – amount of issued shares,
EAT – Earnings after Taxes,

it holds that market value added is a component of the profitability of Equity (EAT/E=ROE) and the risk expressed in the abovementioned indicator P/EPS:

$$MV/E = (EAT / E) * (P/EPS) = ROE * (P / EPS) \tag{7.7}$$

where:

EPS – earnings per share, *P – actual share price,*
ROE – Return on Equity, *EAT – Earnings after Taxes,* *P/EPS – price-earnings ratio*

Two facts emerge from the above analysis. Investors demand (expect) a higher profit from their higher priced investments, and, higher expectations of profit increase demand for the given investment titles, which presses the price on growth. The opposite relation can be seen in the indicator P/EPS, which shows profitability as well as the risks associated with the concrete titles $EPS / P = r_{exp}$. The situation where demand outstrips supply, market price of titles and, consequently, the value of the firm does not correspond to the objective "real" value of the business, but rather it expresses the "subjective" value set by investor's expectations, markets and owners; corresponding to the intrinsic value of the firm. Then the market share price according to the relation P=EPS*[P/EPS] is substituted with investor's expectations (intrinsic value – IV) according to the relation:

$$IV = EPS_{exp} * (P / EPS)_{exp} \quad (7.8)$$

where:

EPS_{exp} *– expected Earnings per Share,*

$(P/EPS)_{exp}$ *– expected P/EPS,*

IV – intrinsic share value.

Firms value based on the expected value of shares will also be an expectation - the intrinsic value of the firm - IVF, and it can be seen after the adjustment of the relation MV=P*a to the following form:

$$IVF = IV * a = (EPS / r_{exp}) * a \quad (7.9)$$

where:

IVF – intrinsic value of the firm,

IV – intrinsic share value,

EPS – earnings per share,

a – amount of issued shares,

r_{exp} *– return expected reflective risk,*

From this comes the fact that the intrinsic value of the firm is given by the capitalization of profit according to the relation:

$$IVF = EAT / r_{exp} \quad (7.10)$$

where:

EAT – Earnings after Taxes current period,

r_{exp} *– Return on Equity expected.*

If the expected profitability (r_{exp}) and the expected profit (EAT_{exp}) does not correspond to the reality measured by the ratio: *Intrinsic value of the firm/Accounting value of Equity* for the relevant period according to the relation:

$$IVF/BV = IVF / E \quad (7.11)$$

where:

IVF/BV – relation Intrinsic Value of firm /Booked Value of Equity,

IVF – Intrinsic Value of firm,

E – Equity value,

We discover overvaluation of the intrinsic value of the firm above the booked value of Equity. If the surplus of free capital on the market causes "inflationary pressure‘‘ and prices dramatically stop corresponding to real value, investors change their behavior and start selling, which increases supply and the disequilibrium which consequently causes distrust in investors, that is the start of the recession, which then spreads through the whole economy.

Demand decreases, consumers start saving and banks stop "advantageously" lending. Firms try to overcome the problems associated with declining income and insufficient funds for financing their needs, but they also want to make profit. So, in line with the theory of returns, they reduce prices, expenses and overheads by cutting production, reducing the workforce and by selling off unnecessary property, sometimes even undervalued, but in such a way as to preserve profits. Limiting purchasing and reducing the workforce is counterproductive because these measures have the effect of decreasing the flow of money to households, therefore suppliers drive down demand even further.

The attempts to solve banks liquidity problems and the insolvency of firms by the present passive policy whereby the state pumps vast amounts of the tax payer's money into the affected businesses will either solve the problem or just make it worse.

Such measures, as it always is, have only a short-term effect; where the recession is long-lasting, they are an insufficient remedy, they cause irreparable changes at business level in the property structure of the firm, reduce the firm‘s potential, which, upon revival of the economy could have helped start development and expansion, thus having helped the firm gain the advantage over its rivals within the frame of economic competition.

In the case that such a firm survives the crisis, its new status can only be initiated by later investments and increased costs for the renewal of the production infrastructure.

Does it mean, then, that firms should not save and reduce costs? No, not at all. Firms should, however, instead of ad hoc cuts with once-off short-term effects, look for conceptual measures arising from changes in behavior and expectations of future profits, and redefine these expectations so as to strive to achieve real objectives.

A relatively reliable indicator of the firm's development under conditions of expansion is the resulting value of the firm, assuming that the resulting value of the firm at the end of the observed period, subtracted from the following year is higher than the current value of the firm at the beginning of the period observed according to the relation (Lee, 2009):

$$V_t - V_0 > 0 \tag{7.12}$$

where:

V_t *– value of firm at the end of period,*

V_0 *– value of firm at the beginning of period.*

Under recession conditions the „real“ value of the firm, generated from its overall potential, is an insurance against the firm's collapse, while at the same time it has the potential to help with eventual destructuralization and revitalization, thus ensuring the continued operation of the firm in the changed conditions of the post crisis period. The prime objective of the firm after the crisis is, therefore, to have minimum demands in order to maintain its value, so that:

$$V_t - V_0 = 0 \tag{7.13}$$

where:

V_t – value of firm at the end of period,

V_0 – value of firm at the beginning of period.

The problem is, how to objectively express this value. The simplest method of expressing a firm's value under stable market conditions, with prices reflecting real value, is by comparing the firm's market value at the end of the observed period with its market value at the beginning of the this period (Marinič, 2008).

$$MV_t - MV_0 > 0 \tag{7.14}$$

where:

MV_t – Market Value of firm at the end of period,

MV_0 – Market Value of firm at the beginning of period.

Market value under recession conditions, where demand goes down, despite falling prices, does not reflect real value; so the application of market given value in such situation is misleading, and therefore this concept cannot be used. It is not possible to apply this approach even in firms, which are not joint stock companies, i.e. their shares are not traded on the securities market. In this lies the substance of the firm's "real" value. One way out of this problem is to express value according to the following relation, in which the lower value of the property and its resulting growth in investment is depicted, as well as a decrease in income of the firm for the relevant period in the form of reduced cash flow.

Firm's value = Value of its essential property + Reduced profit value = (Current value of investment capital + NPV i.e. essential property) + NPV cash flow. (Beninnga – Sarig, 1997), (Stowe, 2007)

$$V = (NPV_c + essentialproperty) + \sum_{t=1}^{n} CF_n /(1+i)^n \tag{7.15}$$

where:

NPV_C +essential property] – firm's property value in the studied period,

$CF_n / (1 + i)^n$ – clear cash flow for the studied period.

If the discount factor is set at the level of the average capital cost (WACC) and if this sets the firm's value at a higher level at the end of the studied period, than the firm's value as expressed in the accounting value of its own capital at the start of the period is the value of the essential property for the given period. In times of recession, in a short-term crisis, it is most desirable for firms to treat their value in such way that it does not go below the accounting value of its own capital.

There is another way to express a firm's value, which arises from the philosophy that Free Cash Flow (FCC) represents the total financial resources which are at the disposal of the owners and creditors for paying all investment assets (Elliot, 2011). This free cash flow is not exactly the same as the cash flows generated by documents on cash flows, rather, they reflect the fact that the part of the

cash which is generated by the firm's business activities must be returned to the firm in the form of investment expenses in order to support the firm's future development.

According to some foreign authors, e.g., Higgins,(2004), Damodaran (2006) this free cash flow is expressed in the following way:

$$FCFF = EBIT \times (1 - t) + D - I + IP - \Delta NWC - dNWC \tag{7.16}$$

where:
FCFF – free cash flow,
EBIT – Earnings before Interest and Taxes,
t – Taxes rate,
D – depreciation,
I – investment,
IP – income from sales of fixed assets,
Δ NWC – increase of net working capital,
dNWC – decrease of net working capital.

Then, the current value of the firm's own capital (Elliot, 2011) would be expressed by the relation:

$$PV = \sum_{t=1}^{n} \frac{FCFF_i}{(1=r)^i} - D \tag{7.17}$$

where:
PV – present value of equity,
$FCFF_i$ – assume of future free cash flow,
r – discounted rate (WACC),
D – present value of debt.

In this relation, the current value of foreign capital is deducted from the current value of the future free cash flow. The reason for this is to attempt to arrive at the value of the firm's own capital, which for the owner represents a firm free from debts (unencumbered by external capital).

Another important criterion for the acceptability of the long-term financial plan is the development of economic added value, which we can express with the aid of the expected (desirable) height of evaluation of the firm's own capital in the following way:

$$r_{exp} = EAT_{exp} / E \tag{7.18}$$

where:
r_{exp} – r_{exp} – Return on Equity expected,
E – Equity,
EAT_{exp} – Earnings after Taxes expected,

and:

$$NOPAT = EBIT\ (1 - t) = EAT + I \times (1 - t) \tag{7.19}$$

where:
NOPAT – Net Operating Profit after Taxes,
EBIT – Earnings before Interest and Taxes
t – taxes rate
I – paid interest
EAT– Earnings after Taxes ,

and furthermore:

$$r_d \times (1 - t) = I \times (1 - t) / D \tag{7.20}$$

where:
r_d *– average interest rate,*
D – pay interest debt,

When we put the WACC according to the model CAPM, with the interest taxed at a rate expressed with the help of the previous equations and costs of the firm's own capital as an expression of that capital's planned profitability (Vernimmen, 2005); we get the following:

$$WACC = I \times (1-t) / D \times \frac{D}{C} + EAT_{\exp} / E \times \frac{E}{C} \tag{7.21}$$

where:
WACC – weighted average cost of capital,
E – Equity
C- Capital invested

After adjustment we can write the average capital costs like so:

$$WACC \times C = EAT_{exp} \times I \times (1 - t) \tag{7.22}$$

When it is placed in the relation for the calculation of economic added value - EVA (Erhardt - Brigham, 2011), we get:

$$EVA = NOPAT - WACC \times C = EAT_a + I \times (1 - t) - ((EAT_{exp} \times I \times (1 - t)) = EVA = EAT_a - EAT_{exp} \tag{7.23}$$

From this formula it emerges that the economic added value - EVA, is the difference between pure profit and planned profit. Planned profit on the basis of the following formula can also be expressed as a component of the real profit of the period of commencement and as an index of changes in planned and real profit of the firm's own capital:

$$\begin{gathered} EAT_{exp} = r_{exp} \times E \\ E = EAT_a / r_a \\ EAT_{exp} = EAT_a \times r_{exp} / r_a \end{gathered} \tag{7.24}$$

where:
EVA- economic value added
r_a *– actual Return on Equity,*
EAT_a *– actual Earnings after Taxes*
EAT_{exp} *– expected Earnings after Taxes*

When we put planned profit according to the previous formula into the relation $EVA = EAT_a - EAT_{exp}$, we get:

$$EVA = EAT_a - EAT_a \times r_{exp} / r_a \tag{7.25}$$

and furthermore:

$$EVA = EAT_a - EAT_{exp} = E \times r_a - E \times r_{exp} \tag{7.26}$$

If we simply extract the value of the firm's own capital in front of the brackets we are expressing the economic added value as a component of the real, increased, firm's own capital and spread [extent] profitability (Marinič, 2008). Then:

$$EVA = E \times (r_a - r_{exp}) \tag{7.27}$$

We can express Market Value Added [MVA] with the index:

$$MVA = EVA / r_{exp} \tag{7.28}$$

In the case that the economic added value exceeds the expected valuation rate of the firm's own capital, then the firm may, or may not, create firm's added value.

The value of firm added value based on economic added value (EVA) - V_{EVA} is then:

$$V_{EVA} = E + MVA \tag{7.29}$$

The development of value is acceptable under the assumption that:

$$EVA_t / EVA_0 > 1 \tag{7.30}$$

or, more precisely:

$$V_{EVAt} / V_{EVA\,0} > 1 \tag{7.31}$$

Under recession conditions, as it was mentioned in the foreword, in consequence of the redefinition of the firm's expectations, the firm should be content with the fact that there will not be a reduction of value, and so:

$$EVA_t / EVA_0 = 1 \tag{7.32}$$

and furthermore that:

$$V_{EVAt} / V_{EVA\,0} = 1 \tag{7.33}$$

where:
V_{EVAt} *– EVA based Value of firm at the end of period,*
V_{EVA0} *– EVA based Value of firm at the beginning of period.*

Which will happen, if the firms give up on the growth of profit $EAT_1 = EAT_0$ and "sacrifice" it as an investment in getting over the crisis (Erhardt - Brigham, 2011).

7.4 Conclusion and implications

However, if the crisis merits the sacrifice of even a part of the economic added value, created during the expansion period, then the r_{exp} of the demanded (expected) rate of value of the firm's own capital does not go below the average of the taxed interest rate of the foreign capital. Measured by Equity multiplier, if its value is greater than 1 (Marinič, 2008):

$$(EBT/EBIT) * (A/E) > 1$$

where:
EBT – Earnings before taxes,
EBIT – Earnings before interest and taxes,
A – Total Assets
E - Equity

But even if for a short period of time this condition is not met, it doesn't mean that the owners don't get the cash flow in the form of residual income. If the firm starts making long-term losses, then there is no other option, but destructuralization and the consequent revitalization of the firm. This is done by a couple of measures defined by the crisis scenario that aim to protect the profit and cash flows of the firm. Under the conditions of global depression, even this measure may be insufficient. But that is an extreme situation calling for state intervention. In any case, however, financial intervention in the firm's favor must be linked to obligations to maintain employment and purchasing power; therefore it is an investment in the demand side as an essential presumption for starting future expansion.

The possible objection that this concept does not necessarily solve immediate liquidity is justified. Liquidity can be solved with the standard instruments (trade deficit management), maybe even by super standard instruments, e.g. by offering advantageous pricing of the firm's own product range by means of installment and other easy payment plans to suppliers and employees. Business is going through an alternating cycle caused by turbulence in external influences at work in certain macroeconomic environments. As can be seen from the previous lines a reliable regulator which can predict future parameters, prevent undesirable developments and which can give timely warning, are firms' profits, as they are one of the decisive generators for the creation of value (value driver), and can be reliably regulated with the aid of instruments of control.

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APPENDIX

After years of conjuncture and continual growth of Czech economics in the years 1995-2007, at the end of 2008, Czech economy has started to feel more than ever that the European and world economic climate is rougher than in previous years. The signs of recession started to show up in Czech economy (Figure 7.1). The growth of GDP[35] decelerated gradually to increase in Q4 by only 0.2% as a consequence of significant decrease of demand on the markets essential for export of Czech firms. This trend continued in 2009, when the GDP in 2009 decreased year-to-year by 4.1 %, compared to the 2.3% growth in the previous year. First signs of destructuralization showed up early in the 2010.

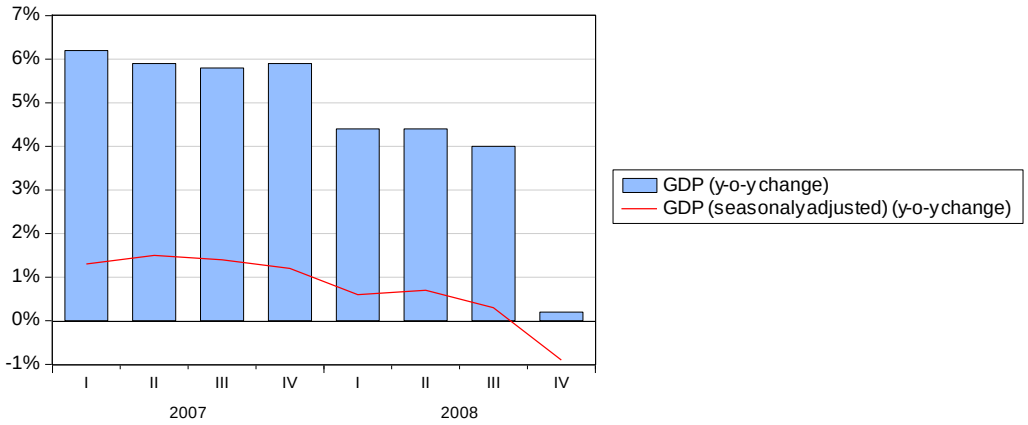

Figure 7.1 GDP (constant prices 2000)

Source: http://www.czso.cz/csu/2008edicniplan.nsf/engtab/84002AFD6B

Weakening of foreign demand from the Czech economy point of view has led to weakening of domestic export (Figure 7.2) and lowering of the efficiency of Czech industry (Figure 7.3). The Czech economy reflected more than ever that the European and world economic climate aggravated compared to the previous years. While in the first quarters the external trade played the leading role in the Czech economy (net exports represented four fifths of growth), over the whole year its influence weakened to almost two thirds while in Q4 the final y-o-y growth of economy slowed down to almost 2/3 when in Q4 the y-o-y growth of economy decreased (-1.1 p.p.) (http://www.czso.cz/csu/2008edicniplan.nsf/publ/1109-08-v_roce_2008).

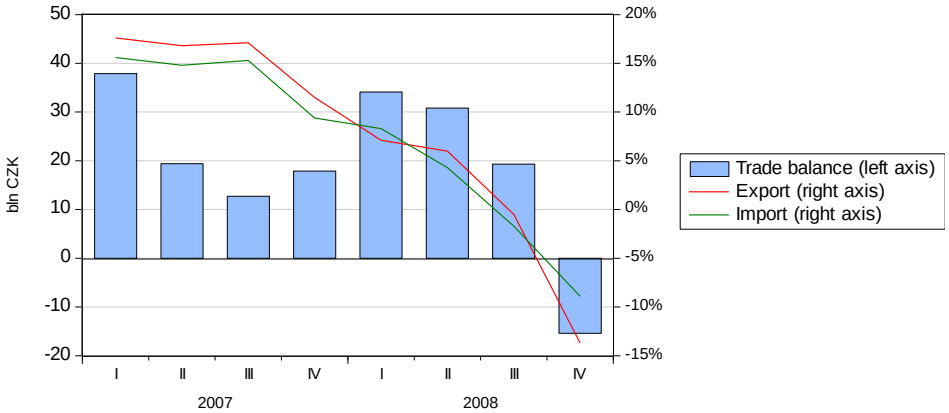

Figure 7.2 Export and import (y-o-y change in %), trade balance (constant prices 2000)

Source: http://www.czso.cz/csu/2008edicniplan.nsf/engtab/84002F7C14

[35] The data about GDP and its components are not seasonally adjusted.

Inflation rate (6.3%) reached its highest values over the last ten years, the inflation differential to EU27 increased; export prices fell faster that import prices - external trade was negatively affected by terms of trade. The drop of industrial production in Q4 almost completely eliminated its growth in the previous quarters (+0.4%, y-o-y); similar growth rate was reported for construction output (0.6%).

Total employment exceeded 5 million persons with quarterly deceleration of growth rates, from Q3 the number of job vacancies began to tumble; real wages increased (+2.1%) showing the smallest growth over the last ten years. (http://www.czso.cz/csu/2008edicniplan.nsf/publ/1109-08v_roce_2008).

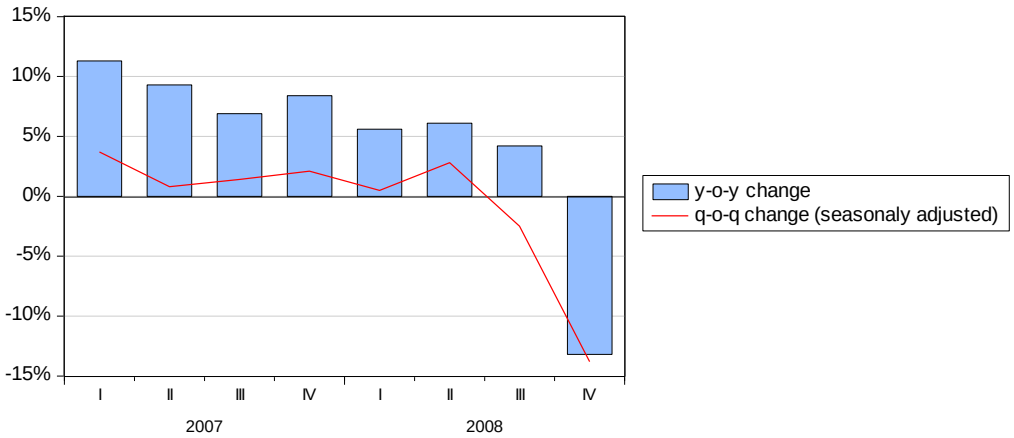

Figure 7.3 Industrial production

Source: http://www.czso.cz/csu/2008edicniplan.nsf/engtab/84002CCF55

A crucial part of the firm's strategy of the leader of the Czech industry, ŠKODA AUTO a.s., is a crisis scenario prepared in advance coming out of philosophy of preventing the company from sales decrease caused by lowered demand caused by recession of economies in countries, to which their product is exported. The main idea of the firm's strategy is to diversify the export in the global market, which allows the firm to maximize the sales during the conjuncture and to minimize the effects of the crisis during recession. ŠKODA AUTO a.s. expands not only to traditional markets in Europe, but also to less saturated markets in Asia, especially to China and India, which show the highest rate of growth potential.

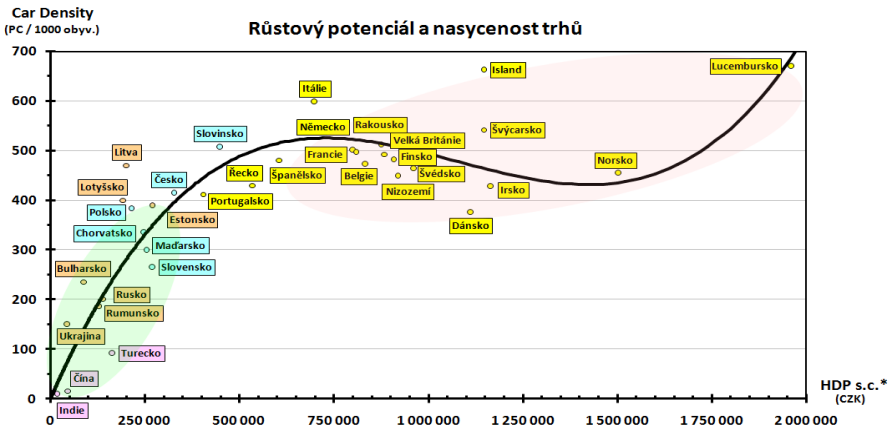

Figure 7.4 Analysis of growth potential

Source: www.anffac.com and own processing

The effect of diversification is visible in two following figures. While the number of sold cars by SKODA AUTO, a.s. is cutting within years 2006-2010, other brands were more successful and increased the sales on the Czech market as an effect of substitution.

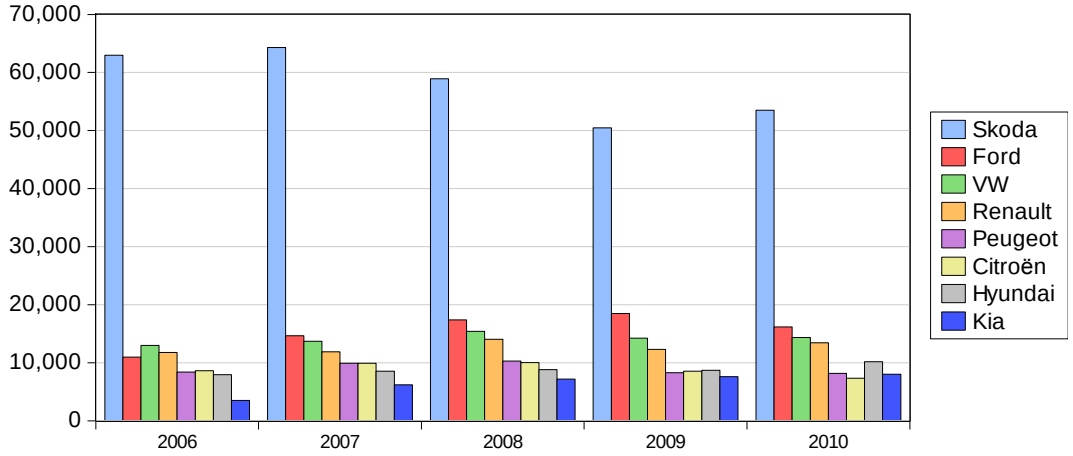

Figure 7.5 Number of sold cars in the Czech republic by producers within years 2006-2010

Source: http://portal.sda.cia.cz and own processing

SKODA AUTO, a.s. expanded abroad and the decline of domestic sales due to weakening demand was compensated through export.

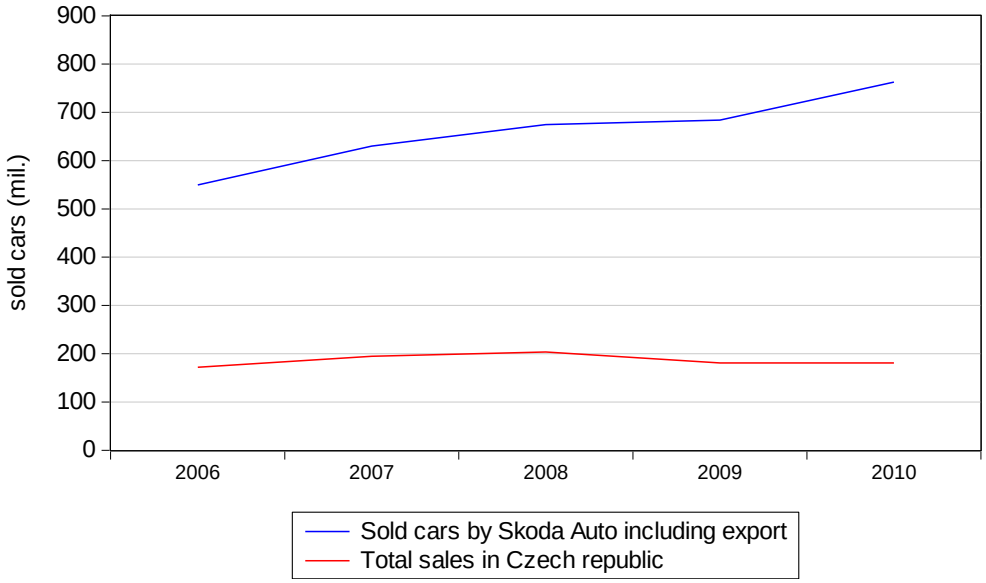

Figure 7.6 Comparison of total number of sold cars in the Czech republic and sold cars by SKODA AUTO, a.s., including export within years 2006-2010

Source: http://portal.sda.cia.cz and own processing

The economic recession from 2007-2008 is showing even in ŠKODA AUTO a.s., but thanks to its prepared crisis scenario the decrease in indicator of sales is relatively low and the absolute numbers of sales aren't decreasing at all, which is a sign that the firm is not losing its position on the market.

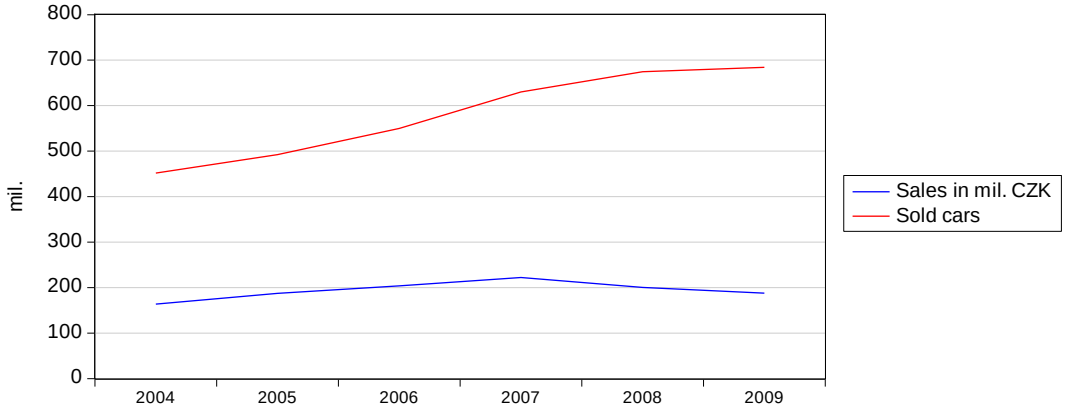

Figure 7.7 Basic indicators of sales - ŠKODA AUTO a.s., years 2004-2009

Source: Inside information of ŠKODA AUTO a.s., own processing

Looking at this fact, we can see an effect of diversification of the sales, because the decrease in profit is only a matter of Central and Eastern Europe, not Asia and Western Europe. The sales in Western Europe have been increasing, mainly because of increasing sales in Germany, which are caused by government support of car sales in the form of scrappage contribution, which can, however, only be used by prepared and well-established makers offering demanded product.

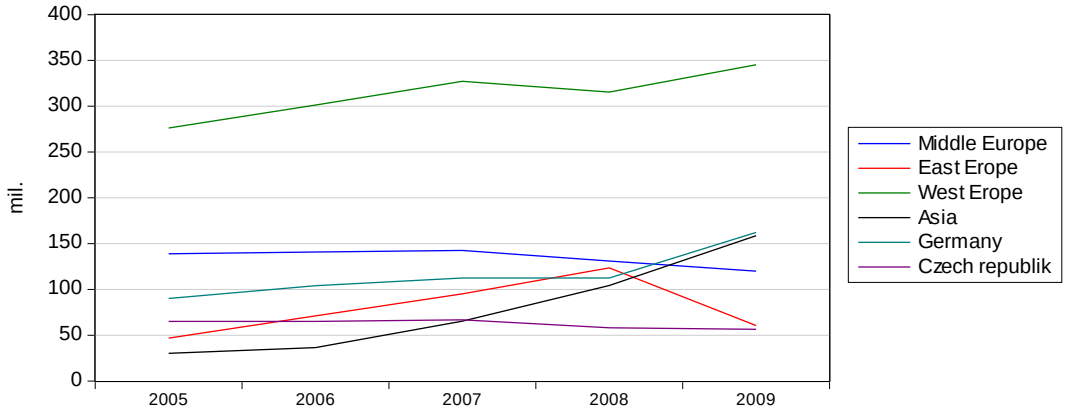

Figure 7.8 Sales as a consequence of diversification of sales of ŠKODA AUTO, years 2005-2009

Source: Inside information of ŠKODA AUTO a.s., own processing

In the studied period, the firm has registered decrease in profit before taxes and interest as well as in net profit after taxes.

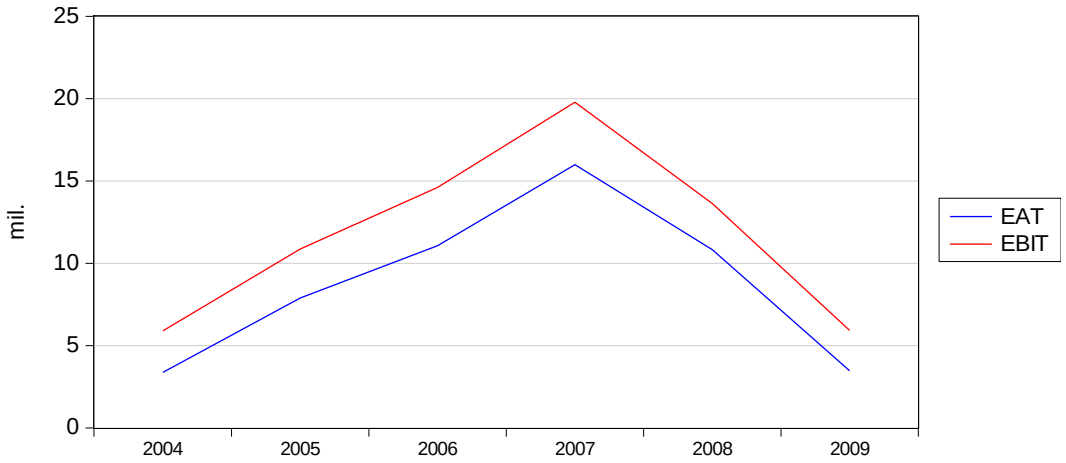

Figure 7.9 Amount of profit ŠKODA AUTO, years 2004-2009

Source: Inside information of ŠKODA AUTO a.s., own processing

Decrease in earnings before interest and taxes, or earnings after taxes, is caused by the decrease of the gross margin, or net margin, as a reaction of the management of ŠKODA AUTO a.s. to the decrease of demand, in the form of lowering the final price of the cars for the end customers.

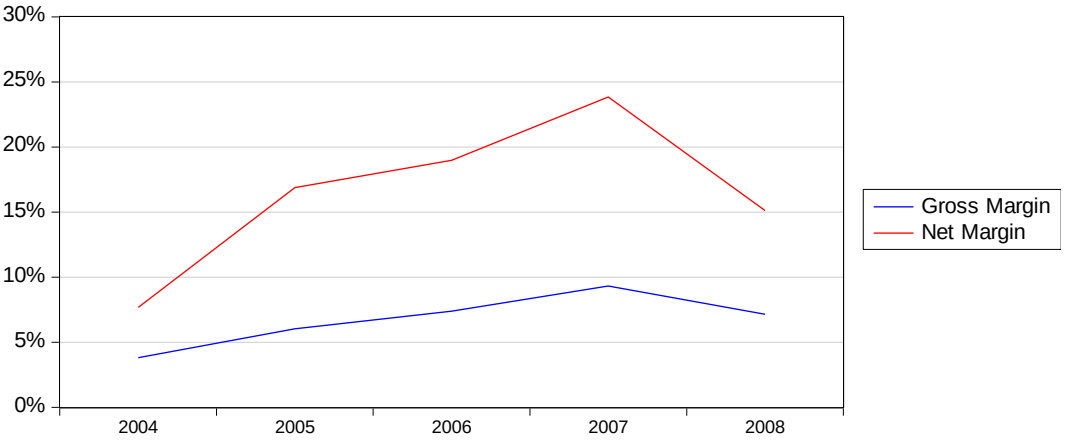

Figure 7.10 Profit margin in ŠKODA AUTO a.s., progress chart in %, years 2004-2008

Source: Inside information of ŠKODA AUTO a.s., own processing

Measures of decreasing the unproductive costs are a part of overcoming the crisis. ŠKODA AUTO a.s. does this by restructuring of the amount of suppliers and contractors within the supply chain:

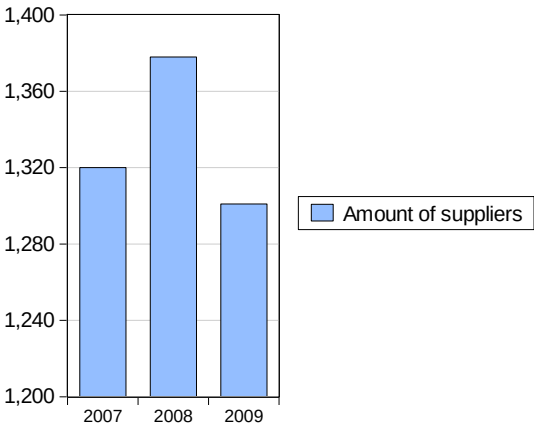

Figure 7.11 Amount of suppliers within supply chain in ŠKODA AUTO, years 2007-2009

Source: Inside information of ŠKODA AUTO a.s., own processing

Another measure to decrease the unproductive costs is the rationalization of the technological processes and consequent more effective use of human resources. There is a decrease in the number of the firm's employees, but as an effect of overall decrease in need of outsourcing resources. In the number of the firm's skeleton staff, the decrease is within the range of natural fluctuation.

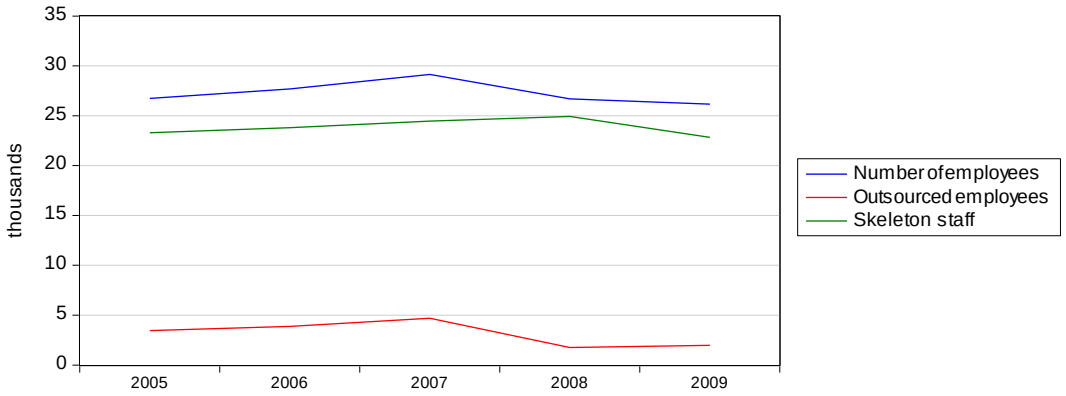

Figure 7.12 Amount of employees in ŠKODA AUTO, years 2005-2009

Source: Inside database of ŠKODA AUTO a.s., own processing

The measures to decrease the costs aren't radical and do not cause a disruption in the firm's process, but they have a conceptual character, which can be seen in the following figure, when the decrease in costs is slower than the decrease in profit and it is only shown in a long period of time.

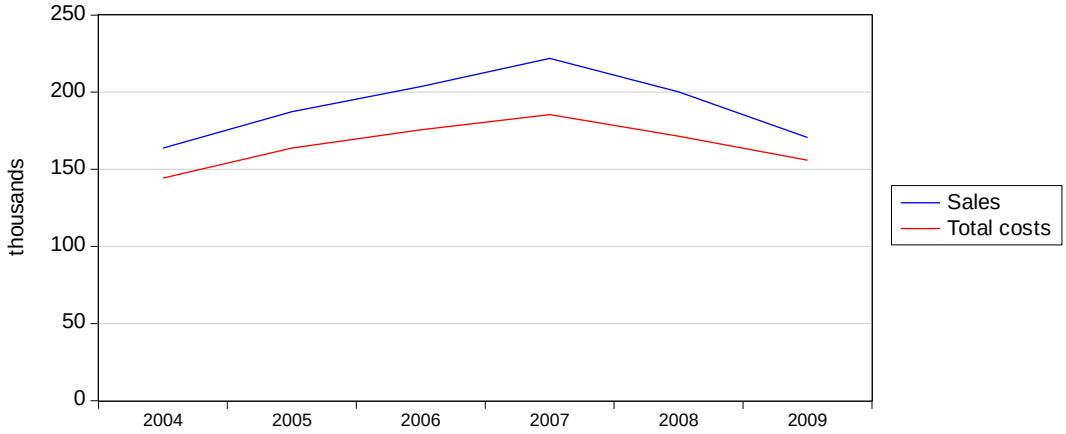

Figure 7.13 Total cost/revenue trend in ŠKODA AUTO years 2004-2009

Source: Inside information of ŠKODA AUTO a.s., own processing

A very important aspect of a well-chosen financial strategy of ŠKODA AUTO a.s. is that the firm hasn't - despite the decreasing profits and worsening paying conditions on the market – lost liquidity and has had enough financial resources to withstand its financial commitments in the studied period.

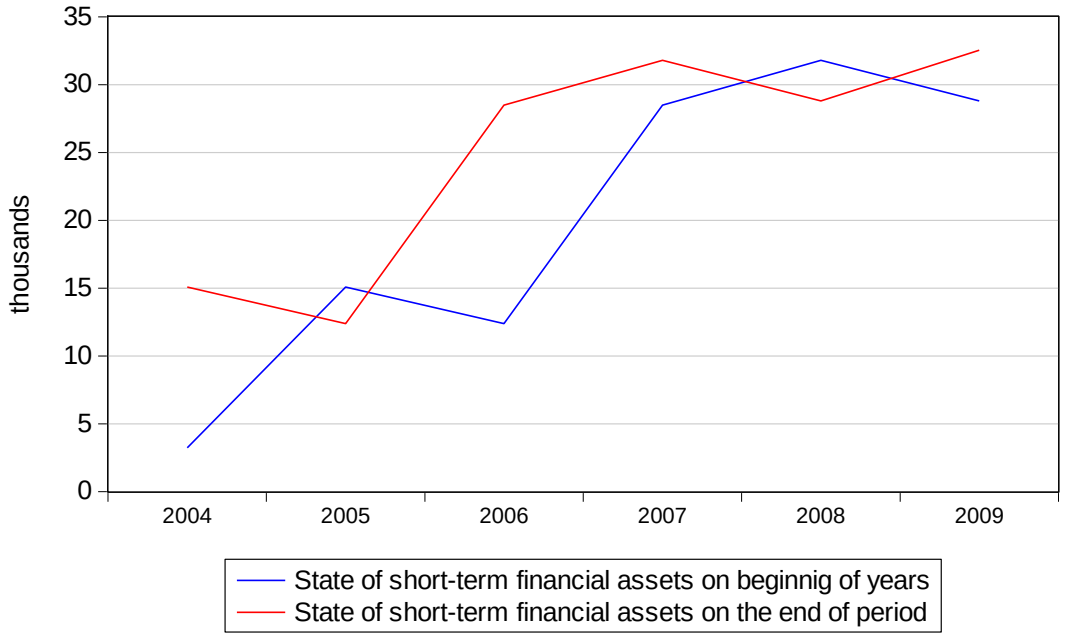

Figure 7.14 State of short-term financial assets in CZK in ŠKODA AUTO years 2004-2009

Source: Inside information of ŠKODA AUTO a.s., own processing

Current Ratio, measured as a relationship between Current Assets, containing Receivables and Cash on the one hand and Current Liabilities composed of Payables and Short-term Debt (Credit´s and Loan´s) on the other hand, reached a positive value every time.

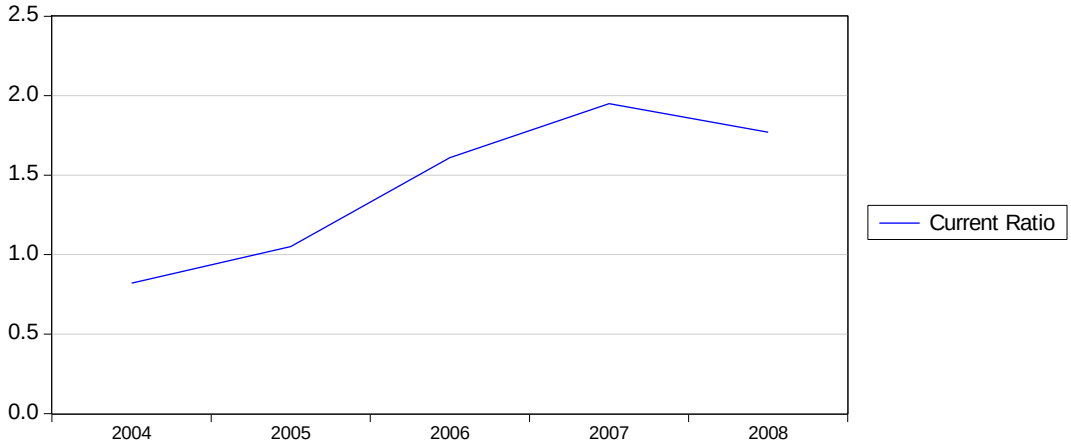

Figure 7.15 Current ratio ŠKODA AUTO, years 2004-2009

Source: Inside information of ŠKODA AUTO a.s., own processing

As a logical implication of the mentioned development of the macroeconomic indicators and following measures implemented by the management of ŠKODA AUTO a.s., the Net Operating Profit after taxes is decreasing, however, the invested capital costs aren't. The firm is generating a lower economic value added in 2008 than in 2007.

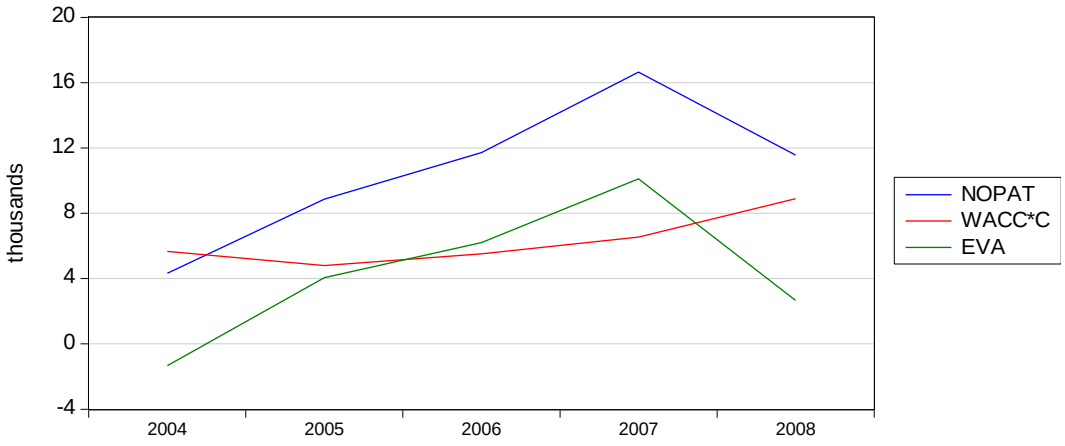

Figure 7.16 Economic value added in ŠKODA AUTO a.s., years 2004-2008

Source: Insider information ŠKODA AUTO a.s., own processing

This fact means that, all in all, ŠKODA AUTO a.s. shows only a mild worsening of the ability of the firm to evaluate invested capital of shareholders. The Equity Multiplier indicator, as interest reduction to capital structure – shows only a mild decrease, which is not caused by the analyzed process, but by the financial strategy of the firm.

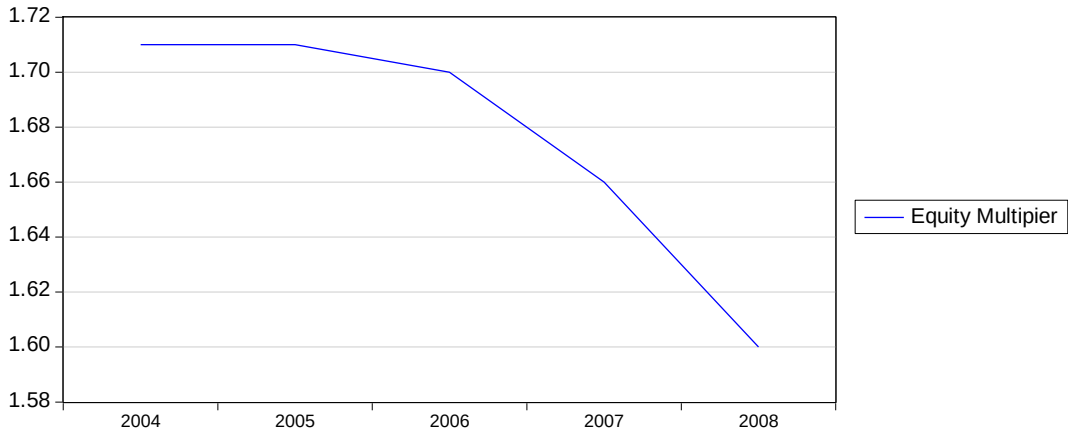

Figure 17 Equity multiplier in ŠKODA AUTO a.s., years 2004-2008

Source: Insider information ŠKODA AUTO a.s., own processing

Chapter 8

GLOBALIZATION, FIRM PERFORMANCE AND GROUP AFFILIATION IN EMERGING MARKETS: EVIDENCE FROM TURKEY

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GLOBALIZATION, FIRM PERFORMANCE AND GROUP AFFILIATION IN EMERGING MARKETS: EVIDENCE FROM TURKEY

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Abstract

Although the process of globalization deeply affects businesses in all aspects, unfortunately, the firm level effects of globalization are highly unexplored in the literature. This research aims to explore how the overall globalization level of a country as well as her economic, her political and her social globalization levels affect the performance of both the group affiliated and the unaffiliated firms, operating in this business environment by using pooled panel analysis. To search for the potential differences that may prevail between the firm performance effects of globalization on the group affiliated firms and on the unaffiliated firms, it focuses on Turkish listed companies for the period 2002-2009. The findings of the study indicate that while globalization improves the stock returns of both the group affiliated and the unaffiliated firms, it deteriorates the operational income of both groups of firms.

The findings also imply that although the effects of economic and political globalization do not seem to differentiate much between the group affiliated and the unaffiliated firms, social globalization may be argued to affect the operating incomes and the firm growth rates of group affiliated and unaffiliated firms differently. Last but not least, the findings suggest that the most influential dimension of globalization in terms of its effects on firm performance for Turkish companies seems to be the economic globalization.

Keywords: globalization, firm performance, emerging countries, panel data.

8.1 Introduction

During the last couple of decades, fostered by the massive trade liberalization and financial integration accompanied with growing political, socio-cultural and military interdependence as well as the excessive technological progresses, the world has gone through a process of increasing interconnectedness and interdependence among nations in all aspects of life such as economic, financial, socio-cultural, political, environmental, military etc. Through its widespread effects on environment, on culture, on political systems, on economic development and prosperity, and on human physical well-being in societies around the World (Kefela 2011), this process which is commonly referred as “globalization”, has become one of the most popular terms of our era. However, despite the popularity of the term, the ambiguity of what is actually meant by globalization preserves its mystery.

Although the term ‘globalization’ is used to refer to a single phenomenon, it is not a single, unified process (Ardıç 2009). Rather, through covering a wide range of distinct political, economic, and cultural trends (Scheuerman 2010), it refers to a catch-all concept to describe a wide range of forces (Archibugi and Iammarino 2002). Hence, despite the fact that the definition of globalization has

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been attempted by hundreds of authors and distinguished speakers on the topic, the word continues to mean very different things to different people (Kefela 2011) and consequently there is no unified definition of globalization as well. Just to mention a few, Oxford English Dictionary defines globalization as the process by which businesses or other organizations develop international influence or start operating on an international scale[37] whereas according to International Forum on Globalization, it stands for the present worldwide drive toward a globalized economic system dominated by supranational corporate trade and banking institutions that are not accountable to democratic processes or national governments[38] while World Health Organization underlines two interrelated elements in defining globalization: the opening of borders to increasingly fast flows of goods, services, finance, people and ideas across international borders; and the changes in institutional and policy regimes at the international and national levels that facilitate or promote such flows[39]. Many researchers have also attempted to define globalization. For example, Giddens (1990) defines globalization as the intensification of world-wide social relations which link distant localities in such a way that local happenings are shaped by events occurring many miles away and vice versa; Szeman (2003) defines globalization as the moment of mass migration, multiculturalism, and cosmopolitanism and De and Pal (2011) define globalization as the process of opening up of economies to the outside world to facilitate trade, reduction in physical and other barriers to increase mobility of goods and factors of production as well as labor force. Actually, it is observed that the definition of globalization depends on the aim and the scope of the debate. Within the scope of this study, following De and Pal (2011), globalization can be defined as the process of integration of economies through economic, social and political processes.

Considering the aforementioned widespread scope and effects of globalization, it is no doubt that it has attracted the interest of among many others, the politicians, the researchers and of course public in general. Consequently, it has been extensively argued from a wide spectrum as well such as the impact of globalization on national economic factors (Dreher 2006, Mutascu and Fleischer 2011, Rao, Tamazian and Vadlamannati 2011, Rao and Vadlamannati 2011), on political issues (Bezemer and Jong-A-Pin 2008, Dreher, Sturm and Ursprung 2008, Leibrecht, Klien and Onaran 2011), on social notions (Lee and Vivarelli 2006) like life satisfaction (Hessami 2011), human welfare (Tsai 2007) and willingness to help immigrants as well as sick and disabled (Koster 2007), on entrepreneurial activity (Vining and Kluijver 2007), on unionization (Dreher and Gaston 2007), on environmental standards (Gassebner, Gaston and Lamla 2008) and water pollution (Lamla 2009), on military interstate disputes (Choi 2010) etc. However, although there obviously exists a wide array of literature regarding almost every aspect of globalization, the previous literature mainly focuses on the macro side effects of it. But unfortunately, although the process of globalization deeply affects businesses in all aspects, the firm level effects of globalization are highly unexplored in the literature. Accordingly, due to the limited empirical studies that have been conducted to investigate how globalization actually affects firms (Thoumrungroje and Tansuhaj 2007), very little is known about the impact of globalization on firm performance.

[37] http://oxforddictionaries.com/definition/english/globalization
[38] http://www.ifg.org/analysis.htm
[39] http://www.who.int/trade/glossary/story043/en/index.html

Among the limited past empirical research, Acheampong *et al.* (2000) examined whether the speed of profitability adjustment varies across countries within an industry in light of an increasingly global economy where increasing globalization is expected to equalize speeds of profitability adjustment and their findings suggest that country effects were not significant in the beverage and tobacco industry which is consistent with the expected impact of globalization while in the food and consumer products industry, speeds of profitability adjustment was found to vary across countries. Thoumrungroje and Tansuhaj (2007) investigated the globalization and firm performance relationship and concluded that globalization acts as a two-edged sword that can be both beneficial and detrimental to business. In their study, Asiedu and Freeman (2007) examined the effect of globalization on the performance of minority-owned and white-owned SMEs in the United States and their findings report that globalization negatively affects the profitability of the minority-owned firms while they lack to provide a statistically significant affect for the white-owned firms. The findings of Peltonen *et al.* (2008) who analyzed the impact of import penetration on firm's profitability in 15 manufacturing industries in 10 euro area countries during 1955-2004, indicate that import competition from emerging market economies has had an overall negative impact on company profitability in the euro area manufacturing sector while the findings of Georgiou (2011) suggest a positive effect of globalization on company profitability for Europe. The findings of Akinola (2012) also suggest that profit before tax of Nigerian Banks increases with globalization. The findings of Karadagli (2012) indicate that the return on stock market indices of E7 (Emerging 7) Countries increases with the globalization level of a country and suggest that the political and the social globalization levels of a country have a statistically significant positive effect on firm performance but lack to provide a statistically significant performance effect of economic globalization at conventional levels.

Given the highly limited past empirical evidence and the contradictory results obtained, how globalization affects firm performance proves to be a crucial empirical question and it is clear that further research on the firm profitability effects of globalization is crucially needed. With this motivation, this research aims to explore how the overall globalization level of a country as well as her economic, her political and her social globalization levels affect the performance of both the group affiliated and unaffiliated firms, operating in this business environment. Considering that diversified business groups dominate private sector activity in most emerging markets around the world (Khanna and Palepu 2000) including Turkey, investigating for the potential differences that may prevail in the firm profitability effects of globalization for the group affiliated firms and the unaffiliated firms proves to be an important query.

Operating under a group affiliation as a proxy for corporate diversification might provide various benefits to the related group firms in a developing market context because in the developing economies there are a variety of market failures due to information and agency problems (Khanna and Palepu 2000). Accordingly, in developed economies, as a result of the institutions that minimize the sources of market imperfections, firms can create value by focusing on a relatively narrower range of activities while in developing economies because of the market imperfections caused by the institutional voids, firms usually need to perform some of the basic functions by themselves (Khanna and Palepu 1997) and, as argued by Khanna and Rivkin (2001), group firms have an important role in overcoming the market imperfections that arise from the institutional voids of the developing economies. Given that institutions affect economic outcomes (Granovetter 1985; Aoki 1984), the

institutional context of a country which consists the financial, the legal and the regulatory environment of the related economy (Fauver, Houston and Naranjo 2003) as well as the markets for product and labor (Khanna and Palepu 1997), will affect the performances of firms operating under this institutional context as well. Khanna and Rivkin (2001) claim that group firms through coordinating their activities that may reflect in sharing a brand name, raising capital jointly, lobbing bureaucrats and politicians together, recruiting managers as a group, pooling resources to invest in new ventures etc. can derive important advantages. On the other hand, it is obvious that the institutional context of a country will be affected by her globalization level as well. Hence, the globalization level of a country may affect the performances of group affiliated and unaffiliated firms differently. So, this research is aimed to investigate the possible effects of group affiliation on the firm performance effects of globalization. For this purpose, in order to provide a wider perspective, not only the performance effects of the overall globalization level is examined but the effects of its single components, specifically her economic, her political and her social globalization levels are also addressed separately.

8.2 Data and methodology

This study aims to examine the impact of overall globalization as well as its single dimensions, specifically the economic globalization, the political globalization and the social globalization, by using KOF Index of Globalization, on firm performance for a sample of 169 Turkish listed companies among which 100 of them are group affiliated firms, for the period of 2002-2009 by using pooled panel analysis with annual data. For this purpose, firm performance is measured by the operating income, the firm growth rate and the stock returns. Additionally, this research is also aimed to explore the differentiating effects of the single dimensions of globalization as well. Thus, in addition to using a single overall globalization index, it also employs the economic, the political and the social dimensions of globalization as separate descriptive variables to differentiate their impacts separately. Firm size, financial leverage and GDP growth rate are used as control variables along with a dummy variable to account for industry effects.

The stock market returns of companies are sourced from Istanbul Stock Exchange (ISE), the data on the financial table accounts of the companies are obtained from Bloomberg, and the GDP growth rate is sourced from IMF database[40]. The data on both the level of overall globalization and on its single dimensions, specifically the levels of economic, political and social globalization are obtained from KOF Index of Globalization 2012[41] which is developed by Dreher (2006), updated by Dreher, Gaston and Martens (2008) and provided by Swiss Federal Institute of Technology, Zurich.

[40] World Economic Outlook Database, April 2012 Edition

[41] KOF Index of economic globalization consists of both the actual flows, specifically trade, foreign direct investment, portfolio investment and income payments to foreign nationals where all the variables are expressed as a percentage of GDP, and the restrictions, specifically hidden import barriers, mean tariff rate, taxes on international trade as a percentage of current revenue and capital account restrictions. The political globalization is characterized by a diffusion of government policies and the sub-index is composed of the number of embassies in a country, the number of memberships in international organizations, the number of UN peace missions she participated in and the number of treaties she signed with other nations. Through combining the data on personal contacts, on information flows and on cultural proximity, the social globalization is expressed as the spread of ideas, information, images and people where personal contacts data include the international telecom traffic measured in minutes per person, the degree of international tourism both incoming and outgoing, the percentage of foreign population as a percent of total population, the number of international letters sent and received as well as government and workers' transfers received and paid as a percentage of GDP; the data on information flows consists of the share of internet users, the fraction of households who have

The firm growth rate is measured by the growth rate of sales which is found by dividing the annual change in sales to preceding years' sales [= ($Sales_t$ – $Sales_{t-1}$) / $Sales_{t-1}$]. Natural logarithm of total assets is used to control for firm size; financial debt ratio which is calculated by dividing the sum of short and long term financial debt to total assets [= (Short Term $Borrowing_t$ + Long Term $Borrowing_t$) / Total $Assets_t$], is used as a proxy for financial leverage; GDP growth rate is used to control for the macroeconomic influences; and two-digit industry codes are assigned to firms based on ISE industry classification to control for the industry effects.

To be able to search for the potential differences in firm performance effects of globalization as well as its single dimensions between the group affiliated and unaffiliated firms, the sample is divided into two subsamples based on whether the company is a group affiliated firm or not. Thereby, the below six models are constructed:

$$OpInc_{i,t} = \beta_0 + \beta_1 Glb_{Aff,t} + \beta_2 Glb_{Unaff,t} + \beta_3 Size_{i,t} + \beta_4 FinLev_{i,t} + \beta_5 GDPgr_t + \beta_6 D_{ind} + \varepsilon \quad (8.1)$$

$$Fgr_{i,t} = \beta_0 + \beta_1 Glb_{Aff,t} + \beta_2 Glb_{Unaff,t} + \beta_3 Size_{i,t} + \beta_4 FinLev_{i,t} + \beta_5 GDPgr_t + \beta_6 D_{ind} + \varepsilon \quad (8.2)$$

$$R_{i,t} = \beta_0 + \beta_1 Glb_{Aff,t} + \beta_2 Glb_{Unaff,t} + \beta_3 Size_{i,t} + \beta_4 FinLev_{i,t} + \beta_5 GDPgr_t + \beta_6 D_{ind} + \varepsilon \quad (8.3)$$

$$OpInc_{i,t} = \beta_0 + \beta_1 EcGlb_{Aff,t} + \beta_2 EcGlb_{Unaff,t} + \beta_3 PlGlb_{Aff,t} + \beta_4 PlGlb_{Unaff,t} + \beta_5 ScGlb_{Aff,t} + \beta_6 ScGlb_{Unaff,t} + \beta_7 Size_{i,t} + \beta_8 FinLev_{i,t} + \beta_9 GDPgr_t + \beta_{10} D_{ind} + \varepsilon \quad (8.4)$$

$$Fgr_{i,t} = \beta_0 + \beta_1 EcGlb_{Aff,t} + \beta_2 EcGlb_{Unaff,t} + \beta_3 PlGlb_{Aff,t} + \beta_4 PlGlb_{Unaff,t} + \beta_5 ScGlb_{Aff,t} + \beta_6 ScGlb_{Unaff,t} + \beta_7 Size_{i,t} + \beta_8 FinLev_{i,t} + \beta_9 GDPgr_t + \beta_{10} D_{ind} + \varepsilon \quad (8.5)$$

$$R_{i,t} = \beta_0 + \beta_1 EcGlb_{Aff,t} + \beta_2 EcGlb_{Unaff,t} + \beta_3 PlGlb_{Aff,t} + \beta_4 PlGlb_{Unaff,t} + \beta_5 ScGlb_{Aff,t} + \beta_6 ScGlb_{Unaff,t} + \beta_7 Size_{i,t} + \beta_8 FinLev_{i,t} + \beta_9 GDPgr_t + \beta_{10} D_{ind} + \varepsilon \quad (8.6)$$

8.3 Research results and discussion

The results obtained from the pooled panel analysis of the above models are provided in Table 8.1. The findings obtained from Model 1 indicate that the overall level of globalization worsens operating income of both the group affiliated and the unaffiliated firms at 1% significance level. This result provides a support for Kaplinsky (2004) who argued that despite the wide diffusion of productive capabilities to developing countries during last several decades, the growing importance of global buyers has squeezed both profit margins and incomes for developing country producers. When the effects of the single dimensions of globalization are separated, it is seen from the findings obtained from Model 4 that only the effect of economic globalization on the operating incomes of group affiliated firms are found to be statistically significant. Also, the findings suggest that only social

a television and the international newspapers traded which is measured as a percentage of GDP; and cultural proximity represents the number of McDonald's restaurants per capita, the number of IKEA in a country per capita and the value of imported and exported books as a percentage of GDP. Then, these three sub-indices, specifically the economic, the social and the political globalization indices are combined into a single overall globalization index. For detailed information on the construction of KOF Globalization Indices please visit: http://globalization.kof.ethz.ch/

globalization have a positive effect on the operating incomes of only group affiliated firms, though this effect is not statistically significant at conventional levels. Though statistically not significant, social globalization seems to improve the operating income of group affiliated firms while it deteriorates the operating incomes of unaffiliated firms. This result may be interpreted as a partial support for the argument of Khanna and Rivkin (2001) who claim that group firms can derive important benefits through coordinating their activities.

Table 8.1 Panel analysis results for the sub-samples of group affiliated and unaffiliated firms

	COEFICIENTS					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	(OpInc)	(Fgr)	(Ri)	(OpInc)	(Fgr)	(Ri)
$Glob_{Aff}$	-4.743*** (-18.127)	3.25E-05 (0.024)	0.054*** (5.596)			
$Glob_{Unaff}$	-4.675*** (-18.127)	0.001 (0.515)	0,057*** (5.718)			
$Ec.Glob_{Aff}$				-4.657* (-1.876)	0.024** (1.845)	1.641*** (21.526)
$Ec.Glob_{Unaff}$				-3.852 (-1.360)	0.034** (2.247)	1.750*** (20.120)
$Pol.Glob_{Aff}$				-0.981 (-0.643)	-0.010 (-1.219)	-0.831*** (-17.730)
$Pol.Glob_{Unaff}$				-0.856 (-0.481)	-0.022** (-2.274)	-0.879*** (-16.074)
$Soc.\ Glob_{Aff}$				0.602 (0.823)	-0.008** (-2.171)	-0.255*** (-11.366)
$Soc.\ Glob_{Unaff}$				-0.363 (-0.426)	0.001 (0.248)	-0.290*** (-11.109)
Size	62.012*** (22.494)	0.009 (0.644)	-0.106 (-1.015)	62.321*** (22.653)	0.009 (0.560)	-0.106 (-1.257)
Financial Leverage	11.469 (1.107)	0.239*** (4.346)	-1.135** (-2.903)	12.820 (1.234)	0.245*** (4.435)	-0.645** (-2.021)
GDP Gr. Rate	-1.484* (-1.689)	-0.001 (-0.268)	-0.083** (-2.499)	1.090 (0.818)	-0.014** (-2.016)	-0.867*** (-21.160)
Industry Dummy	2.804*** (6.475)	0.001 (0.546)	-3.88E-05 (-0.003)	2.898*** (6.692	0.001 (0.544)	-0.003 (-0.196)

Notes: t-statistics are presented in parentheses.
***,**,* denote statistical significance at 1%, 5% and 10% levels, respectively.

When the impacts of the overall globalization and its single dimensions on the firm growth rate are examined, interesting findings are obtained. Although the overall globalization lacks to provide a statistically significant effect on firm growth rate for both the group affiliated and the unaffiliated firms, it is found that the firm growth rate of both group of firms increases with economic globalization at 5% significance level. On the other hand, although political globalization is found to affect negatively the firm growth rate of both the group affiliated and the unaffiliated firms, only the effect for the unaffiliated firms are statistically significant. Besides, social globalization seems to affect the firm growth rate of group affiliated and unaffiliated firms differently. It is found that social globalization adversely affects the firm growth rate of group affiliated firms at 5% significance level while for unaffiliated firms, though statistically not significant, it has a positive effect.

Considering the fact that the objective of the firm is to maximize its value to its shareholders where value is represented by the market price of the company's common stock (Van Horne 1974), the effects of globalization and its single dimensions on stock returns of group affiliated and

unaffiliated firms are also addressed. The findings indicate that both the overall globalization and its single dimensions affect stock returns of both the group affiliated and unaffiliated firms at 1% significance level. The stock returns of both the group affiliated and the unaffiliated firms are found to increase with globalization. However, a deeper evaluation of the results indicates that this effect mainly comes from the economic globalization. In fact, the findings suggest that both the political and the social globalization have a negative effect on the stock returns of both groups of firms.

An overall examination of the results also implies that economic globalization have a statistically significant effect on all performance measures, specifically, the operating income, the firm growth rate and the stock returns, at 10%, 5% and 1% significance levels respectively, for the group affiliated firms. However, while this effect is positive for the firm growth rate and the stock returns, for the operating income economic globalization is found to have a negative effect. For unaffiliated firms, operating income is again found to be adversely affected from economic globalization, but this effect is insignificant at conventional levels. For the firm growth rate and the stock returns, economic globalization is found to have a statistically significant positive effect at 5% and 1% levels respectively, just like the results obtained for the group affiliated firms. The political globalization is found to have a negative effect on all performance measures for both the group affiliated and the unaffiliated firms, though the impact of political globalization on operating incomes of both group of firms are insignificant at conventional levels. The effect of political globalization on the stock returns of both group of firms are found to be significant at 1% level while for the performance measure of firm growth rate, political globalization is found to affect the performance of unaffiliated firms at 5% significance level whereas the result for the group affiliated firms is insignificant at conventional levels. Hence, it can be concluded that the effects of economic and political globalization do not seem to differentiate much between the group affiliated and the unaffiliated firms. But it can be argued that unaffiliated firms benefit more in terms of stock returns or loose less in terms of operating income from economic globalization. This point may imply that the investors are overoptimistic in their expectations about the future prospects of firms brought by the economic globalization. Another interesting finding is that while economic globalization is found to worsen the operating income, it enhances the firm growth rate which may be regarded as a support for the view that globalization reduces the price markups through increased competition accompanied by an increased ability to expand into foreign markets. Another finding that worth mentioning is that, while the operating income of firms is dependent on the industry in which the firm operates in at 1% significance level, the market seems to lack in accounting for industrial differences.

8.4 Conclusion

This chapter examines the impact of globalization as well as its single dimensions, specifically the economic, the political and the social globalization on firm performance in an emerging market. Although, as argued by Naghshpour and Marie (2008), emerging markets are more globalized than others, very little is known about the impact of globalization on firm performance. Hence, in an attempt to contribute to fulfilling this gap, this research focuses on Turkish listed companies both to examine the effect of globalization on firm performance and to search for potential differences that may prevail between the firm performance effects of globalization on the group affiliated firms and on the unaffiliated firms.

The research undertaken in this study deviates from the majority of the previous work in some important aspects. First of all, though previous research mainly address the effects of globalization at national level, this study concentrates on the effects of globalization and its single dimensions on the performance of firms operating under this business environment at firm level. Next, considering that the limited previous research mainly employed accounting based performance measures such as gross operating rate, return on equity etc., using stock returns as a proxy of firm performance also provides important insights on the market's evaluation of the prospects brought by the globalization process. Additionally, to the best of my knowledge, how globalization affects firm growth has not been empirically examined before. Likewise, whether globalization affects the group affiliated and the unaffiliated firms differently has not been questioned before as well. Besides, with the hope of providing additional insights in assessing the relative importance of different dimensions of globalization on firm performance, not only the effect of overall globalization is addressed, but the effects of the economic, the political and the social globalization on firm performance are also examined.

The findings indicate that while globalization improves the stock returns of both the group affiliated and the unaffiliated firms, it deteriorates the operational income of both groups of firms. This may be due to the argument that despite the wide diffusion of productive capabilities to developing countries during last several decades, the growing importance of global buyers has squeezed both profit margins and incomes for developing country producers Kaplinsky (2004), and imply that the investors may be overoptimistic in their expectations about the future prospects of firms brought by the globalization. Besides, although the effects of economic and political globalization do not seem to differentiate much between the group affiliated and the unaffiliated firms, social globalization may be argued to affect the operating incomes and the firm growth rates of group affiliated and unaffiliated firms differently. Another important finding is that the most influential dimension of globalization in terms of its effects on firm performance for Turkish companies seems to be the economic globalization. Actually, this result is in contradiction with the findings of Karadagli (2012) who examined the profitability effects globalization for E7 Countries and report that the profitability enhancement effect of globalization mainly comes from the political and the social globalization levels of a country. In fact, for economic globalization, though a positive effect is reported, her findings fail to provide a statistically significant effect. These conflicting results obtained leads to the conclusion that the firm performance effects of globalization depends on country specific factors as well and provide support for De and Pal (2011) who argued that the impacts of globalization across different countries also depend on their existing productive capacity and quality. Hence, generalizations can be highly misleading and should be evaded. Instead, more country specific future research is crucially needed and in multi-country researches country specific factors should be carefully taken into account.

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II.

Global Imbalances, Debt Constrains and Exchange Rates Arrangements

Chapter 9

2000s: PAINFUL AND TURBULENT DECADE OF DEBT. HOW DID WE END UP IN THIS MESS?

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2000S: PAINFUL AND TURBULENT DECADE OF DEBT. HOW DID WE END UP IN THIS MESS?

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Abstract

Around the globe observations demonstrate that the countries with expected near- future- inflation, unsustainable ballooning government spending and expected recession head towards a financial crisis unless significant policy transformations take place convincingly and before late. And whilst the recent sharp increase in advanced country sovereign debts has led to serious concerns about fiscal sustainability as well as their broader economic and financial market impacts, research on the relationship between sovereign or public debt and economic growth remains sparse, particularly from an empirical perspective.

To avoid another chaotic catastrophe the trends of the sovereign debt and macroeconomic performance of countries needs to be watched closely. The projection of the future patterns based on the past and current trends are imperative since it will provide adequate safety net before another financial calamity arrives. Needless to say if the extent of sovereign debt for a nation is too large to finance and service, bankruptcy is very likely to occur and by then there will be little motivation for other countries to cooperate with the system in finding an immediate solution.

Keywords: financial crisis, sovereign debt, federal budget, fiscal sustainability.

9.1 Introduction

Around the globe observations demonstrate that the countries with expected near- future- inflation, unsustainable ballooning government spending and expected recession head towards a financial crisis unless significant policy transformations take place convincingly and before late. And whilst the recent sharp increase in advanced country sovereign debts has led to serious concerns about fiscal sustainability as well as their broader economic and financial market impacts, research on the relationship between sovereign or public debt and economic growth remains sparse, particularly from an empirical perspective.

To avoid another chaotic catastrophe the trends of the sovereign debt and macroeconomic performance of countries needs to be watched closely. The projection of the future patterns based on the past and current trends are imperative since it will provide adequate safety net before another financial calamity arrives. Needless to say if the extent of sovereign debt for a nation is too large to finance and service, bankruptcy is very likely to occur and by then there will be little motivation for other countries to cooperate with the system in finding an immediate solution.

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9.2 Theory and empirics

Public sector debt is not necessarily an evil, it could be due to financial instability as well as its remedy, and nevertheless, both themes must be investigated prudently. The theoretical literature tends to point to a negative relationship between sovereign debt and growth. According to Elmendorf and Mankiw (1999), the conventional view is that debt stimulates aggregate demand and output in the short run, but crowds out capital and reduces output in the long run. The channels through which sovereign debt may affect economic growth are argued to be diverse. Drawing on contributions by Buchanan (1958), Meade (1958) and Musgrave (1959), Modigliani (1961) argues that government debt becomes a burden for future generations through a reduced flow of income resulting from a lower stock of private capital. Apart from a direct crowding-out effect, he also points to the impact on long term interest rates, as the resulting reduction of private capital drives up its marginal product. Diamond (1965) augments this analysis to include the effect of taxes on the capital stock and to differentiate between external and internal debt. He concludes that, through the impact of taxes needed to finance interest payments, both types of public debt have a negative impact on the capital stock by reducing both the available lifetime consumption of taxpayers as well as their savings. He also contends that internal debt tends to produce a further reduction in the capital stock due to the substitution of public debt for physical capital in individual portfolios.

A number of studies have further investigated the interest rate effects of increased public debt. Surveying the empirical literature Gale and Orszag (2003) conclude that a projected increase in the budget deficit of 1% of GDP raises long term interest rates by 50 to 100 basis points. For apanel of 31 advanced and emerging market economics Baldacci and Kumar (2010) find that increases in public debt lead to a significant increase in long-term interest rates, with the precise magnitude dependent on initial fiscal, institutional and other structural conditions, as well as spill-overs from global financial markets. They conclude that large fiscal deficits and public debts are likely to put substantial upward pressure on sovereign bond yields in many developed economies over the medium term.

The empirical literature regarding the relationship between sovereign debt and growth is primarily focused on the role of external debt in developing countries, much of it motivated by the “debt overhang hypothesis” (Krugman, 1985, Sachs, 1984, Sachs, 1986). A debt overhang is said to occur where the debt service burden is so heavy that a large proportion of output accrues to foreign investors and creates disincentives to invest. Analysing the non-linear impact of external debt on growth across a panel of 93 developing countries between 1969 and 1998, Patillo, Poirson and Ricci (2002) find that for a country with average indebtedness, doubling the debt ratio reduces annual per capita growth by between half and a full percentage point. They further find that the average impact of debt becomes negative at 35-40% of GDP with the predominant mechanism being to lower the efficiency of investment rather than its volume. In a subsequent chapter aimed at specifically investigating the channels through which debt affects growth, the same authors find that the negative impact of high debt levels on growth operates both through a strong negative effect on physical capital accumulation and on total factor productivity growth, the contributions of each being approximately one-third and two-thirds respectively.

Other studies that have similarly found a non-liner negative effect of external debt on growth include Cohen (1997), Smyth and Hsing (1995), and Clements *et al.* (2003). Analyzing the relationship for a panel of 55 low income countries over the period 1970-1999, the latter authors find a threshold level of external debt at approximately 20-25% of GDP. By contrast Schclarek (2004) fails to find support for a concave relationship, instead concluding the existence of a negative linear relationship for a number of developing economies. Unlike Patillo, Poirson and Ricci (2004), Schclarek's findings suggest that the relationship is mainly driven by effects on capital accumulation with limited evidence on the relationship between external debt and total factor productivity growth.

In one of the few analyses to investigate the relationship for developed economies, Schclarek's (2004) analysis also includes a number of industrial economies. He concludes however that no significant relationship exists between gross government debt and economic growth. In a ground breaking study into both advanced economies and emerging markets, Reinhart and Rogoff (2010) employ data on 44 countries spanning 200 years, covering a diverse range of political systems, institutions, exchange rate and monetary arrangements, and historic circumstances. Searching for a systematic relationship between high public debt levels, growth and inflation, they find that the relationship between public debt levels and growth is remarkably similar across emerging markets and advanced economies. Their main result is that although the link between growth and debt appears relatively weak at "normal" debt levels, median growth rates for countries with sovereign debt at over 90% of GDP are about 1% lower than otherwise, with mean growth rates being several percent lower. With regard to inflation however, they find no systematic relationship between high debt levels and inflation for developed economies as a group (albeit with individual country exceptions, including the United States (see next section)), whilst high debt levels appear to coincide with higher inflation in emerging market economies.

Investigating the debt-growth relationship for twelve euro area countries over a period of 40 years from 1970, Checherita and Rother (2010) find support for a concave relationship with a threshold point of 90-100% of GDP. Confidence intervals for this threshold suggest that the negative effect of high debt may start to appear at levels of 70-80% of GDP which, they argue, calls for even more prudent sovereign debt policies. They also find evidence of a negative linear relation between the annual change in the debt ratio, the budget deficit-to-GDP ratio, and per-capita GDP growth. Analyzing the channels through which public debt impacts growth, they find support for private saving, public investment, total factor productivity, and sovereign long-term nominal and real interest rates.

Kumar and Woo (2010) analyses a panel of advanced and emerging market economies over the period 1970-2007 and find that, on average, a 10 percentage point increase in the initial debt-to-GDP ratio is associated with a slowdown in per capita growth of around 0.2 percentage points per year with the impact being smaller (approximately 0.15%) in advanced economies. Similar to previous findings, they also find evidence of non-linearity with a threshold level of 90% of GDP. The effect largely reflects a decline in labor productivity growth, predominantly due to reduced investment and slower growth of capital stock per worker.

9.3 The cases of the United States: The beginning of snowball effect

In recent years United States' public debt has seen rapid growth, climbing from 36.2% of GDP in 2007 to 53.0% in 2009, and further to 62.3% in 2010, and above 90% in 2011 (CIA World Factbook). Despite levels continuing to soar, an analysis of the economic impacts of US debt is virtually absent from the literature. As previously cited, papers by Reinhart and Rogoff (2010), Kumar and Woo (2010), and Schclarek (2004) have included the United States within a panel of advanced economies. Although a single country investigation of the relationship between growth and debt is absent, as an appendix to their main findings, Kumar and Woo (2010) have extended their analysis to provide an analytical perspective for the United States. Employing a simple Cobb-Douglas production framework and assuming that each dollar of debt crowds out one dollar of capital in the long run, they estimate that an increase in the ratio of net debt to DGP of 40% over the five years from 2010-2015 will lead to a growth slowdown of around 0.8%: or 0.2% per year on average for a 10% increase in government debt. Reinhart and Rogoff (2010) also note that, whilst for a panel data set of advanced economies there appears to be no correlation between inflation and high debt levels, for the US, debt levels of over 90% are linked to significantly elevated inflation.

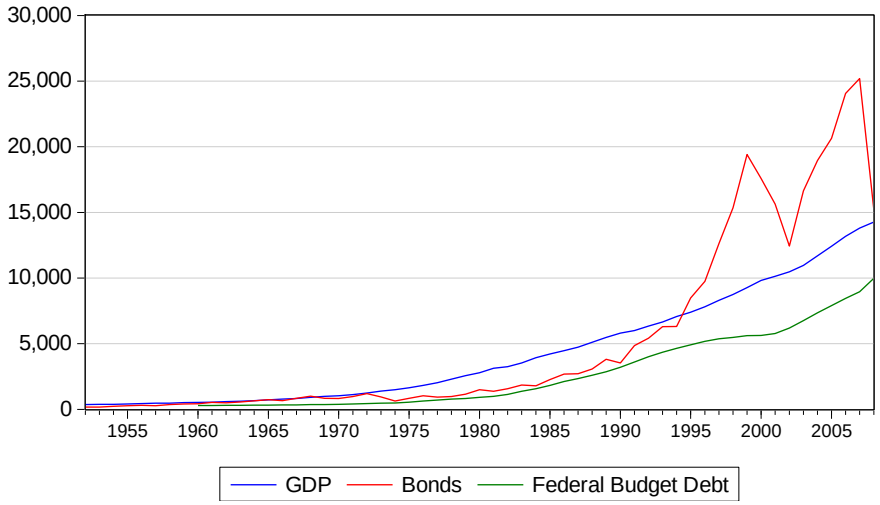

Figure 9.1 GDP, federal budget debt and government bonds

Source: based on data collected from US Census Bureau (in Billions of Dollars)

While the US government increases the government expenditure bizarrely to renovate the domestic economy, there increases the urgent need to raise enough cash to finance this huge spending. This has been partially funded through domestic and international borrowing, whereby government sells treasury securities and bonds of different maturity. Obviously this borrowing makes a sizeable increase in national and external debt, which has climbed above $15 trillion in 2009 and still rising.

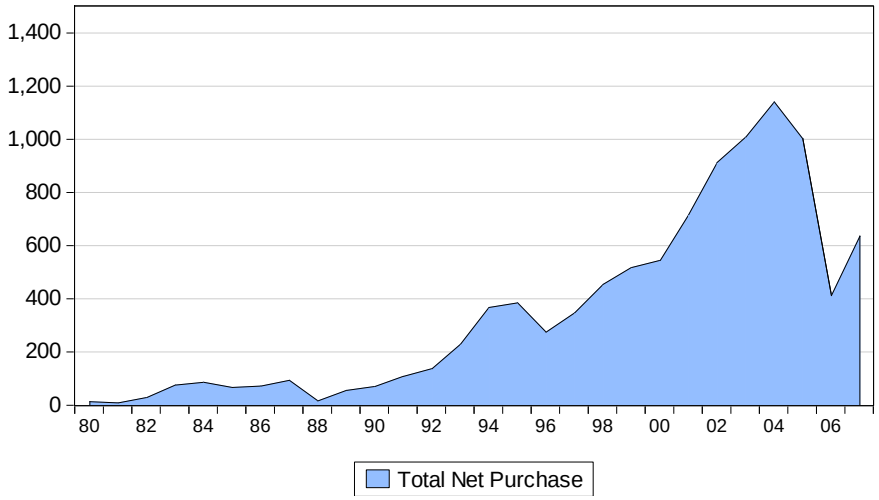

Figure 9.2a Foreign purchases of T- bonds, corporation bonds, corporate bonds and corporate stocks

Source: based on data collected from US Census Bureau (in Billions of Dollars)

Foreign purchase of US securities is what is called "US sovereign debt". Sovereign debt is more worrying and important than domestic public debt, as domestic debt is normally injected back into the domestic economy through fiscal spending and different types of investments. Therefore significant part of interest payments goes to US citizens. However, the sovereign debt indicates absolute leakage out of the US economy due to the international holders of US government bonds and treasury securities. This generates a bigger economic problem as US is giving away the future income to support today's expense.

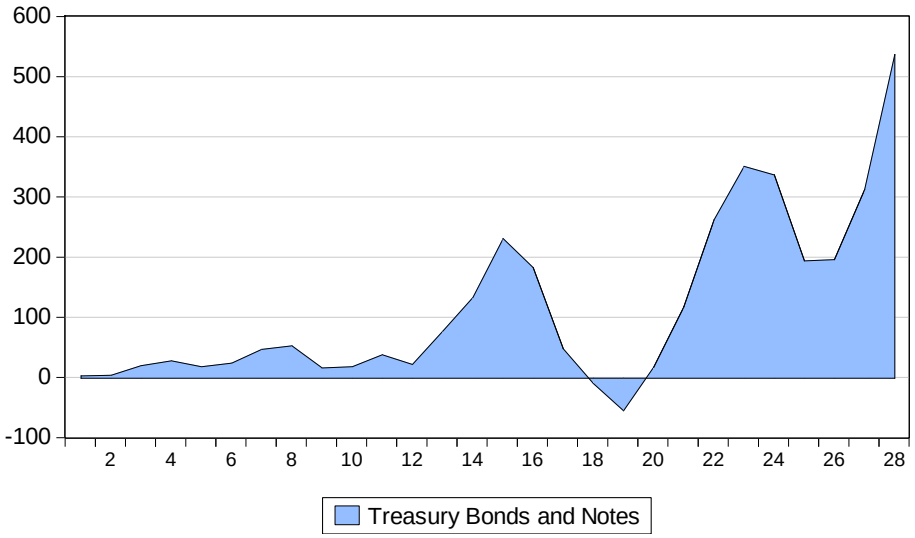

Figure 9.2b Net purchases (purchases and sales) of treasury bonds and notes

Source: based on data collected from US Census Bureau (in Billions of Dollars)

While figure 9.2b shows that the net purchase of the US T-bonds and notes increased steadily since 2001, but Figure 9.2a illustrates a significant shift in the amount of foreign purchase of US securities, bonds and stocks from mid 1990s onward. This in part can explain a relatively low inflation rate in the US from mid 90s as well as appreciation of USD in the global market since the demand of USD was increasing sharply.

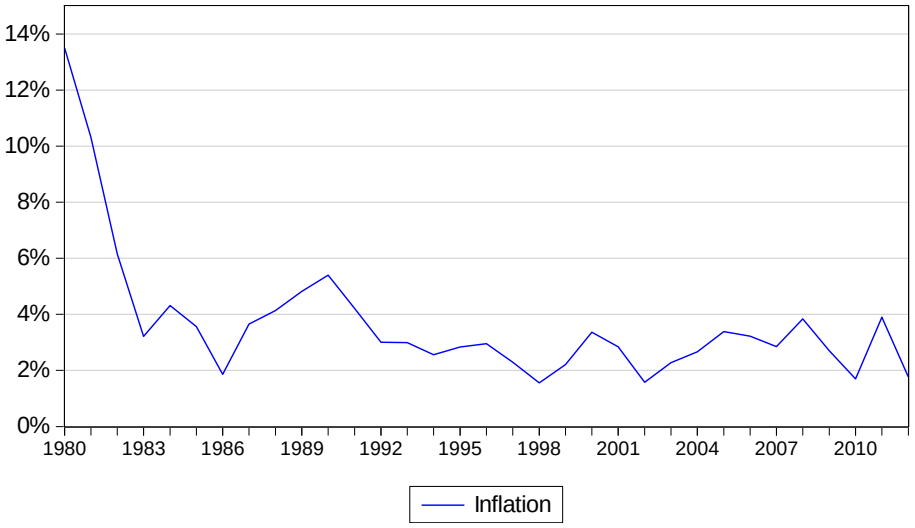

Figure 9.3 US Inflation (%)

Source: based on data collected from U.S Census Bureau

To show that if US needs to be concerned about the level of its sovereign debt, we apply the concept of debt-to-GDP ratio that shows the country's federal debt in relation to its gross domestic product. The United States has the debt-to-GDP ratio of nearly 95%, based on January 2010 release of the latest data on GDP and federal debt, and with an annual GDP of $14.5 trillion.

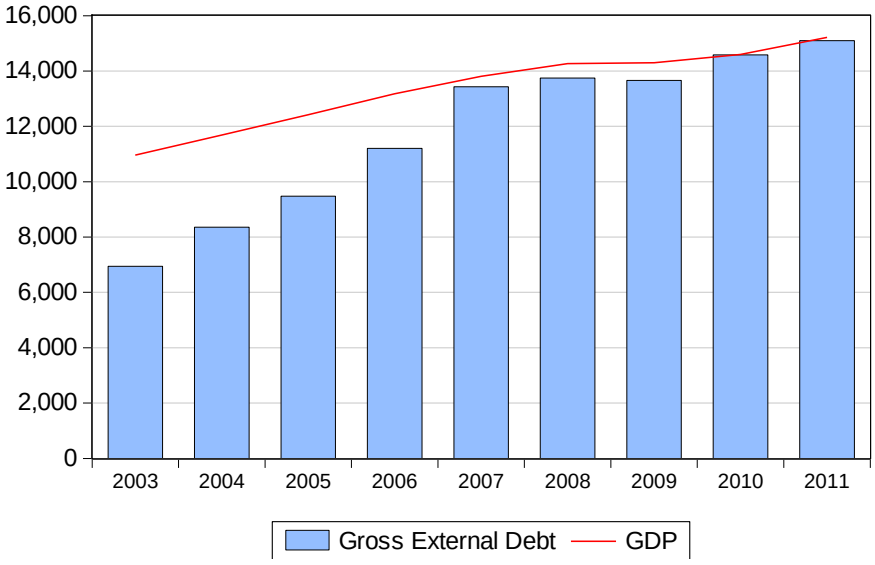

Figure 9.4 US sovereign debt and GDP

Source: based on data collected from US department of treasury and US Census Bureau (in Billions of Dollars)

Another key indicator which shows the status of deleveraging is called "total credit market debt" which captures financial sector debt, government (federal, state and local) debt, household debt, and corporate debt. The following figure (9.5) sows shows that Total Credit Market Debt for the US stood at above $52 trillion as in 2011, which is 350% of the US GDP in 2011.

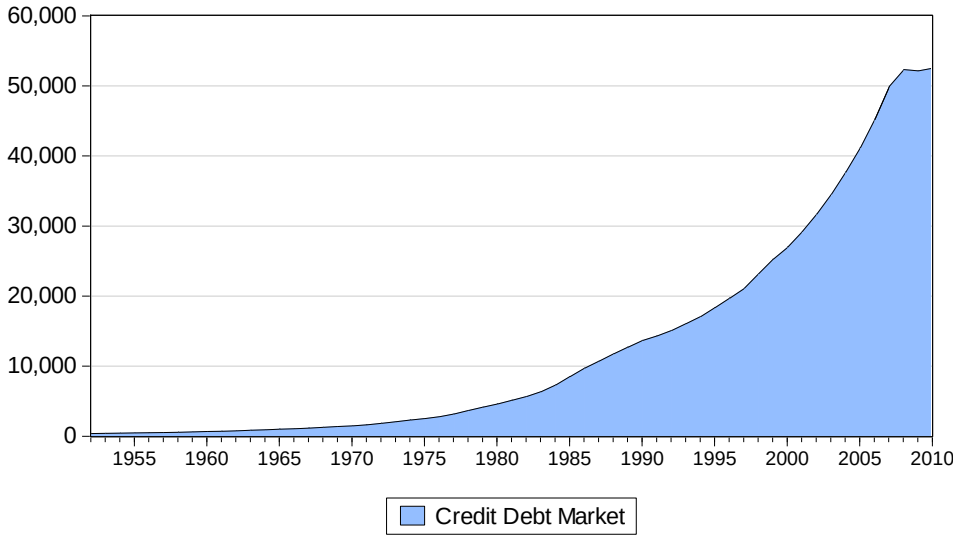

Figure 9.5 US credit market total debt including the government debt

Source: based on data collected from US department of treasury and US Census Bureau (in Billions of Dollars)

This sharp exponential growth in credit market debt is explained by D'Silver (2011) who argues; debts couldn't be serviced, the weaker and more highly leveraged participants got clobbered first (Lehman, Greece, Las Vegas housing, etc.), and the dominoes collapsed from the outside in towards the center. Money was dumped in, but traction has been weak. "What begins as a temporary program of providing liquidity becomes a permanent program of printing money needed in order for the system to merely function".

US Treasury securities are the most important means of funding US federal budget debt, which totaled $10 trillion as of 2008. US treasury securities held 70% share of government debt in 2009.

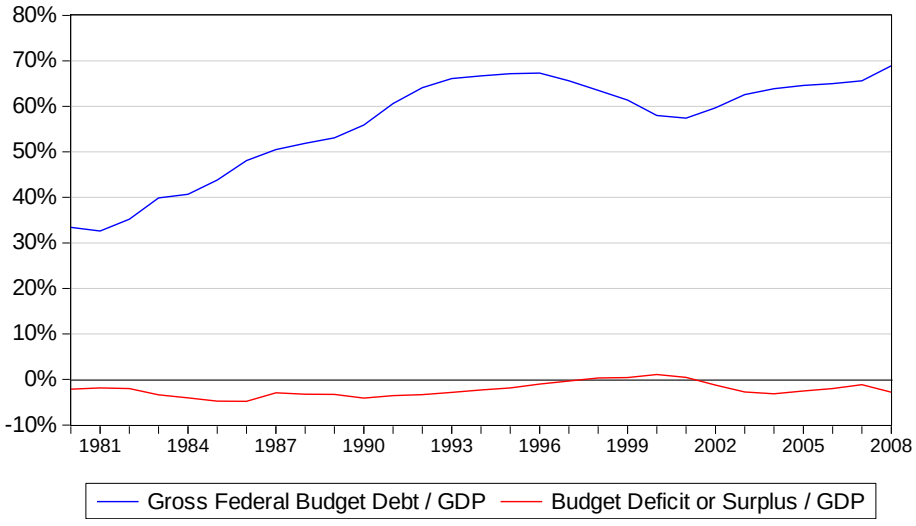

Figure 9.6a US debt-GDP ratio and budget deficit

Source: data are collected from US department of treasury and US Census Bureau

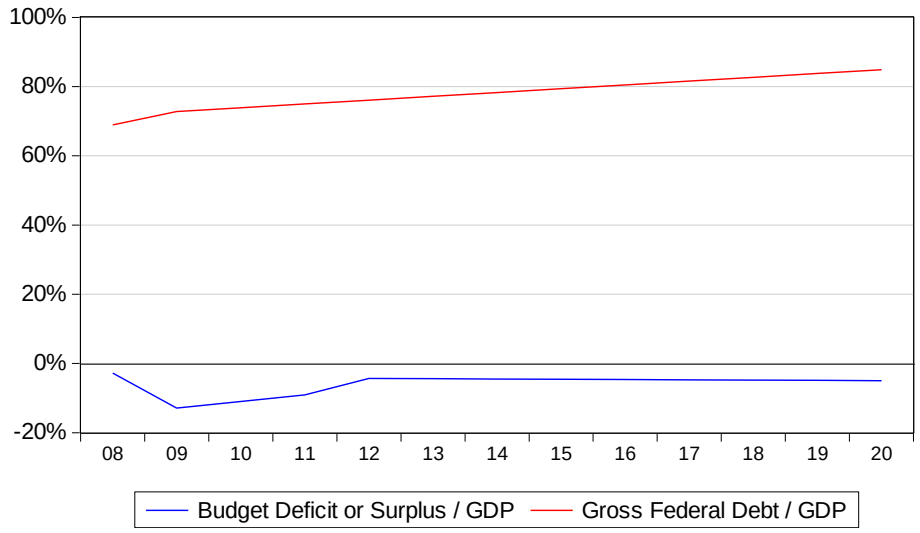

Figure 9.6b US debt-GDP ratio and budget deficit projection, estimation starts after 2008

Source: based on data from US department of treasury and US Census Bureau

The existing trends aren't promising. Growth seems to be slow even though inflation is kept low as a result of low interest rate policy during the recession, GDP growth in 2009 was only 0.2%, and future estimation doesn't depict strong and sustainable growth. Specially, interest rate rise in early 2010 created a drag on the economy, nevertheless US still is obliged to pay interest on what it is borrowed, and borrowing on top of borrowing is in fact poisoning the future of the economy and jeopardizing the long term health of financial system even if the US is the largest economy in the world with nearly $ 15 trillion worth of GDP. Moreover, living standards in the US and the UK have seen a dramatic decline soon after GFC hit in 2007, the effect of which lingers well into 2010. The decline in GDP per capita during and after GFC combined with the decline in the value of US dollars and the UK sterling means that these economies have experienced an even sharper deterioration in their relative living standard compare with other major economies around the world.

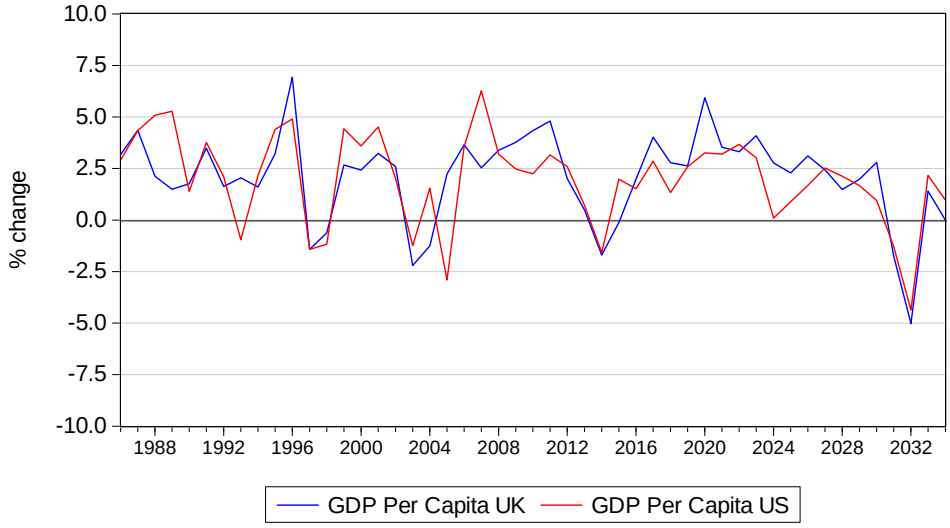

Figure 9.6c United Kingdome and United States GDP per capita

Source: Based on data from US department of treasury and the UK National Statistics

Figure 9.7 US GDP growth rate, projection starts after 2011

Source: based on data collected from US Census Bureau

In addition the 2010 US budget assigns major debt increase, and in February 2010 President Obama signed debt ceiling of $ 14.3 Trillion. 2010 budget also projects debt will rise to $20 trillion by 2020, with a Debt-to-GDP ratio of nearly 1 and remain in that level thereafter.

In comparison with the US, some strong and macro economically sound countries have very low debt-to-GDP ratios, such as China (18%), Luxembourg (14.5%), Australia (14.3%), based on 2008 and 2009 data. The case of China in particular is very interesting since China managed to achieve high and strong economic growth during the last decade without relying significantly on the bond market given that few characteristics of bond market are essential for financing economic growth. Moreover China has managed to be the world's largest US creditor in the past decade. The US reliance on foreign governments, particularly those of China and Japan, to sustain its citizens' standard of living and to service its foreign debts comes with definite risks and cost. Hillary Clinton told CNBC in 2007 that she sees "a slow erosion of our economic sovereignty," and she singled out China's big holdings of Treasury debt as an example. When she was asked why US doesn't impose tougher policies with china on issues like trade, she responded: "How do you get tough on your banker?"

In the past some argued that the likelihood that China would suddenly shrinks its holdings of US securities is doubtful since doing so could have a substantial negative effect on the Chinese economy. However, some economists opposed this view explaining that such attempt by China could have a significant negative impact on the US economy (at least in the short run) as well. They reason that the US interest rate needs to rise to attract investments back which this in turn will dampen the economic growth of the country. The statistics, however, already shows that the largest US creditors (i.e. China and Japan) have already reduced their holdings US government securities for the first time in 2011 since the Treasury Department began compiling the data in 2001.

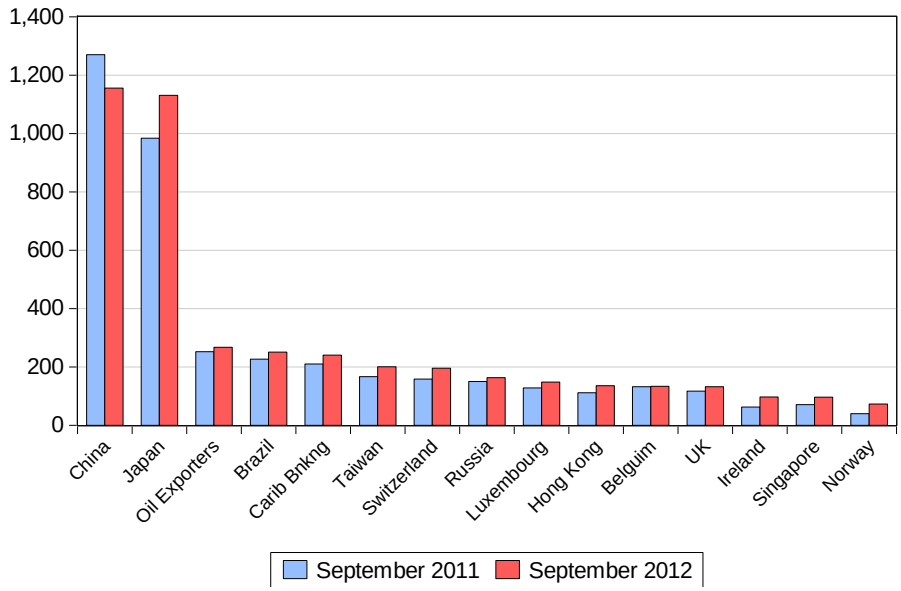

Figure 9.8 Major foreign US treasury holders (Comparison for the years 2011 and 2012)

Source: US department of treasury and Federal Reserve board

This indicates that Chinese and Japanese investors began to view the mounting level of US sovereign debt unsustainable and that the US securities no longer offer the best return on their investment. Consequently, they began to shift their investment funds away from US assets.

9.4 Do we have to prepare for when the money dies?

Global economy continues to feel lingering effects of the 2008 Global Financial Crisis (GFC) and investors all round the world know that “strong” currencies such as US dollar, GBP, and Euro are unstable. In consequence the demand for the currencies of developed countries is at risk of taking a plunge as no investors want to deal in those currencies.

Moreover, unprecedented level of sovereign debt in developed economies is projected to increase to about 108% of GDP in 2015 (Bi, 2012). This will make the matter far worse as developed countries will come to the point that they will no longer be able to repay their debts to other countries, this will instigate a “domino effect” that sets the destruction of currency system. The purchasing power of these currencies will be virtually zero, and they will be depreciated against most currencies (process of which has already began since early 2011) leading to a plunging spiral that leads to even deeper indebtedness.

It is hard to argue with the fact that the global financial crisis has morphed into sovereign debt crises, yet developed countries tend to fund their deficit through the combination of issuing more Treasuries and printing more currency. In February 2010, US banks excess reserve held at the Federal Reserve Bank reached 1 trillion dollars, and interest rate on reserves consequently increased. Mr. Bernanke announced that “By increasing the interest rate on reserves, the Federal Reserve will be able to put significant upward pressure on all short-term interest rates," hoping that in the future federal reserve will be able to restrain the economy that is agitated and running the risk of high inflation and dollar devaluation, which lowers the living standard of US residents. In 2012, this excess reserve reached 1.4 trillion dollars with short term interest rate near zero. Nevertheless, Bernanke expressed his concern about the slow pace of recovery and declaring that the growth in business

fixed investment has slowed and the housing sector has remained depressed. However, the problem starts when the borrowing has been repaid and banks start to expand their loans or purchase even more of government bonds, as a results money supply increases sharply and dollar devaluates to new low.

Some argue that the possibility that US defaults and renounce on its sovereign debt is seems low at least in the current decade, since entire US government debt is in US dollar, and the central bank always can issue and print more bills. If this approach is taken by the central bank it indicates that US can repay its creditors, and if worse comes to worst, the Federal Reserve could monetize the debt, and nevertheless, this is possible at the high cost of high inflation as a way of inflating debt away. Inflating the debt away by the means of issuing more bills allows repaying debt with devalued money (dead money), however, inflation that comes with it unrestrainedly wears away financial wealth. On the other hand some economist argue that the possibility of the US defaulting on its debt is virtually impossible, because reserves generate interest payment which is often equal to the interest paid on 30-day treasury bills, and investors are reluctant to hold long term bonds due to higher risk of capital loss. And this is the main reason why interest paid on government securities in the US are so low.

This conventional view reasons that since the US dollar is the de facto national currency of about 50 countries and since the financial health of these other currencies is dependent on US dollar; it seems very unlikely that countries around the globe tend to abandon US dollar altogether as all the economies are afraid that this sets off a series of reactions in the financial markets and reals sectors, and that it would backfire and affect them negatively, therefore the scenario of global downfall of dollar might take longer than some may suggest.

However, the fact is that for decades US has been exporting paper money in exchange with all sorts of foreign goods and services, and at some point these foreign holders will start discarding US dollars as global market is already very tensed about this devalued currency. Devalued dollar, (dead dollar), will only temporarily boost US export, however, this is a very short-lived effect which will vanish in the longer run by severely hurting technology investments, growth of capital and national savings. Germany and Japan didn't become world's greatest exporter economies despite strong currencies, but as Casey (2011) argues; in large measures because of strong currencies these two countries managed to become most export oriented countries in the world.

In the meantime, China is wasting no time in exercising its growing control and influence in the global market. China is dynamically working with other economies in the world to bring dramatic changes to the way world trade is steered and money is exchanged. These economies are moving away from dollar and no longer consider the US as a stable and reliable economy and they are in search of alternatives as a hedge against the death of US dollar. Consequently, numerous agreements were signed or are being signed in order to distance from dollar as a mean of trade. For example, a barter system is set up between Iran and china where Iranian oil is traded with Chinese products. China, Japan, Korea and the United Arab Emirates are planning to trade goods and services using their own currencies. The International Monetary Fund (IMF) issued a statement about replacing the dollar as the world's reserve currency with a system of Special Drawing Rights called SDR. Once the dollar is no longer reserve currency the negative impact on the US economy and its ability to engage in trade with other countries will be severe.

9.5 Is the risk of sovereign debt appropriately addressed in the regulations?

Conventional view suggests that the European debt Crisis, which resulted in major adjustment programs by the European union and International Monetary Fund particularly in countries such as Greece, Ireland and Portugal, was instigated by inefficiency of fiscal policy and inappropriate continental European Welfare State model. The alternative view such one of Soros (2011) suggests that the EU crisis followed 2008 crash, starting with the fall of Lehman brothers, forced the financial system to substitute the sovereign credit of government for the commercial credit that had collapsed.

Perez-Caldentey & Vernengo (2011) argues that particularly in the case of the EU after the adoption of the euro in 1999, the main typical feature of the EU public debt is that it is denominated in a currency that the sovereign national units do not directly control, and it is affiliated to foreign "denominated debt". "The global financial crisis has exposed the weaknesses of mainstream economics and it has given a boost to heterodox theories, in particular Keynesian theories" (Lavoie, 2011). The mainstream view on the about the inappropriateness of fiscal policies has been criticized. Lavoie (2011) reminds us that post-Keynesian economists were very precautious about structure of EU monetary system from the very beginning on the basis that EU zone did not fulfill the necessary criteria for a single currency area. European central bank is prevented from directly purchasing sovereign debt; so post Keynesian economists had predicted that encountering financial problems was inevitable under new structure of EU monetary policy.

Many of the fiscal and monetary policy approaches have been inadequate to deal with specific symptoms of financial and growth crises and have the potential to make matters worse. For example lack of fiscal policy offsets within the region would mean that when different crisis shocks hit monetary system, there would be no policy switches to offset the external shocks.

Another problem that exists in the monetary and financial regulations in some regions in the world is the structure and format of the capital market and banking system and how they are interrelated. For example, EU financial system is formatted in such a way that securities and OTC derivatives are based on "margin accounts" and need collateral, but this is diluted by significant price shifts. Shambaugh (2012) illustrates when banks are unable to meet collateral calls liquidity crises arise and "banks are not given the time to recapitalise through the earnings benefits of low interest rates and a positive yield spread". Moreover, World Pension Council (WPC) has criticizes the EU for adopting the Basel II recommendation which according to its experts is "drafted hastily, and unevenly transposed in national law".

On the other hand, some hedge fund investors claim that "The perceived risk is greater than the actual risk". However, even they draw back from investments in Greece, Italy and Spain (Schwartz, 2012).

9.6 Will ongoing sovereign debts cause another financial crisis?

The world's financial markets are trapped in a set of overlapping and interlinked crises that could threaten the currencies and monetary systems especially those in the EU and the US. Banking systems are struggling to survive, sovereigns are under debt pressures, and the goal of achieving sustained and sufficient economic growth in the periphery seems impracticable. if stressed sovereign debts holders such as Greece, Ireland, Spain and Italy don't pay their debts the global banking system

can become bankrupted. Without persistent economic growth, the sovereign debt crises will persist, and economic growth is unlikely when the credit channel is broken especially in sovereign states, as Shambaugh (2012) argues. According to Shambaugh (2012) though the EU appeared to continue sound improvement in 2010, with just a short-lived slowdown around the first sovereign debt scare, the area average masked wide discrepancy. German economic sentiment was rising and by September 2010 had in fact surpassed its pre-crisis peak. The Southern tier countries in the euro, though, remained stuck at a very low level of business and consumer confidence.

By the early 2011, sentiment was falling everywhere and tension escalated in sovereign bond markets. Particularly in countries where sovereign debt amplified abruptly, a "crisis of confidence" arose due to fiscal profligacy and lack of common fiscal policy which brought with it the widening of bond yields spread. Consequently, analysts around the world expressed their concerns about the US and the EU countries heading towards a severe sovereign debt crisis which will be complemented by the loss of investors' confidence. The US and EU countries heavily rely on foreign investors to fund their large budget deficits, which results in rising debt levels and increasing susceptibility to a unexpected reversal in investors' trust.

9.7 Concluding remarks

The governments and analysts around the world began to believe that the banking crisis has become a sovereign debt crisis, with the degree of indebtedness rising. Next few years are most likely going to be turbulent years due to fast mounting sovereign risk. The interest rates already began to rise since February 2010 in the US and other developed and developing countries around the globe that reveals the actual costs of the recent financial crisis. The US, the UK and the EU countries with large amount of sovereign debt need to come up with effective and realistic plan.

Although the outlook of debt-to-GDP can be an informative way to recognize a country's debt position, the future of a country's sovereign debt depends on domestic macroeconomic performance and its sustainability as well as the ability to attract foreign investments. The question is whether the economy is capable of paying off domestic and external debts. But an implicit lesson learned from recent global financial crisis is that sustaining excessive debt is extremely harmful to economies, regardless of the size of debtor country. The profound transformation in global financial market after GFC, and exponential growth of sovereign debt of the US, the UK, and the EU countries; calls for a new outlook and approach towards fiscal practicality. Debt-to-GDP ratios in these countries should be brought back to safety levels, which indicates the urgent need for further consolidation efforts to bring back macroeconomic stability, and coordinated governance. And lastly but certainly not leastly, as Stiglitz (2011) argues; Counter-cyclical fiscal policy, rather than the blind fiscal discipline, should be applied to inspire economic growth during recessions and to bring down public debt during periods of robust economic growth. This indicates that governments and policymakers around the globe should embrace the central arguments presented by John Maynard Keynes in the General Theory (Keynes 1936).

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Chapter 10

THE INTERNATIONAL MONETARY SYSTEM IN FLUX: OVERVIEW AND PROSPECTS

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THE INTERNATIONAL MONETARY SYSTEM IN FLUX: OVERVIEW AND PROSPECTS

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Abstract

This chapter analyses the architecture of the International Monetary System (IMS) and the role of reserve currencies in it. We begin by describing the evolution of the IMS from the Gold Standard to the Bretton Woods system and the European integration process that led to the creation of the euro. We then discuss the role played by the euro in the IMS as an international reserve currency. Drawing on econometric estimations, we extrapolate the evolution of the shares in international reserves of the euro, the US dollar and the renminbi. In the discussion, we take into account the current sovereign debt crisis and the possibility of a currency war taking place as a result of the reportedly excessive undervaluation of the renminbi and of the expansionist monetary policies undertaken in several advanced economies, namely in the USA. The text ends with a review of proposals for reducing the likelihood of currency wars, which may disrupt the functioning of the current IMS.

Keywords: currency war; euro; financial crisis; International Monetary System; exchange rate misalignments.

10.1 Introduction

The international financial crisis initiated in 2007, followed by the sovereign debt crisis in late 2009, appears to have generated a consensus on the need for reform of the International Monetary System (IMS). At the center of the debate is the possible emergence of a bipolar system (with the euro and the dollar as the poles) or even of a multipolar system. Over the last decade, the euro has consolidated its position as the second most important international currency. It possesses many of the characteristics that are essential for an international reserve currency and it is viewed as the most viable alternative to the dollar – see Cooper (2009).

However, the succession of international crises - see, e.g., Alexandre *et al.* (2009), Bação and Duarte (2011), Andrade and Duarte (2011), Bação *et al.* (2012) - has diminished investors' confidence in financial institutions, namely in the euro zone. This problem has been compounded by the lack of decisive political action to end the euro zone's sovereign debt crisis. Pessimism concerning the future, and desirability, of the euro itself is at record levels. At the same time, the IMS appears to be on the

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verge of becoming the arena of a currency war (see Cline and Williamson, 2010). Persistently large external imbalances and domestic monetary policy actions designed to prevent or combat recessions are frequently cited as likely causes of a currency war. But some attribute these problems to persistent exchange rate misalignments in emerging economies (see Cline and Williamson, 2011). The authorities in these economies intervene in foreign exchange markets and use capital flow controls to contain the appreciation of their currencies and to be able to accumulate massive amounts of foreign reserves, which may be used as shields during future currency crises.

The aim of this text is thus to analyses the current functioning of the IMS and to discuss its possible evolution in the near future. Special attention will be paid to the international role of the euro and to currency wars. The chapter is organized as follows. Section 10.2 presents a brief historical retrospective of the IMS. Section 10.3 discusses the threats to the current architecture of the IMS. In section 10.3 we also report predictions concerning the evolution of the IMS based on an econometric model. Section 10.4 provides concluding remarks.

10.2 From the gold standard to the Euro

The IMS has been through periods of stability and international cooperation, as well as periods of crisis, exchange rate instability and extreme competitive behavior by countries trying to conquer new markets for domestic firms. In the beginning of the XIX century, most countries had in place a bimetallic monetary system, characterized by the simultaneous circulation of gold and silver coins (see, e.g., Bordo and Schwartz, 1997). Difficulties in the operation of a bimetallic system and the need to develop a monetary system that would facilitate international trade led to the transition from bimetallism to a mono-metallic system based on gold. The Gold Standard thus emerged in the late 1870s.

By then, Great-Britain, which had in fact adopted a gold standard since 1821, displayed worldwide its commercial, industrial and financial power, derived from the industrial revolution. London became the main financial center and the British pound became the main currency in the IMS, providing a nominal anchor to the system. Countries with strong commercial and financial ties with Great Britain had an incentive to adhere to the Gold Standard, and Portugal was the first European country to join the Gold Standard, in 1854, even before it became dominant (see Duarte and Andrade, 2012).

Under the Gold Standard, the value of currencies was fixed in terms of gold and, at the international level, currencies were freely convertible into gold at that parity (see Bordo and Jonung, 2001). The functioning of this system was thus based on the presumption that countries would sustain the fixed parity, although small fluctuations within narrow bands ("gold points") were allowed. This behavior gave rise to an automatic adjustment mechanism that ensured balance of payments equilibrium (see Duarte, 2006).

Until 1913, this monetary system appeared credible. However, to finance the war effort, many countries resorted to the printing press. The result was an increasing gap between currency in circulation and gold reserves. Inevitably, countries began to suspend the convertibility of their currencies, and the Gold Standard collapsed. A phase of great monetary disorder ensued, characterized by large exchange rate fluctuations.

At the same time, countries began to accumulate reserves in currencies that were still convertible in gold. A gold-exchange standard thus emerged. The international scene was, however, different from that in the pre-war. The United States now appeared as the main creditor of the countries that had participated in the First World War, and as the main economic and financial power in the world. It is unsurprising that the dollar should by then rival the pound as an international reserve currency. Nevertheless, Britain, among other countries, attempted a return to the Gold Standard and to the status quo ante, but the pre-war parities were by now completely misaligned, giving rise to an adjustment problem (see Bordo and MacDonald, 2003). With the British pound overvalued, Britain recorded persistent external deficits and saw its reserves ebb. On the contrary, those countries that returned to the Gold Standard with undervalued currencies recorded external surpluses and accumulated reserves. This flow could not and did not last for long. The start of the Great Depression further strained the IMS and in 1931 Britain again gave up on the Gold Standard, and so did the other countries that still adhered to it.

At that time, exchange rates were often steered by government intervention, with frequent competitive devaluations, the adoption of trade restrictions and a bilateral approach to international trade agreements. It was only by the end of World War II that measures to effectively stabilize the IMS were undertaken, already under the aegis of the USA and the dollar. On July 22, 1944, the Bretton Woods agreement was signed. The Bretton Woods monetary system was based on fixed, but adjustable, exchange rates. The exchange rates of other currencies with respect to the dollar would fluctuate within a ±1% band. The dollar itself would be tied to gold, with a fixed parity of 35 dollars per ounce of gold. In the event of a "fundamental disequilibrium", dollar and gold parities could be adjusted (see Williamson, 1985).

The Bretton Woods agreement established that, after a transition period, countries had to allow their currencies to be convertible for current transactions purposes. This rule was a compromise between John Maynard Keynes's view and the American position. According to Keynes, capital controls were essential for countries to retain autonomy of national economic policies. The representatives of the US government were more sympathetic to the liberalization of capital flows. Despite the agreement provisions for an adjustment period, the USA maintained a more liberal framework concerning capital flows than other industrialized countries; these other countries only left the transition period regarding capital flows in 1961. Before that, these countries aimed at maintaining external surpluses, with the aid of import restrictions, with the goal of accumulating dollar (or gold) reserves. An asymmetry thus developed in the working of the system: the country with the anchor currency had persistent external deficits, which supplied the liquidity demanded by the other countries in the system. Eventually, this led to a declining confidence in the value of the dollar and thus in the sustainability of the Bretton Woods system – a problem known as the "Triffin dilemma" (see McKinnon, 1993). The 1960s were spent fighting against the difficulties posed by this problem, both to the Bretton Woods system and to the conduct of economic policy in the USA. Notable critics of the situation were the French, whose President, Charles de Gaulle, and Finance Minister, Giscard d'Estaing, bitterly complained about the "exorbitant privilege" that the international role of the dollar granted to the USA (see Eichengreen, 2011).

The insurmountable contradiction between the fixed exchange rate regime and the inflationary economic policy adopted in the USA – especially as a consequence of the Vietnam war and of the

expenditures associated with President Johnson's "Great Society" program – threatened to exhaust the USA's gold reserves. These were being used to meet the conversion demands made by those countries that had accumulated dollar reserves, namely France. It should be noted that high US inflation was putting pressure on the price of gold in the open market, driving it away from the official parity (35 USD per ounce). Given this, countries holding dollar reserves had growing concerns about the sustainability of that parity, and thus preferred to convert dollars into gold. Faced with the possibility of exhaustion of gold reserves, President Nixon suspended the convertibility of the dollar in August 1971. In December 1971, an attempt at rebuilding confidence in the dollar gives rise to the Smithsonian agreement. The dollar is devalued against gold and the fluctuation band of other exchange rates is widened to ±2.25%. However, in February 1973 the dollar was again devalued and in March 1973 the system collapsed, leading to the widespread fluctuation of exchange rates. Despite this outcome, the search for a framework that could contribute to the stabilization of exchange rates continued. Although other goals were also important - first and foremost the goal of building political union –, Europe took the most decisive steps towards introducing some means of stabilizing the IMS. First, the European Monetary System (EMS) was created in 1979 and with it the European Currency Unit (ECU), against which European exchange rates could fluctuate in a ± 2.25% band. The EMS went through several phases, but in 1989 a plan (Delors Report) was presented to create an Economic and Monetary Union in Europe. Eventually, this process was completed in January 2002, with the physical circulation of the euro. The first years of the euro were successful. The share the euro in official reserves (allocated) increased significantly, from 18% to 25%, between 1999 and 2003 - see Figure 10.1.

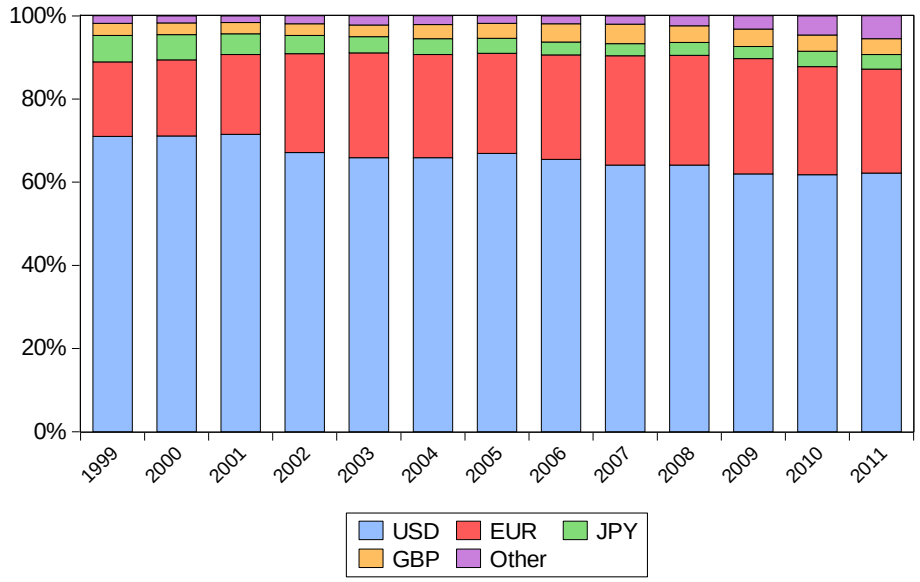

Figure 10.1 Share in official reserves (allocated)

Source: COFER, IMF

The economic and financial crisis that began in 2007 increased the interest alternative reserve currencies, namely the euro, which saw its share increase to almost 28% in 2009. The crisis turned attention to the functioning of the IMS and led to calls for its reform. The dollar was shaken by the turmoil in the US financial sector and by the Great Recession that followed the financial crisis. Therefore, a widely discussed issue has been whether the supremacy of the dollar as an international

currency will be challenged by other currencies. Some authors have argued that in the near future it is not likely that the dollar will lose its status as the leading international currency (see Cooper, 2009). Others have argued that the IMS is evolving towards a "multipolar" system (see Ahearne *et al.*, 2007, and Eichengreen, 2010).

The next section discusses this matter and presents predictions based on an econometric model of the share of the main international currencies in official reserves.

10.3 Reserve currencies

10.3.1 Alternatives to the dollar

Can an alternative international currency emerge? The dollar currently enjoys a number of advantages: it is widely accepted; there is a highly liquid market of low-risk assets denominated in dollars (US Treasury Bills); most transactions in Forex markets use the dollar - see Cooper (2009). Nevertheless, as Figure 10.1 shows, its share in official reserves has declined significantly (around 9 percentage points) in the last decade.

The alternatives envisaged in the economic literature focused on the euro, viewed as the most promising candidate (see Chinn and Frankel, 2008). However, the dollar will also have to face the growing competition of the yen and of the BRICs' currencies, especially the renminbi. Another possibility is the creation of a global currency based on the IMF's Special Drawing Rights (SDR), which were created with the goal of creating liquidity at the international level (see Williamson, 2009, and Stiglitz, 2010). However, the SDR is still not widely used as a reserve currency. Additionally, it cannot be used by individuals and it is not used in commercial transactions.

The yen's international status is harmed by Japan's high public debt, low interest rates, economic stagnation and the perception that it is a "weak" currency, subject to the intervention of the Japanese central bank in the Forex market (see Ahearne *et al.*, 2007, and Cooper, 2009). As for the renminbi, currently it lacks several of the characteristics of an international currency. It is still inconvertible in capital accounts and little used in international trade. Chinese financial markets are not well developed and difficult to access by foreign investors, and China imposes strict capital controls.

The emergence of a bipolar or a multipolar system might have a significant impact on the international balance of powers and on the management of international financial stability issues. The consequences of a transition to a bipolar or multipolar system have been discussed in the economic literature, especially in connection with sustainability and stability themes. Some authors (see, e.g., Eichengreen, 2010, and Bénassy-Quéré and Pisani-Ferri, 2011) argue that the transition to a system with several reference currencies may bring improvements in terms of equity and efficiency, relatively to a system in which the issuer of the reserve currency enjoys an "exorbitant privilege" and in which countries hoard reserves (by accumulating trade surpluses) as an insurance against the volatility of capital flows.

The fact that seigniorage income would be shared by several countries in a bipolar or multipolar system could also facilitate the conduct of economic policy in the issuers of the new reserve currencies. Nevertheless, competition for the status of reserve currency could limit the scope for

bolder measures, as countries try to safeguard the conditions required their currency to maintain the reserve currency status.

However, one should bear in mind that a multipolar system would lack a leader, and that this could be viewed as a sign of the inability of a multipolar system to coordinate the actions of countries, when crisis demands it. A bipolar or multipolar system may thus lead to more acute international crises (see Bénassy-Quéré and Pisani-Ferry, 2011, and Farhi *et al.*, 2011).

In summary, a bipolar or multipolar IMS can only develop if each pole allows its currency to play an international role. This requires lifting restrictions to international trade and finance, and sophisticated financial markets. Cooperation between reserve currency issuers will be an essential requirement in such a system, especially to allow the management of international liquidity in times of crisis. But, given the evolution from the international financial crisis – that eroded confidence in the dollar - to the euro zone sovereign debt crisis, will the euro provide a reliable pole? And is the talk about "currency wars" a good omen for a multipolar system? We discuss these issues next.

10.3.2 The sovereign debt crisis

The international financial crisis that began in 2007 arose fears of a repetition of the Great Depression. To prevent this possibility, governments intervened massively with the goal of propping up the economy, and especially to avoid the imminent collapse of the financial system. The intervention in the financial system was explicitly advocated, in October 2008, by the G7 and the Eurogroup. Besides this, the European Commission also called on governments to undertake measures to support the economy.

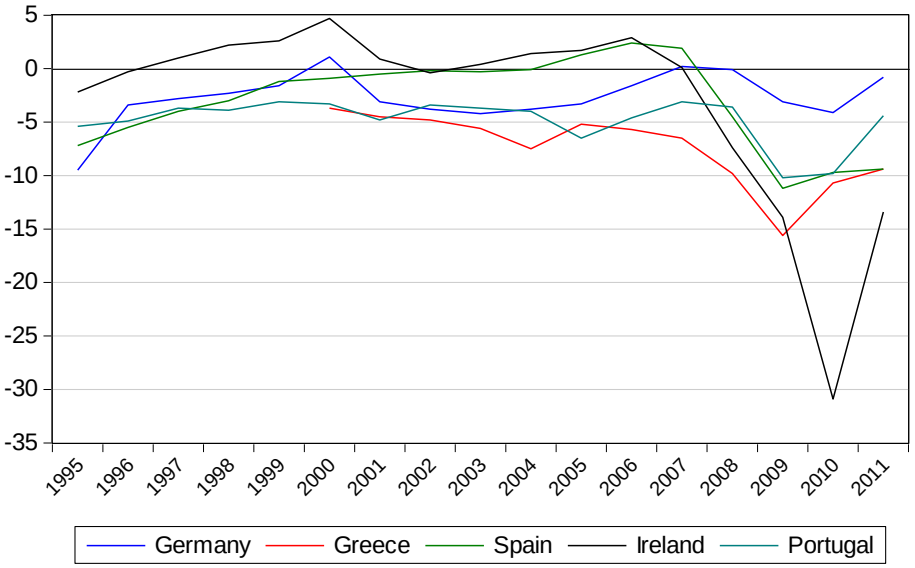

Figure 10.2 Public deficits in selected Eurozone countries (%GDP)

Source: Eurostat

The impact of the aid given to the financial sector on public deficits was small in the European Union (about 0.5% of GDP - see Banque de France, 2012), although it was very large in certain countries, namely in Ireland (above 20% of GDP in 2010).[46] However, a more powerful impact of the

[46] Some governments actually profited from the aid given to the financial sector – see Banque de France (2012, p.19).

crisis on public finance operated through "automatic stabilizers", i.e., through the decline in tax revenues and the increase in expenditure with social benefits, namely unemployment benefits, that are inevitable during a recession. Additionally, many governments adopted temporary measures to stimulate employment creation, or to provide temporary relief for the unemployed. All in all, the result was a very large increase in public deficits (see Figure 10.2) and in public debt (see Figure 10.3).

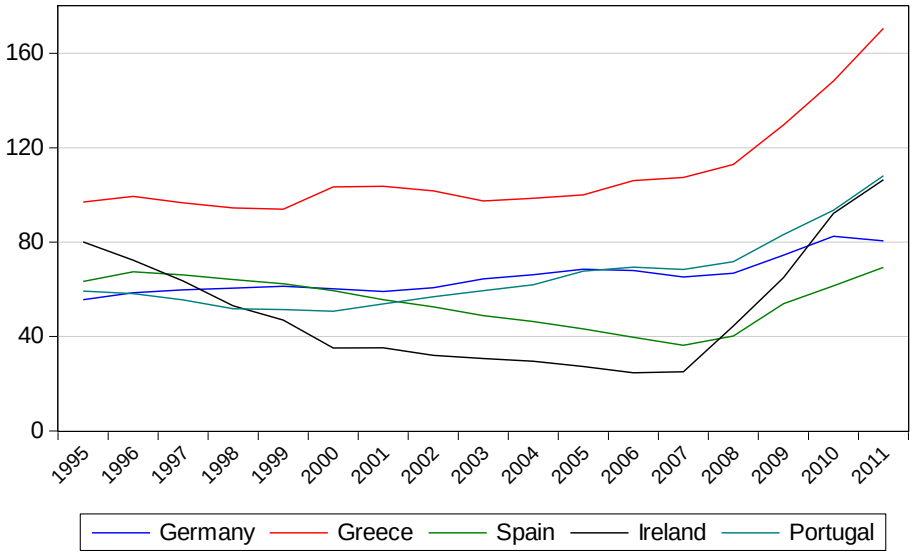

Figure 10.3 Public debt in selected Eurozone countries (%GDP)

Source: Eurostat

The large public deficits and debt levels sent jitters through the financial markets. The disclosure that Greek public finance statistics had been rigged added fuel to the flames and soon after the credit rating of Greek government bonds was downgraded. Interest rates began an ascending movement (see Figure 10.4), piling pressure on already overstretched public finances. In May 2010, the bailout of the Greek government is announced. Meanwhile, Ireland continued to adopt austerity measures in order to compensate for the mounting costs of the nationalization of several financial institutions. In November 2010, Ireland also receives a rescue package. In April 2011, the Portuguese government finally acknowledges the need for a bailout, which is granted the following month. In October 2011, an agreement for reducing Greece's debt is reached. The following month, both Greece's and Italy's prime ministers resign and are replaced by "technocratic" interim prime ministers. In December 2011, the magnitude of the dangers for the European financial system led the ECB to carry out a long-term refinancing operation amounting to almost 500 billion euros.

2012 was marked by a deterioration of economic conditions in Europe, further downgrades of European sovereign ratings, further loans of the ECB to the European financial system, and by the discussion on how to reformulate European economic governance so as to prevent debt crises in the euro zone. The need to balance the risk of moral hazard and the need to convince the financial markets that euro zone countries are now solvent, makes progress difficult. Nevertheless, in March 2012 a new fiscal stability pact was signed, while the establishment of a banking union continues to under analysis. Bailouts continued: in June, Spain was given a "partial bailout", directed at the financial sector, while Cyprus also applied for a bailout.

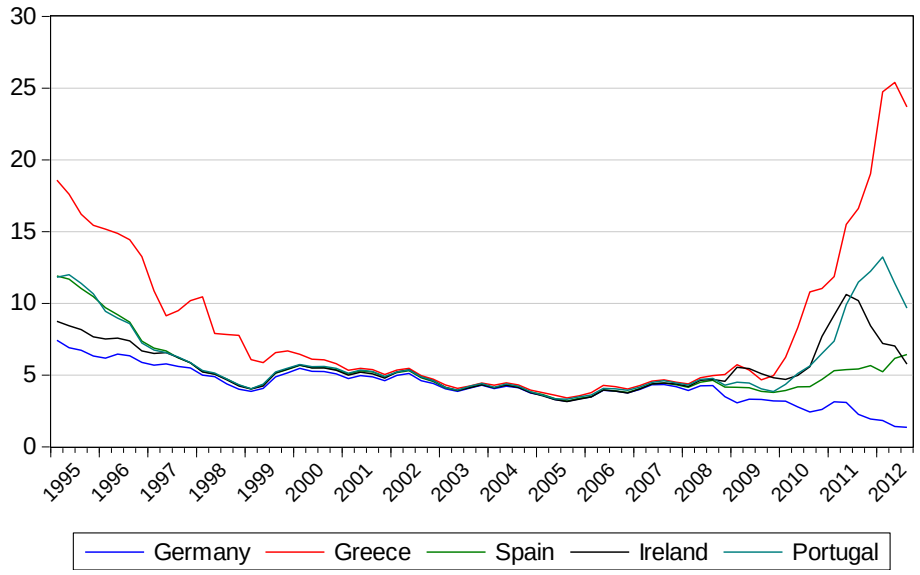

Figure 10.4 Interest rates in selected Eurozone countries

Source: Eurostat (10-year government bonds)

The uncertainty about the evolution of the euro zone crisis, with speculation about a "Grexit", and even about Germany, rather than the weak countries, leaving the euro, has naturally brought back doubts about the sustainability of the European currency union. Perhaps because of this, the euro has lost some of its importance as a reserve currency: from its peak of 27.7% in 2009 - when the focus was still on the Great Recession in the US - it has declined to 25% in 2011. Thus, until the euro zone sovereign debt crisis is overcome, the prospects that the euro will challenge the dollar as the main international currency appear very slim.

10.3.3 Currency wars

Besides the euro crisis, the IMS has also been disturbed by the possibility of a "currency war". The exchange-rate theme has assumed importance in the face of the large and persistent external imbalances that have been recorded in recent years. Persistent exchange-rate misalignments are often cited as a possible cause of the large external imbalances, and as a threat to global stability (see Ahearne *et al.*, 2007, Cline and Williamson, 2010). The current architecture of the IMS is seen as incapable of responding to global competitive shifts, or promoting the adjustments necessary to eliminate the imbalances. The large current account deficits of several advanced economies, and the large current account deficits of several emerging economies, are usually put forward as evidence of the deficiencies of the IMS.

At the same time, it should be noted that one of the lessons that emerging economies have drawn from past financial crises is that high levels of foreign reserves are an essential tool for dealing with the shocks originated by financial crises. One way of accumulating reserves is to sell more than you buy, for which it may be helpful to keep an undervalued currency, namely through intervention in the forex market; to impose capital controls may also help to achieve the same goal. China is deemed to be the quintessential practitioner of this art. This has made other countries reproach China. The USA have been particularly sensitive about this matter, and have threatened with trade restrictions. China is one of the countries with the largest current account surplus, and have been accumulating

large amounts of foreign reserves, whereas the USA have been reporting large external deficits, and have been increasing their foreign debt (see Ahearne *et al.*, 2007). Since the renminbi's exchange rate does not float enough to correct the imbalance, voices in the USA claim that China is manipulating the exchange rate. It was in this context that the term "currency war" appeared. It was popularized by the Brazilian finance minister, Guido Mantega, who complained about the over-valuation of the Brazilian currency, but other currencies would also get embroiled in a currency war, namely in East Asia.

According to Cline and Williamson (2010), issuers of overvalued currencies and posting large external deficits, could be justified in their intervention in Forex markets to prevent further appreciation of their currencies. However, exchange-rate manipulation by countries bent on maintaining current-account surpluses can only worsen global imbalances. Cline and Williamson (2011) estimated the fundamental equilibrium exchange rate for a group of currencies. By comparing those estimates with the actual exchange rates in October 2011, Cline and Williamson also estimated the misalignment implicit in actual exchange rates, and thus were able to conclude on which currencies were overvalued, undervalued or at the equilibrium level. Some of the results are reproduced in Table 10.1. The group of countries with undervalued currencies includes China, Singapore, Malaysia and Hong Kong. On the other side are countries such as Japan, Brazil, USA, Australia and the euro area.

Table 10.1 Exchange rate misalignments

Country	FEER (2007 REER=100)	REER (2007=100)	Overvaluation (%)	Undervaluation (%)
Euro area	96.1	97.6	1.6	
Australia	99.8	118.1	15.5	
Brazil	117.1	123.6	5.2	
China	131.0	118.4		10.6
USA	81.3	89.6	9.3	
Hong Kong	101.7	88.2		15.4
Japan	116.0	127.5	9.0	
Malaysia	114.7	100.0		14.7
New Zealand	79.6	100.8	21.0	
Singapore	141.2	116.2		21.5
Thailand	101.1	100.5		0.6

Source: Adapted from Cline and Williamson (2011).

Notes: FEER: fundamental equilibrium exchange rate, REER: real effective exchange rate (end of October 2011).

Prevention (or resolution) of a currency war requires that governments be willing to let the exchange rates converge to their equilibrium values, and thus to lose this instrument of economic policy. However, the conflict over exchange rates has been stoked up by economic policy measures adopted by advanced economies with a view to fighting the Great Recession. The US Federal Reserve, the central bank of Japan and the Bank of England, have introduced massive liquidity provision measures, usually known as "Quantitative Easing" (QE). The ECB has created a 3-year lending facility, charging an interest rate of 1% (LTRO- Long Term Refinancing Operations). Emerging economies have reacted to these measures with annoyance; they view these measures as devaluations in disguise (see Darvas *et al.*, 2011).

Unsurprisingly, the G20 has shown a growing concern about these issues. However, an agreement on how to rebalance global demand is yet to be reached. The IMF also appears to be taking a passive stand on the matter. There is, therefore, a lack of the necessary leadership to build a consensus and stabilize the system. How will all this play out? The next section gives some hints.

10.3.4 Empirical analysis

In this section we estimate, using panel data, a model for the share of a currency in official reserves. The group of countries is composed of the US dollar, the UK pound, the Japanese yen, the Swiss franc and the euro, since these are the main international currencies (over the sample, these currencies accounted for over 90% of allocated official reserves). The estimated model is similar to that estimated in Chinn and Frankel (2008). Chinn and Frankel estimated their model on a pre-euro sample. Their goal was to evaluate the likelihood that the euro would overtake the dollar as the main reserve currency. Here we estimate the model on a sample that begins after the introduction of the euro (1999) and ends in 2011, and our goal is comment on the likely evolution of the international role of the euro and of the dollar, and what space there will be for other variables in official reserves.

Table 10.2 Data definitions and sources

Variable	Description	Source of raw data
reserves	share of each currency in allocated official foreign exchange holdings	COFER (Currency Composition of Official Foreign Exchange Reserves), IMF
gdp	share of the currency issuer's country in world GDP	World Economic Outlook Database, IMF
infl	deviation from average consumer price inflation in the G7 in each year	World Economic Outlook Database, IMF
fe_turn	turnover of the currency in foreign exchange markets as a fraction of total turnover	Triennial Central Bank Survey, Foreign exchange and derivatives market activity in 2010, BIS
er_vol	average standard deviation of the exchange rate vis-à-vis the special drawing rights unit of account, in deviation from the average value across the five currencies used in our study	Exchange rate archive, IMF
er_diff	annual end-of-period change in the logarithm of the exchange rate against the SDR (SDRs per currency unit)	Exchange rate archive, IMF

The dependent variable in the model is the share of each currency in allocated official foreign exchange holdings, according to the COFER (Currency Composition of Official Foreign Exchange Reserves) database provided by the IMF. The variables commonly used to explain the behavior of this share (see Chinn and Frankel, 2008) include the share of the currency issuer's country in world GDP (*gdp*), the evolution of inflation in the currency issuer's country (*infl*), the turnover of the currency in foreign exchange markets (*fe_turn*), the volatility of the currency's exchange rate against the SDR (*er_vol*) and its appreciation (*er_diff*). The share in world GDP (which should not be too different from the share in world trade) is an indicator of the country's importance in the world economy. Naturally, the currency issued by more important countries should be in more demand. The turnover in foreign exchange markets may be viewed as another measure of the importance of the currency. However, trust in the value of a currency should also matter for the decision to hold it. Confidence in a currency may be eroded by high inflation in the currency issuer's country. Additionally, confidence in a currency

may be associated to an appreciation of that currency, or to low volatility in its exchange rate. Further details on the data employed are given in Table 10.2.

Since the variable to be explained (share in foreign exchange reserves) is bounded between 0 and 1, it is customary (see again Chinn and Frankel, 2008) to apply to it the logit transformation:

$$y = \ln\left(\frac{x}{1-x}\right) \tag{10.1}$$

where *x* is the share in foreign exchange reserves and *ln()* is the natural logarithm. By applying this transformation, we obtain a new variable which can take any real value. This variable may then be regressed on a linear function of explanatory variables, without concern for the possibility that the result of the estimation might yield shares outside the [0,1] interval, as would be the case if the dependent variable went untransformed.

However, one may ask whether this particular transformation should be used rather than some alternative transformation. We thus decided to embed the logit transformation in a more general framework, appearing as a particular case of the Box-Cox transformation applied to the ratio:

$$w = \frac{x}{1-x} \tag{10.2}$$

We thus analyze the performance of the following transformation:

$$z = \frac{w^{\lambda}-1}{\lambda} \tag{10.3}$$

and choose λ so as to minimise the sum of squares of the implied residuals. Notice that as λ approaches zero, *z* approaches the logarithm of *w*, i.e., the logit transformation of *x*.

Our procedure[47] thus consists of the following steps:

1. transform *x* into *z* using the current value of λ
2. estimate the model:

$$z = b_1 + b_2 gdp + b_3 infl + b_4 fe\_turn + b_5 er\_vol + b_6 er\_diff + b_6 z_{-1} + \varepsilon \tag{10.4}$$

3. save the estimated *z*'s ($\hat{z}$)
4. compute the implied residuals:

$$e = x - \frac{(\hat{z}\lambda+1)^{\frac{1}{\lambda}}}{1+(\hat{z}\lambda+1)^{\frac{1}{\lambda}}} \tag{10.5}$$

5. save the sum of squares of e
6. repeat the preceding steps for different values of λ and choose the λ that minimises the sum of squared implied residuals. The values of λ go from 0 to 1, with a step length equal to 0.01.

Note that in step 3 a difficulty may arise, which is that $\hat{z}\lambda + 1$ may be negative and thus the exponentiation may not be feasible when λ is fractional. This happened in very few cases, located on

[47] All computations were performed with Gretl 1.9.11.

the fringe of the area where the minimum value of the sum of squares was found. Nevertheless, we opted to consider the implied residual equal to *x* in those cases, since the value of $\hat{z}\lambda + 1$ was between -1 and 0. This also provided a smooth evolution of the sum of squares along the grid for λ.
What was the result of this procedure? The optimal value of λ was found to be 0.2. Although this means that the logit transformation is not strictly optimal, one should bear in mind that the sum of squares was actually very flat in this region. This result suggests that the logit transformation may be a reasonable approximation to the optimum in this class of transformations. To elucidate this issue, we will estimate both the logit model and the optimized model (with $\lambda = 0.2$), and compare the results. Note that we are interested in the effect of the explanatory variables on the share of each currency in official reserves (*x*), but this is a nonlinear function (via *w* and *z*) of the explanatory variables. To compare the results obtained for different nonlinear functions of these explanatory variables, we need to move from the estimated coefficients to the marginal effects of each explanatory variable on *x*, i.e., we need to compute for each explanatory variable *v*:

$$\frac{\partial x}{\partial v} = \frac{\partial x}{\partial w}\frac{\partial w}{\partial z}\frac{\partial z}{\partial v} \tag{10.6}$$

Given the nonlinearity of *w* and *z*, the marginal effect of variable *v* will depend on the value of *v*. In the context of this study, we decided to compute the marginal effect for each variable-country pair at the value taken by that variable in that country in the year 2011 (the last year in our sample). The results are reported in Table 10.3 for the case of the logit transformation, and in Table 10.4 for the case of the optimized model.

Table 10.3 Estimated coefficients and marginal effects (logit transformation)

	Coeff	s.d.	euro	USD	GBP	JPY	CHF
Gdp	1.5158***	0.39051	0.277	0.360	0.057	0.051	0.002
Infl	-3.3795*	1.8042	-0.617	-0.802	-0.127	-0.115	-0.004
fe_turn	0.78785***	0.16983	0.144	0.187	0.030	0.027	0.001
er_vol	-2.1357	4.1929	-0.390	-0.507	-0.081	-0.072	-0.003
er_diff	0.93717***	0.10714	0.171	0.222	0.035	0.032	0.001
z_1	0.95802***	0.0094886	0.175	0.227	0.036	0.033	0.001

Note: Joint significance of differing group means: F(4, 49) = 1.29643 with p-value 0.284437
Breusch-Pagan test statistic: LM = 1.3263 with p-value = prob(chi-square(1) > 1.3263) = 0.249465
The dependent variable is *z=ln(x/(1-x))*, where *x* is the share of each currency in allocated official reserves.

Since the data we are using is panel data, the question of whether to use a pooled, fixed or random effects model naturally arises. The results of the specification tests reported (the individual effects test and the Breusch-Pagan test) indicate that the pooled model is indeed adequate. In both the logit and the Box-Cox models, the signs of the estimated coefficients are the same and are what one would expect: an increase in GDP share, in foreign exchange turnover and in the exchange rate contribute to augmenting the weight of the currency in official reserves; an increase in inflation and in the volatility of the exchange rate lead to a decline in the weight of the currency in official reserves. It is also important to note that there appears to be a lot of persistence: the coefficient on the lagged weight is between 0.92 and 0.96. Nevertheless, there is a difference in the results concerning the significance of inflation and of the exchange rate volatility. In the logit model, exchange rate volatility is

not significant at the 10% level, whereas in the Box-Cox model inflation is not significant at the 10% level. It is unsurprising then that these are also the variables where the estimated marginal effects differ more between the two models. However, inflation and exchange rate volatility are the least significant variables in both models - all other variables are significant at the 1% level.

Table 10.4 Estimated coefficients and marginal effects (Box-Cox transformation)

	Coeff	s.d.	Euro	USD	GBP	JPY	CHF
Gdp	1.2719***	0.078652	0.297	0.277	0.093	0.084	0.006
Infl	-0.61909	0.48854	-0.145	-0.135	-0.045	-0.041	-0.003
fe_turn	0.34298***	0.032968	0.080	0.075	0.025	0.023	0.001
er_vol	-6.6043**	2.6872	-1.542	-1.440	-0.484	-0.435	-0.029
er_diff	0.53583***	0.079264	0.125	0.117	0.039	0.035	0.002
z_1	0.92694***	0.0044233	0.216	0.202	0.068	0.061	0.004

Notes: Joint significance of differing group means: F(4, 49) = 1.40078 with p-value 0.247621
Breusch-Pagan test statistic:
LM = 2.57567 with p-value = prob(chi-square(1) > 2.57567) = 0.108518
The dependent variable is *z=(w^0.2-1)/0.2*, where *w=ln(x/(1-x))* and x is the share of each currency in official reserves.

What do our results imply for the near future of the international monetary system? To answer this question we calculated the shares that our model predicts each of the currencies will have in official reserves between 2012 and 2017. Naturally, this requires the specification of values for the explanatory variables in those years. In the cases of the share in world GDP and inflation, we used the forecasts reported by the IMF in the World Economic Outlook. In the cases of the turnover in foreign exchange markets and exchange rate volatility, we assumed the variables will remain at their 2011 levels. Finally, in the case of exchange rate appreciation, we assumed the change in the value of the exchange rate would converge to zero by 2017. This scenario leads to the evolution report in Table 10.5.

Table 10.5 Predicted evolution of official reserves' composition

	2011	2017 (Box-Cox)	2017 (logit)
EUR	25.0%	19.3%	15.4%
USD	62.1%	56.0%	58.3%
GBP	3.8%	4.5%	4.1%
JPY	3.5%	2.3%	2.1%
CHF	0.1%	0.1%	0.1%
Total	94.6%	82.2%	80.0%

Over the next five years, both models predict a very significant decline of the importance of the five currencies in our sample, from 94.6% to 82.2% (Box-Cox model) or 80% (logit model). The only share predicted to increase is that of the UK pound. The logit model predicts a large fall of the euro's share (minus 9.6 percentage points), whereas the Box-Cox model predicts that the biggest loser will be the dollar (minus 6.1 percentage points). These results are in stark contrast with some of the scenarios reported in Chinn and Frankel (2008), according to whom the dollar will continue its decline and be replaced by the euro.

Instead, our results suggest that over the next five years there will be a fast increase in the importance of other currencies in the international monetary system. The obvious candidate appears to be China's renminbi. Nevertheless, other emerging countries' currencies may well move forward to fill the gap left by the euro and the dollar. Such development is likely to require emerging countries not only to continue to grow at a fast pace, but also to take steps towards full integration of their currencies in the international monetary system.

10.4 Conclusion

The international importance of the dollar has been declining and our econometric model suggests that this will continue to happen in the near future. Therefore, there will be space for other currencies to occupy in official reserves. Nevertheless, the emergence of a multipolar IMS does not appear likely in the short run, given the problems that the euro zone and the Japanese economy face, and the restrictions that affect the international use of the Chinese currency. Most likely, the IMS will continue in a state of flux for some years, until one, or several, of the alternative reserve currencies is able to rise above the rest and challenge the dollar's dominance.

Whether this process of sorting out reserve currencies will be accompanied by an explicit currency war is unclear. In fact, participation in a currency - with the goal of achieving a depreciation of one's currency - is prima facie incompatible with issuing an international reserve currency, demanded for its worth and usefulness in international transactions, as our econometric model corroborates. However, in the short run governments appear to be worrying about stabilization of the domestic economy rather than about the international standing of the currency. Mediation by international forums such as the G20 may thus be important in shaping a smooth path in the years to come for the International Monetary System.

Acknowledgements

The authors thank Adelaide Duarte for their helpful comments and suggestions. Financial support from Fundação para a Ciência e a Tecnologia, research grant PTDC/EGE-ECO/100825/2008, through Programa Operacional Temático Factores de Competitividade (COMPETE) of the Community Support Framework III, partially funded by FEDER, is gratefully acknowledged.

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Chapter 11

REAL OUTPUT AND PRICES ADJUSTMENTS UNDER DIFFERENT EXCHANGE RATE REGIMES

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REAL OUTPUT AND PRICES ADJUSTMENTS UNDER DIFFERENT EXCHANGE RATE REGIMES

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Abstract

Exchange rate regimes evolution in the European transition economies refers to one of the most crucial policy decision in the beginning of the 1990s employed during the initial stages of the transition process. During the period of last two decades we may identify some crucial milestones in the exchange rate regimes evolution in the European transition economies. due to existing diversity in exchange rate arrangements in the European transition economies in the pre-ERM2 period there seems to be two big groups of countries - "peggers" (Bulgaria, Estonia, Latvia, Lithuania) and "floaters" (Czech republic, Hungary, Poland, Romania, Slovak republic, Slovenia). Despite the fact, there seems to be no real prospective alternative to euro adoption for the European transition economies, we emphasize disputable effects of sacrificing monetary sovereignty in the view of positive effects of exchange rate volatility and exchange rate based adjustments in the country experiencing sudden shifts in the business cycle. In the chapter we analyze effects of the real exchange rate volatility on real output and inflation in ten European transition economies. From estimated VAR model (recursive Cholesky decomposition is employed to identify structural shocks) we compute impulse-response functions to analyze responses of real output and inflation to negative real exchange rate shocks. Results of estimated model are discussed from a prospective of the fixed versus flexible exchange rate dilemma. To provide more rigorous insight into the problem of the exchange rate regime suitability we estimate the model for each particular country employing data for two subsequent periods 2000-2007 and 2000-2011.

Keywords: exchange rate volatility, economic growth, economic crisis, vector autoregression, variance decomposition, impulse-response function

11.1 Introduction

Nowadays, in the time of economic and debt crisis, many European Union member countries are exposed to the large complex of negative implications of recession, peaking rates of unemployment, increased public debt burden as well as worsen conditions to maintain fiscal sustainability. Moreover, increased uncertainty on the financial markets resulted in higher volatility of market prices/rates reduces predictability of market trends, even in the short period. As a result, increased instability of exchange rates seems to be inevitable but painful implication. Due to many external causes we may also experience sudden changes in determination potential of exchanges rate especially toward key aspects of macroeconomic performance in countries under flexible exchange rate arrangements. One of the most controversial implications of different exchange rate arrangements is addressed to their appropriateness and sustainability in countries at different stage of business cycle in short period while reflecting the overall macroeconomic performance. Wide range of such implications became highly discussed especially in the group of countries (so called European

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transition economies[49] which joined European Union in 2004. It may seem that fixed versus flexible exchange rates dilemma in the period of increased global uncertainty and negative trends in the global economy became alive again while discussions on policy issues, challenges and controversies may find it difficult to provide clear suggestions.

European transition economies already challenged a decision to adopt euro and participate in the project of common currency in the Eurozone together with Western European countries few years before world economic crisis arises. Among many circumstances and policy issues associated with a proposition of convenient time table for the schedule of euro adoption became the sacrifice of monetary sovereignty a highly discussed implication. The loss of exchange rate flexibility in the Eurozone candidate countries raised as a direct contrary effect of gained exchange rate stability associated with sacrificed monetary sovereignty. Despite real benefits of fixing exchange rate to euro followed by the euro adoption it may seem that the risks of loss in mutual interconnections between the overall macroeconomic development and the exchange rate leading path are still not well observed in the current empirical literature.

Exchange rate regimes evolution in the European transition economies refers to one of the most crucial policy decision in the beginning of the 1990s employed during the initial stages of the transition process. Despite its differences there seem to be some similar features of the starting point affecting exchange rate regime choice in each particular economy, such as similar macroeconomic development after initial transition shock (recession followed by restoration of macroeconomic stability), number of transition packages employed to support market principles and incentives as well as intention to apply for European Union membership followed by the euro adoption in the near future. During the period of last two decades we may identify some crucial milestones in the exchange rate regimes evolution in the European transition economies. Macroeconomic stability, as one of the primary objectives in the initial phase of the transition process, revealed an absence of nominal anchor and its crucial role in reducing the risks of excessive external imbalances while providing firm constrains for national authorities. A decision to adopt so pegged exchange rate regimes (feasibility to estimate the “right” equilibrium exchange rate may be still disputable) might seem to be the most convenient and appropriate solution to reduce current account imbalances, strengthen fiscal discipline and provide a suitable anchor for prudential monetary policy. On the other hand, sustainability of pegged exchange rate is obviously determined by central bank’s ability to maintain safe level of exchange reserves. Inadequate stock of foreign exchange held by central banks in Bulgaria, Romania and Slovenia refers as a most common reason to their inability to establish soft-pegged exchange rate regime in the early 1990s. Despite general expectations, European transition economies did not follow a common trend in the exchange rate regime evolution during last two decades. Central European countries (Czech republic, Hungary, Poland, Slovak republic) have experienced a long trend of successive shift from soft-pegged exchange rate regimes to floating regimes. Baltic countries implemented pegged exchange rate regimes in the first half of the 1990s. Estonia and Lithuania anchored exchange rate based stabilization by employing hard peg regime (currency board), while Latvia implemented soft peg regime (conventional fixed pegs). Bulgaria challenged financial crisis in 1996-97 initiated by imbalanced growth and low credibility (excessive amount of failed commercial bank loans) followed by forced shift from floating regime (managed floating) to hard peg regime

[49] Bulgaria, Czech republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak republic, Slovenia.

(currency board). Romania and Slovenia remained as the only two countries not enjoying benefits of exchange rate based stabilization and kept employing floating exchange rate regimes during the whole period.

Determination process of the exchange rates leading path in the European transition economies followed quite similar principles in the long run. At the same time, it has also reflected effects of many specific features of the transition process, i.e. structural changes in the production base, institutional changes, deregulation of markets, changing structure of relative prices, etc. All those country-specific processes substantially affected long-run trends (even in the area of the exchange rate determination), that is why a rigorous insight into their principles seems to be crucial for understanding and implementation the appropriate exchange rate regime in particular country from the group of the European transition economies.

Considering a substantial similarity of exchange rate regimes employed by the most of the European transition economies in the early 1990s (provided their diversity at later stages of the transition process) similar initial conditions at the starting point of the transition process seem to be a crucial for its understanding. A decision to adopt pegged exchange rate regimes reveals an intention to benefit from firm external nominal anchor in fighting high inflation and reducing costs of disinflationary process. Such an approach reflected the fact that the most of the countries from the past Eastern bloc performed as small opened economies. After successful accession of the European transition economies to the European Union in 2004 and 2007 (Bulgaria and Romania) it seems that new European Union countries with flexible exchange rate arrangements enjoyed higher exchange rate stability. Participation of national currencies in ERM 2 followed by euro adoption seems to be the only feasible solution at the final stage of the successful lung-run integration process of the European transition economies.

Despite the fact, there seems to be no real prospective alternative to euro adoption for the European transition economies, we emphasize disputable effects of sacrificing monetary sovereignty in the view of positive effects of exchange rate volatility and exchange rate based adjustments in the country experiencing sudden shifts in the business cycle. On the other hand, due to existing diversity in exchange rate arrangements in the European transition economies in the pre-ERM2 period there seems to be two big groups of countries - “peggers” (Bulgaria, Estonia, Latvia, Lithuania) and “floaters” (Czech republic, Hungary[50], Poland, Romania, Slovak republic, Slovenia). Effects of sacrificing exchange rate flexibility and its spurious effects on real output and inflation can be conventionally interpreted as fixed versus flexible exchange rates dilemma. At the same time, macroeconomic effects of various exchange rate arrangements during the crisis period may provide a better insight into suitability of relative exchange rate volatility in each individual economy during sudden changes in the business cycle.

In the chapter we analyze effects of the real exchange rate volatility on real output and inflation in ten European transition economies. From estimated VAR model (recursive Cholesky decomposition is employed to identify structural shocks) we compute impulse-response functions to analyze responses of real output and inflation of positive real exchange rate shocks. Results of estimated model are discussed from prospective of fixed versus flexible exchange rate dilemma. To

[50] Hungarian forint operated during pre-crisis period in de facto fixed peg regime, but due to substantial range for fluctuations provided by wide horizontal bands it was included in the group of countries, so called “floaters”

provide more rigorous insight into the problem of the exchange rate regime suitability we estimate the model for each particular country employing data for two subsequent periods 2000-2007 and 2000-2011. Comparison of results for both models is crucial for analysis of the current economic crisis implications on real output and inflation responses and to the negative (devaluation or depreciation) real exchange rate unexpected shifts. We suggest our results provide a rigorous insight into real exchange rate determination potential in ten European transition economies. Relative diversity in real output and inflation adjustments under different exchange rate arrangements may reveal disputable implications and associated risks of the breakdown in mutual interconnections between the overall macroeconomic development and the exchange rate leading path.

11.2 Overview of exchange rate regime evolution in the European transition economies

Macroeconomic stability, fast recovery from deep and sudden transition shock and real output growth stimulation represents one of the most challenging objectives for the European transition economies in the early 1990s. Consistent choice as well as flexible adjustments of monetary policy framework and exchange rate regime accompanied key crucial economic policy decisions in this process. Associated changes in monetary-policy strategy reflected wide range of macroeconomic aspects underlying sustainability of appropriate exchange rate regime choice.

Among key determinants of the exchange rate regime choice in the European transition economies at the beginning of the 1990s we may consider an effort to regain macroeconomic stability, foreign exchange reserves requirements and availability, overall external economic (trade and financial) openness, etc. At the later stages of transition process we emphasize the role of massive foreign capital inflows, sustainability of real economic growth, institutional adjustments according to perspectives of ERM2 entry.

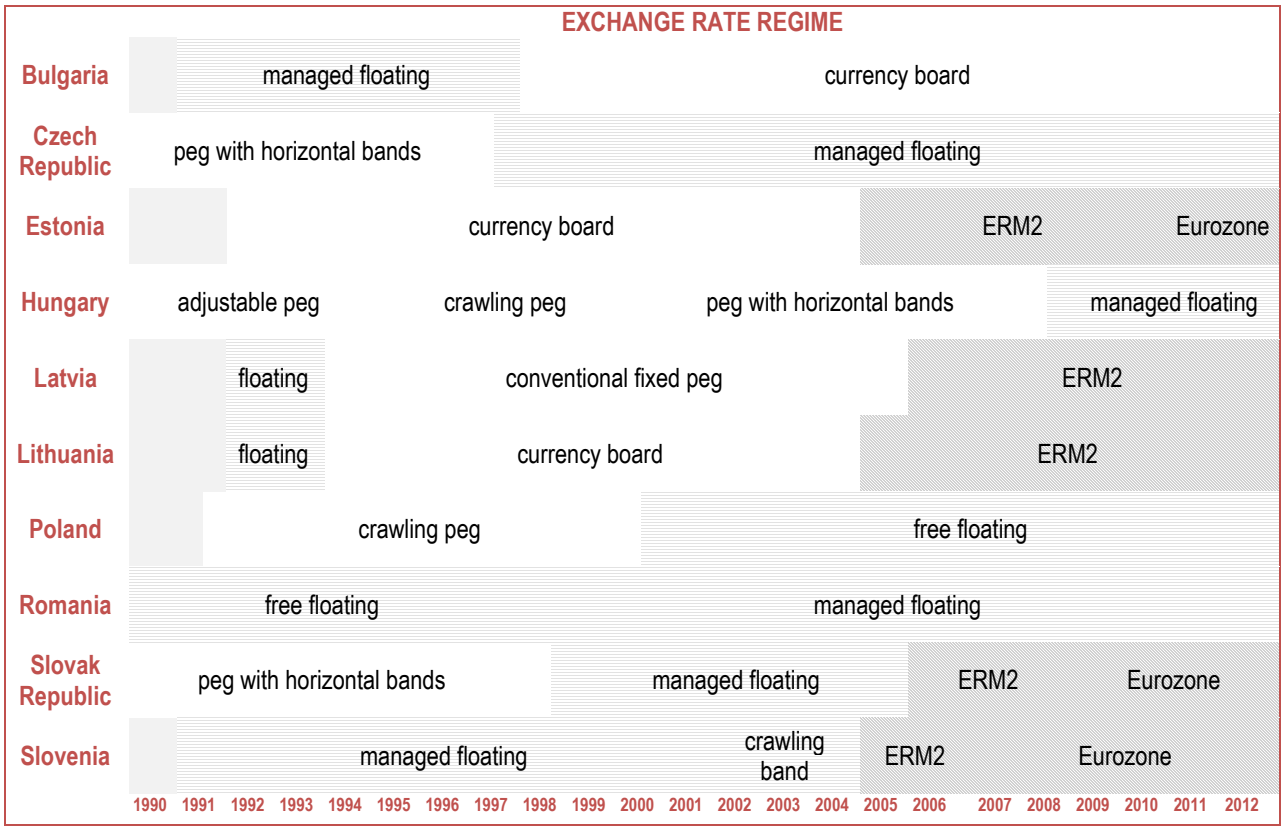
Initial transition shock followed by the sharp real output decline associated with intensive inflation pressures (caused by rapid exchange rate devaluations, price liberalization and deregulation, tax reforms, fiscal imbalances, etc.) emphasized a crucial importance of strong nominal anchor for monetary authorities in restoring a macroeconomic stability and confidence as well as positive expectations of economic agents. However immediate exchange rate based stabilization became an appropriate strategy only for countries with adequate foreign exchange reserves while being able to significantly reduce inflation pressures in adequate (short) time period to prevent undesired rapid overvaluation. As a result it seems to be convenient to divide the European transition economies in two groups (so called “peggers” and “floaters”) considering initial exchange rate regime framework.

Relative diversity in exchange rate regimes in the European transition economies revealed uncertain and spurious conclusions about the exchange rate regime choice during last two decades. Moreover, Eurozone membership perspective (de jure pegging to euro) realizes uncertain consequences of exchange rate regime switching especially in the group of large floaters.

Successful anti-inflationary policy associated with stabilization of inflation expectations in the European transition economies at the end of 1990s significantly increased the role of short-term interest rates in the monetary policy strategies. At the same time, so called qualitative approach to the monetary policy decision-making performed in the low inflation environment, gradually enhanced the role of real interest rates expectations in the process of nominal interest rates determination.

However, economic crisis increased uncertainty on the markets and thus worsen expectations (inflation expectations including) of agents.

Table 11.1 Exchange rate regimes in the European transition economies



Note: Exchange rate regime evolution in the European transition economies: *Bulgaria* - since 1991 floating (pegged exchange rate regime undesirable due to possible low credibility), currency board since 1997 (after 1996-1997financial crisis (public debt, bad commercial banks loans)). *Czech Republic* - exchange rate pegged to currency basket with narrow but continuously widen horizontal bands, since May 1997 after currency attacks switch to managed floating with no predetermined path for the exchange rate with DEM (EUR) as reference currency. *Estonia* - currency board since 1992 till 2011 (euro adoption), plan to adopt in 2008 but delayed due high inflation, since 2011 Eurozone membership. *Hungary* - managed floating till February 1995, since March 1995 till the end of 1999 crawling peg with continuously decreased rate of periodical devaluation and widen horizontal bands, since January 2000 exchange rate pegged to euro combined with wide horizontal bands (since May 2001), since May 2008 managed floating with EUR as reference currency. *Latvia* - since February 1994 exchange rate pegged to SDR (fixing the exchange rate to a basket of currencies (SDR) instead of a single currency serves to promote long-term stability) (since January 2005 pegged to EUR). *Lithuania* - since April 1994 currency board (exchange rate pegged to USD, in February 2002 pegging switched to EUR). *Poland* - since the end of 1991 crawling peg with continuously decreased rate of periodical devaluation and widen horizontal bands, since April 2000 free floating. *Romania* - free floating, since 1998 exchange rate arrangement reclassified as managed floating. *Slovak Republic* - exchange rate pegged to currency basket with narrow but continuously widen horizontal bands, since October 1998 after currency attacks switch to managed floating with no predetermined path for the exchange rate with DEM (EUR) as reference currency, since 2009 Eurozone membership. *Slovenia* - managed floating with no predetermined path for the exchange rate (since February 2002 crawling band - the monetary authority manages the float of the domestic currency within certain fluctuating margins around a depreciating path - a heavily-managed crawling band with pragmatic monetary, real, external and financial indicators).
ERM2 - June 2004 - Estonia (left in January 2011 after euro adoption), Lithuania, Slovenia (left in January 2007 after euro adoption; - May 2005 – Latvia; - November 2005 - Slovak Republic (left in January 2009 after euro adoption)
Source: IMF AREAER 1990-2011, author's processing.

Eurozone member countries as well as global economy are currently exposed to the negative effects of the economic and debt crisis. To alleviate recession and support economic recovery, monetary authorities dramatically reduced key interest rates. Low interest rates together with

quantitative easing, however, should not necessarily increase supply of loans due to prudential credit policy of commercial banks reflecting increased uncertainty on the markets. As a result, policy of low interest rates seems to be inefficient.

Exchange rate policy evolution represents one of the key parts of crucial economic policy decisions at the beginning of the transition process in countries from the region of Central and Eastern Europe in the early 1990s. Despite its complexity and particularity there seems to be some similar features at the starting point of transition process in all European transition economies such as recession followed by initial transition shock and common vision of European union and Economic and Monetary union membership.

Macroeconomic stability as one of the primary objectives in the initial phase of the transition process affected exchange rate regime choice in the European transition economies. However, low credibility of monetary institutions, lack of foreign exchange reserves and high inflation differentials represented real constraints and difficulties related to the sustainability of pegged exchange rate regimes. Brief overview of the exchange rate regimes evolution in the European transition economies provides Table 11.1.

It seems to be clear that the European transition economies did not follow common practice in the process of the exchange rate regime choice at the beginning of the 1990s. Small Baltic countries adopted currency board regime (Estonia and Lithuania) eventually conventional fixed peg regime (Latvia). Hungary adopted crawling peg regime (after few years of adjustable peg in place) together with Poland. Czech Republic and Slovak Republic adopted pegged regime with horizontal bands. Despite high inflation rates Bulgaria, Romania and Slovenia adopted floating exchange rate regime due to low level of reserves and lack of credibility though Bulgaria switched to currency board after 1996-97 financial crisis. It seems to be clear that most of the European transition economies enjoyed disinflationary and credibility benefits of so called hard or soft exchange rate regimes. Fixed exchange rates as the nominal anchor significantly contributed to the successful disinflationary process at the end of the 1990s.

Till the end of the decade many countries from the group switched to more flexible exchange rate regimes (Czech Republic in 1997, Slovak Republic in 1998 and Poland in 2000). Similarly Hungary switched to intermediate regime by widening horizontal bands. Although Hungary stacked to exchange rate pegged to euro, by employing wide horizontal bands de facto followed the same trend as previous group of countries.

Exchange rate regime choice also affected corresponding monetary policy strategy framework. Countries with exchange rate as nominal anchor (hard pegs or soft pegs with narrow horizontal bands) successfully implemented exchange rage targeting. Countries with soft pegs (pegs with wide horizontal bands or crawling pegs) and floating regimes employed monetary targets as intermediate criteria of monetary policy (monetary targeting).

Overall success of disinflationary process represents one of the key milestones on the road to stable macroeconomic environment with crucial role of low and stable inflation expectations. Low inflation combined with stable inflation expectations is considered to be a substantial condition for switching from quantitative (money supply) to qualitative (interest rates) approach in monetary policy decision-making. This adjustment in monetary policy strategies seems to be obvious in the European transition economies since the end of 1990s as a part of prevailing trend in weakening of relationship

between money and inflation. Increased role of inflation expectations together with raising credibility of monetary authorities resulted in adoption of direct (explicit) inflation targeting strategy in many European transition economies - Czech Republic (1998), Poland (1999), Hungary (2001), Slovenia (2002), Romania (2005) and Slovak Republic (2005).

European transition economies challenged a decision of a euro adoption and Eurozone membership several years before the economic crisis arises. Disputable policy implications of sacrificing monetary sovereignty rose as a crucial assumption affecting main features as well as durability of preparation phase timetable in countries with flexible exchange rate regimes (Czech Republic, Poland, Romania, Slovak Republic and Slovenia). Among a variety of determinants and aspects we emphasize the role of decisions inevitably associated with "right" scheduling of the Eurozone entry. Some countries from the group of the European transition economies already joined the Eurozone (Estonia (2011), Slovak Republic (2009), Slovenia (2007)) followed by participation of their currencies in ERM2 (Estonia (June 2004), Slovak Republic (November 2005), Slovenia (June 2004)). On the other hand currencies of Lithuania and Latvia are still participating on ERM2.

The loss from sacrificing exchange rates flexibility in the Eurozone candidate countries became directly confronted with benefits related to exchange rate stability associated with sacrificing monetary autonomy. Despite plausible advantages of pegging exchange rates of candidate countries to euro followed by the euro adoption it seems to be clear that risks associated with potential effects of breakdown in mutual interconnections between macroeconomic development and flexible exchange rates leading path seem to be of a minor interest in current empirical literature.

Economic theory provides clear suggestions in fixed versus flexible exchange rates dilemma in fighting high inflation pressures. At the same time exchange rate based enhancement of external competitiveness may provide a convenient framework to foster economic growth even when domestic economy is cooling down. On the other hand, incentives to increase external demand during the crisis period may start unfavorable spiral of competitive devaluations. Central banks and governments may tend to devaluate currencies (internal devaluation) especially in times when low interest rates policy associated with quantitative easing doesn't provide correct and sufficient incentives to foster domestic demand. Internal devaluation causing real exchange rate to depreciate became highly discussed nowadays, in the time of economic and debt crisis in Eurozone, when inability of low performing economies to increase foreign competitiveness of their production forces authorities to experiment with internal devaluation considering all adjustments are made by prices, wages (and associated costs of production) and assets values falling.

11.3 Overview of the literature

Effects of the real exchange rate volatility on the macroeconomic performance of countries at the different stages of business cycle are well document in the empirical literature. Aguirre a Calderón (Aguirre a Calderón, 2005) analyzed the role of the real exchange rate in determining the real output volatility on the sample consisting of 60 countries implementing cointegration analysis using panel data. Burdekin a Siklos (Burdekin a Siklos, 1999) investigated implications of the exchange rate regime shifts to price level development in the United Kingdom, United States, Canada and Sweden. Domac, Peters a Yuzefowich (Domac, Peters a Yuzefowich, 2001) observed mutual relationships

between the exchange rate regime and macroeconomic performance of the selected European transition economies (Czech republic, Hungary, Estonia, Poland and Slovenia). Ghosh, Gulde, Ostry a Wolf (Ghosh, Gulde, Ostry a Wolf, 1996) analyzed the effects of the alternative exchange rate regimes on inflation and economic growth on the sample of 145 countries during the 30 years period. Levy-Yeyati a Sturzenegger (Levy-Yeyati a Sturzenegger, 2001) observed implications of exchange rate volatility on domestic price level, money supply, real interest rates and real output in 154 countries since 1974 till 1979. Arratibel, Furceri, Martin and Zdzienicka (Arratibel, Furceri, Martin and Zdzienicka, 2011) investigated relationships between exchange rates development and foreign direct investments, domestic loans and current account on the sample of 9 countries from the Central and Eastern Europe. Lee a Chinn (Lee a Chinn, 1998) analyzed implications of real exchange rate fluctuations on the current account development in 7 most developed industrial countries. Sek a Chuah (Sek a Chuah, 2011) explored causality between the exchange rate changes and the current account dynamics in 6 Asian countries. Arghyrou a Chortareas (Arghyrou a Chortareas, 2008) investigated effects of the exchange rate volatility on the current account adjustments in 11 Eurozone member countries. Obstfeld a Rogoff (Obstfeld a Rogoff, 2005) focused their investigation on estimation of effects of global current account imbalances reduction on exchange rates (USD, EUR and Asian currency) equilibrium path in the model with alternative scenarios.

11.4 Fixed versus flexible exchange rate dilemma

To estimate effects of the real exchange rate variability on industrial production and inflation in the European transition economies under different exchange rate arrangements we divided countries from our group to two groups - “peggers” (Bulgaria, Estonia, Latvia, Lithuania) and “floaters” (Czech republic, Hungary[51], Poland, Romania, Slovak republic, Slovenia). Responses of industrial production and inflation to the exchange rate depreciation under different exchange rate regimes seems to be crucial for estimation and understanding of possible effects related to the exogeneity of exchange rate shocks.

Exchange rate flexibility (i.e. exchange rate depreciation as a result of economic growth cool down) serves as a convenient vehicle for exchange rate based recovery (i.e. automatic adjustment process) through increased competitiveness of domestic production on markets home and abroad provided there are flexible adjustments to price incentives on the markets. On the other hand, exchange rates shifts (under fixed exchange rate regime) associated with volatility of main reference currency serving as the nominal anchor are usually not originated by changes in domestic economy (i.e. real output fluctuations during the business cycle turnovers in country with fixed exchange rate) and thus may act as unexpected and destabilizing shock reducing its price effects on demand. As a result we suggest that the exchange rate downward flexibility may provide wide range of incentives stimulating overall demand and thus accelerate economic growth in the recession. Exchange rate rigidity under fixed exchange rate arrangement may stabilize exchange rate expectations with positive contributions to the overall macroeconomic stability. Sudden shifts in exchange rate of the reference currency may cause a fixed exchange rate of domestic currency to become volatile. Moreover,

[51] Hungarian forint operated during pre-crisis period in de facto fixed peg regime, but due to substantial range for fluctuations provided by wide horizontal bands it was included in the group of countries, so called “floaters”

exchange rate based adjustments of real output will not work provided that price incentives may be associated with false signals and spurious effects on expected short-term exchange rate leading path. Effects of the exchange rate volatility on inflation, as a part of the fixed versus flexible exchange rates dilemma, refer to relative changes in prices of exports and imports and associated price effects on the aggregate price level. Under fixed exchange rate arrangement, credible nominal anchor (i.e. sound foreign currency of a country with a low and stable inflation) provides very efficient tool in fighting high inflation while helping to stabilize inflation expectations. As a result, country with fixed exchange rate should experience successful periods of disinflation (provided that a decision to adopt fixed exchange rate originated from high inflation pressures). Ability of the country to achieve price stability (and maintain low inflation differentials) within a reasonable period of time seems to be crucial for fixed exchange rate sustainability. It seems that stable inflation expectations anchored by fixed exchange rate to credible foreign currency represent a crucial role for understanding price effects of the sudden exchange rate shifts. Exchange rate volatility under fixed exchange rate arrangement originated in anchoring foreign currency instability may cause domestic price level to adjust accordingly in the short period, though persisting inflation or disinflation pressures are not expected. It is especially due to positive effects of stable inflation expectations that (we suggest) do not seem to be affected for longer period of time.

On the other hand, price stability in countries with flexible exchange rate arrangement obviously suffers even more in the short period due to absence of credible nominal anchor provided that the monetary policy strategy of the central bank is based on either inflation targeting or interest rate transmission channel. Low levels of inflation targeted by the monetary authority are obviously more sensitive to exogenous price shocks originated in the sudden and unexpected exchange rate shifts. Price effects of exchange rate volatility in countries with flexible exchange rate arrangements may be even strengthened by corresponding effects of real output or its components to unexpected movements of exchange rate on domestic price level as a part of the exchange rate adjustment process. As a result, exchange rate fluctuations in countries with flexible exchange rate arrangements are usually associated with more intensive a durable adjustment in price level.

Quite specific seems to be a situation in countries with fixed exchange rate arrangement and anchoring currency that serves as a local or global currency widely used in foreign transactions. Real output and price effects of volatility in reference currency leading path may be reduced provided that a large number of trading partners are also fixing their exchange rate against same reference currency (membership of countries in currency union with our reference currency as common currency seems to have the same effect). Even when the large portion of foreign transactions in country with fixed exchange rate against such anchoring currency were immune to the reference currency volatility, remaining transactions are still exposed to the reference currency exchange rate unexpected shifts. On the other hand, real exchange rate sudden shifts are not exclusively caused by the nominal exchange rate volatility. Increased intensity of price adjustments associated with crisis related effects on real output are usually followed by accelerated deviations of real exchange rates from their equilibrium leading path especially in the short period.

Effects of exchange rate volatility on the price level in countries with different exchange rate regime may be even strengthened during the crisis period. Excessive price adjustments due to uncertainty and lower predictability of the exchange rate leading path under flexible exchange rate

arrangement, regardless of the sources and intensity of exchange rate instability, reflects the absence of a nominal anchor to stabilize inflation expectations. At the same time, inflation expectations anchored by the credible foreign currency, provides more fundamentally appropriate framework to preserve and sustain price stability.

11.5 Econometric model

VAR models represent dynamic systems of equations in which the current level of each variable depends on past movements of that variable and all other variables involved in the system. Residuals of vector ε_t represent unexplained movements in variables (effects of exogenous shocks hitting the model); however as complex functions of structural shocks effects they have no economic interpretation. Structural shocks can be still recovered using transformation of true form representation into reduced-form by imposing a number of identifying restrictions. Applied restrictions should reflect some general assumptions about the underlying structure of the economy and they are obviously derived from economic theory. There are two general (most used) approaches to identify VAR models. Cholesky decomposition of innovations implies the contemporaneous interactions between the exogenous shocks and the endogenous variables are characterized by a Wald causal chain. Ordering of the endogenous variables than reflects expected particular economy structure following general economic theory assumptions. However the lack of reasonable guidance for appropriate ordering led to the development of more sophisticated and flexible identification methods - structural VAR (SVAR) models. Identifying restrictions implemented in SVAR models reflects theoretical assumptions about the economy structure more precisely.

We implement a VAR methodology to analyze macroeconomic aspects of the real exchange rate volatility in the Central European countries. Cholesky decomposition of variance-covariance matrix of the reduced-form VAR residuals is implemented to estimate effects of the real exchange rate fluctuations on the selected main macroeconomic indicators variability.

True model is represented by the following infinite moving average representation:

$$X_t = A_0\varepsilon_t + A_1\varepsilon_{t-1} + A_2\varepsilon_{t-2} + \ldots = \sum_{i=0}^{\infty} A_i\varepsilon_{t-i} = \sum_{i=0}^{\infty} A_i L^i\varepsilon_t = A(L)\varepsilon_t \qquad (11.1)$$

where X_t represents $n \times 1$ a vector including endogenous variables of the model, $A(L)$ is a $n \times n$ polynomial consisting of the matrices of coefficients to be estimated in the lag operator L representing the relationship among variables on the lagged values, ε_t is $n \times 1$ vector of identically normally distributed, serially uncorrelated and mutually orthogonal errors (white noise disturbances that represent the unexplained movements in the variables, reflecting the influence of exogenous shocks):

$$E(\varepsilon_t) = 0, \quad E(\varepsilon_t\varepsilon_t') = \Sigma_\varepsilon = \mathrm{I}, \quad E(\varepsilon_t\varepsilon_s') = [0] \quad \forall t \neq s \qquad (11.2)$$

Vector X_t consists of six endogenous variables - industrial production $(y_{r,t})$, money supply (m_t), core inflation (p_t), short-term nominal interest rates $(ir_{n,t})$ and real exchange rate $(er_{r,t})$. In the five-variable VAR model $(X_t = [ip_{r,t}, m_t, p_t, ir_{n,t}, er_{r,t}])$ we assume five exogenous shocks that contemporaneously affects endogenous variables - demand shock $(\varepsilon_{ip_r,t})$, nominal shock $(\varepsilon_{m,t})$, inflation shock $(\varepsilon_{p,t})$, monetary policy shock $(\varepsilon_{ir_n,t})$ and exchange rate shock $(\varepsilon_{er_r,t})$.

The structural exogenous shocks from equation (11.1) are not directly observable due to the complexity of information included in true form VAR residuals. As a result structural shocks cannot by correctly identified. It is than necessary to transform true model into following reduced form

$$X_t = C(L)Y_{t-1} + e_t \tag{11.3}$$

where $C(L)$ is the polynomial of matrices with coefficients representing the relationship among variables on the lagged values and e_t is a $n \times 1$ vector of normally distributed errors (shocks in reduced form) that are serially uncorrelated but not necessarily orthogonal:

$$E(e_t) = 0, \quad \Sigma_u = E(e_t e_t') = A_0 E(\varepsilon_t \varepsilon_t') A_0' = A_0 A_0', \quad E(e_t e_s') = [0] \quad \forall t \neq s \tag{11.4}$$

Relationship between reduced-form VAR residuals (e_t) and structural shocks (ε_t) can be expressed as follows:

$$e_t = A_0 \varepsilon_t \tag{11.5}$$

As we have already noted at the beginning of the chapter we implement a Cholesky identification scheme to correctly identify structural shocks. In order to identify our model there must be exactly $n^2 - [(n^2 - n)/2]$ relationships among the endogenous variables of the model, where *n* represents a number of variables. We have to impose $(n^2 - n)/2$ restrictions on the matrix A_0 based on the Cholesky decomposition of the reduced-form VAR residual matrix that define matrix A_0 as a lower triangular matrix. The lower triangularity of A_0 (all elements above the diagonal are zero) implies a recursive scheme (structural shocks are identified through reduced-form VAR residuals) among variables (the Wald chain scheme) that has clear economic implications and has to be empirically tested as any other relationship. Identification scheme of the matrix A_0 implies that particular contemporaneous interactions between some exogenous shocks and some endogenous variables are restricted reflecting causal (distribution) chain of interaction transmission. It is clear that the Wald causal chain is incorporated via convenient ordering of the variables.

Considering lower triangularity of a matrix A_0 the equation (11.5) can be rewritten as follows:

$$\begin{bmatrix} e_{y_r,t} \\ e_{m,t} \\ e_{p,t} \\ e_{ir_n,t} \\ e_{er_n,t} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 & 0 \\ a_{41} & a_{42} & a_{43} & 1 & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_{y_r,t} \\ \varepsilon_{m,t} \\ \varepsilon_{p,t} \\ \varepsilon_{ir_n,t} \\ \varepsilon_{er_n,t} \end{bmatrix} \quad (11.6)$$

Correct identification of the exogenous structural shocks reflecting Cholesky ordering of variables denotes following assumptions:

- Industrial production doesn't contemporaneously respond to the shock from any other endogenous variable of the model.
- Money supply doesn't contemporaneously respond to inflation, interest rate, and exchange rate shocks, while it is contemporaneously affected only by the industrial production shock.
- Inflation doesn't contemporaneously respond to the interest rate and exchange rate shocks, while it is contemporaneously affected by the industrial production and money supply shocks.
- Interest rate doesn't contemporaneously respond to current account shock, while it is contemporaneously affected by the industrial production, money supply, inflation and interest rate shocks.
- Exchange rate is contemporaneously affected by the shocks from all of the endogenous variables of the model.

After initial period endogenous variables may interact freely without any restrictions.

Estimated VAR model is used to compute impulse response functions to analyze responses of endogenous variables to the one standard deviation negative exchange rate shock in the European transition economies countries. To check the robustness of the empirical results we estimate the model considering different ordering of the endogenous variables in both models (model A (2000M1-2007M12) and model B (2000M1-2011M12)):

- model A1, B1 $\left(X_t = \left[y_{ip_r,t}, m_t, p_t, ir_{n,t}, er_{r,t}\right]\right)$;
- model A2, B2 $\left(X_t = \left[y_{ip_r,t}, er_{r,t}, m_t, ir_{n,t}, p_t\right]\right)$;
- model A3, B3 $\left(X_t = \left[y_{ip_r,t}, p_t, m_t, ir_{n,t}, er_{r,t}\right]\right)$.

11.6 Data and results

We employed monthly data with period 2000M1-2007M12 (model A) consisting of 96 observations and with period 2000M1-2011M12 (model B) consisting of 144 observations for the following endogenous variables - industrial production[52] (nominal volume of the industrial product deflated by averaged PPI), money supply (monetary aggregate M2), inflation (core inflation), short-term interest rates (interbank offered rates with 3 months maturity[53]), exchange rate (real effective exchange rate) and balance of payment's current account (Figure 11.1). Estimation of two models is in line with the primary objective of the chapter to estimate effects of the real exchange rate variability

[52] Time series for monthly industrial production were employed due to absence of data on the same basis for real output (GDP).

[53] Short-term interest rates in Estonia, Slovak republic and Slovenia we replaced by EURIBOR after euro adoption in each particular country (2007, 2009 and 2011).

to industrial production and inflation considering possible implications of economic crisis on presented results. Time series for all endogenous variables were drawn from IMF database (International Financial Statistics, February 2013). Time series for industrial production, money supply and inflation were seasonally adjusted.

Figure 11.1 Industrial production, money supply, inflation, interest rates and real effective exchange rate in the Central European Countries (2000Q1-2011Q4)

Note: Endogenous variables - industrial production (IP), money supply (M2) and real effective exchange rate (REER) are expressed as indexes (left axis in figures) (2005 = 100). Inflation (INF) and interest rates (IR) are expressed in percentage (right axis in figures).

Source: Compiled by author based on data taken from IMF - International Financial Statistics (February 2013).

To correctly identify exogenous shocks hitting the model as well as to compute impulse-response functions it is necessary VAR model to be stationary. To check the model it is necessary to test the time series for unit roots and cointegration.

A. Testing procedures

The augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests were computed to test the endogenous variables for the unit roots presence. Both ADF and PP tests indicate that most of the variables are non-stationary on the values so that the null hypothesis of a unit root cannot be rejected for any of the series. Testing variables on the first differences indicates the time series are stationary so that we conclude that the variables are I(1).

Because there are endogenous variables with a unit root on the values it is necessary to the test the time series for cointegration using the Johansen and Juselius cointegration test (we found reasonable to include variables I(0) for testing purposes following economic logic of expected results). The test for the cointegration was computed using three lags as recommended by the AIC (Akaike Information Criterion) and SIC (Schwarz Information Criterion).

The results of the Johansen cointegration tests confirmed the results of the unit root tests. Both trace statistics and maximum eigenvalue statistics (both at 0.05 level) indicate that there is no cointegration among the endogenous variables of the model.

To test the stability of the VAR model we also applied a number of diagnostic tests. We found no evidence of serial correlation, heteroskedasticity and autoregressive conditional heteroskedasticity effect in the disturbances. The model also passes the Jarque-Bera normality test, so that errors seem to be normally distributed. The VAR models seem to be stable also because the inverted roots of the model for each country lie inside the unit circle. Detailed results of time series testing procedures are not reported here to save space. Like any other results, they are available upon request from the author.

Following the results of the unit root and cointegration tests we estimated the model using the variables in the first differences so that we can calculate impulse-response functions for all ten European transition economies. In line with the main objective of the chapter we focus on interpretation of the responses of industrial production and inflation on the negative one standard deviation exchange rate shock. We also observe effects of economic crisis on the exchange rate determination potential in the European transition economies by comparing the results for models estimated using time series for two different periods - model A (2000M1-2007M12) and model B (2000M1-2011M12).

Changed ordering of the variables didn't seem to affect the results of the analysis. Considering impulse-response functions are not very sensitive to the endogenous variables ordering we present the results of the models (model A1 and B1) with default ordering of the endogenous variables (detailed results for models A2, A3, B2, B3 are available upon request from the author).

B. Crisis effects on volatility of inflation and exchange rates

One of the most significant effects of the economic crisis refer to sudden changes in the price level accompanied by diverse effects on relative prices and thus changing relative prices. So called redistributive price effects (even on international level) seem to be much more significant among large number of countries provided that they are operating a common market for free goods, services, labor and capital movements.

The Figure 11.2 provides an overview of the inflation differentials calculated on 1, 3 and 6 months basis in the European transition economies during the period 2000-2011. We suggest that smaller volatility in inflation differentials reveals slower speed of adjustment in price level to the price effects of market forces and thus reflects higher stability of inflation expectations. Sudden and sharp shifts in the inflation differentials seem to be associated with higher speed of adjustment in the price level with negative impact to the stability of inflation expectations.

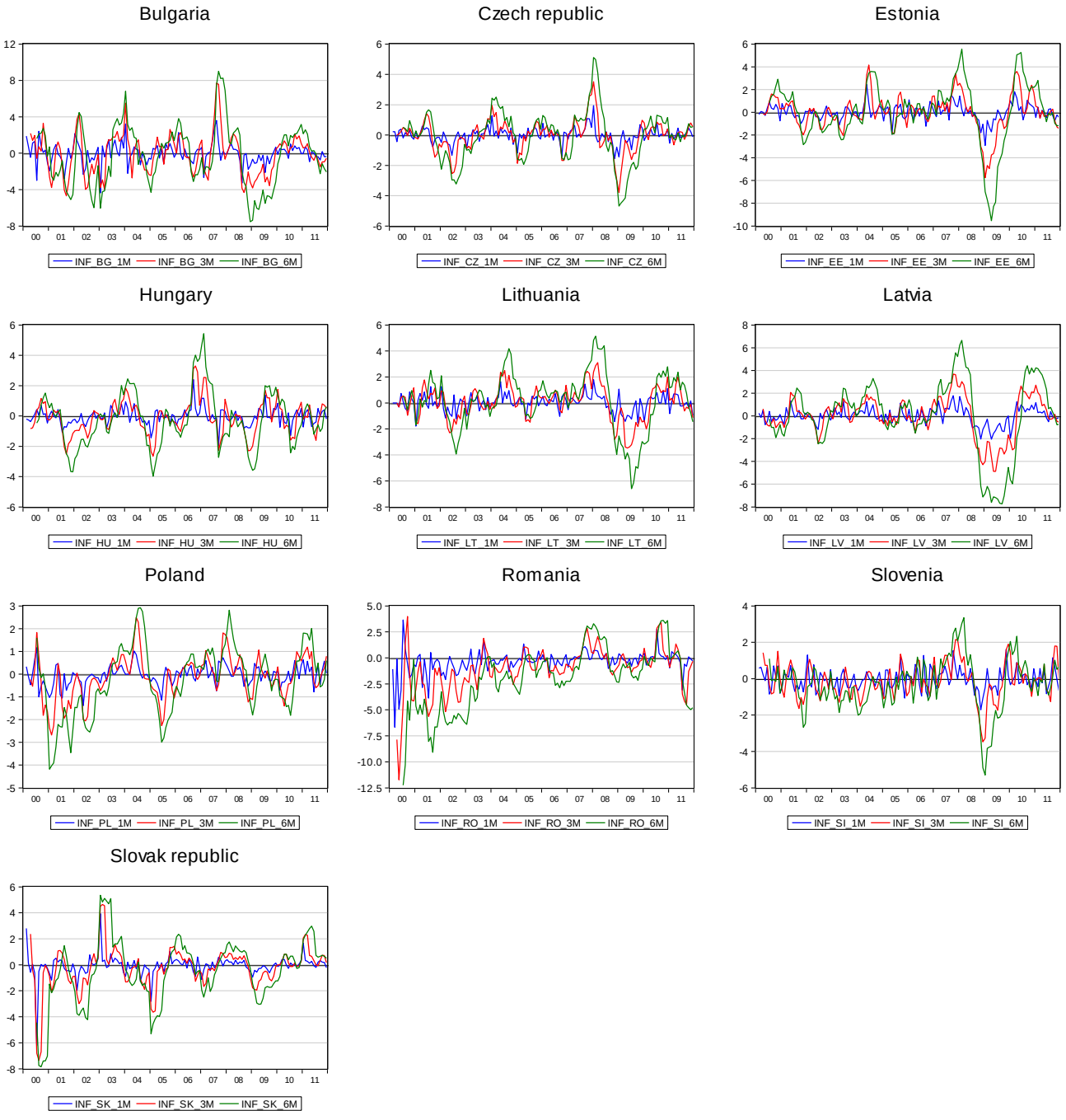


Figure 11.2 Volatility of inflation adjustments (2000M1-2011M12)

Note: Curves represent inflation differentials calculated on 1, 3 a 6 month basis.
Source: Authors calculation.

Volatility of inflation rates reveals relatively high diversity among individual countries. Despite some minor exception, Baltic countries ("peggers") experienced relatively stable speed of adjustment in the rates of inflation during the whole pre-crisis period. However, with increasing lag for differencing the inflation rates it seems that a volatility of inflation differentials increased. The last country from the group of "peggers", Bulgaria, experienced little more volatile adjustments in the rates of inflation. It seems that the strong nominal anchor may provide a convenient vehicle for the reduction of inflation pressures however doesn't seem to be sufficient to successfully stabilize inflation expectations, especially in the low performing transition economy. Our results also reflect slightly higher average volatility of inflation differentials in the group of "floaters" during the pre-crisis period. The Czech republic and Slovenia seem to be provide the best results followed by the Slovak republic and Hungary. Despite the absence of nominal anchor (i.e. fixed exchange rate) in this group of four countries it seems that adoption of direct inflation targeting was associated with reduction in the speed of inflation rates adjustment and thus providing very efficient framework for stabilizing inflation expectations. The highest speed of adjustment in price level we experienced in case of Romania reflects the absence of credible nominal anchor especially during the first half of the pre-crisis period. Inflation targeting implemented at the later stage in the low inflation environment significantly helped to reduce the volatility of inflation adjustment.

Economic crisis affected the volatility of inflation adjustments in the European transition economies with ambiguous results. Overall volatility of inflation in the European transition economies during the crisis period significantly increased especially due to sharp decrease in the rate of inflation followed by peaking inflation pressures at the end of the pre-crisis period. Strong nominal anchor in the group of "peggers" (the size of the group increased due to new Eurozone member countries - Slovenia (2007) and Slovak republic (2009)) even accelerated disinflation processes in countries with fixed exchange rate arrangement. On the other hand, countries from the group of "floaters" experienced similar scenario of increased inflation adjustments volatility during the crisis period. Finally, due to complexity of the crisis effects on the volatility of inflation adjustments we provide some insight into fixed versus flexible exchange rate dilemma in the part C.

The Figure 11.3 provides an overview of the real exchange rates differentials calculated on 1, 3 and 6 months basis in the European transition economies during the period 2000-2011. The overall volatility of the exchange rates adjustments seems to be significantly higher in comparison to the volatility of inflation adjustments. Despite effects of price adjustments, real exchange rates are determined by either nominal exchange rate adjustments (under flexible exchange rates arrangements) or adjustments in the exchange rate of the anchoring reference currency. As a result, real exchange rates may become more volatile (even under fixed exchange rate arrangement) provided that the leading paths of the nominal exchange rate and the rate of inflation follow different trend. On the other hand, the real exchange rate volatility may be reduced (under flexible exchange rate arrangement) provided that the nominal exchange rate leading paths (determining external purchasing power of the currency) is associated with inflation differentials and corresponding adjustments of the domestic price level (determining internal purchasing power of the currency).

It seems that real exchange rates leading path of countries from the group of "peggers" reflected slightly higher stability in comparison of those from the group of "floaters" during the pre-crisis period. It seems that the volatility of nominal exchange rates in countries with flexible exchange

rate arrangements was not inevitably associated with inflation differentials causing higher real exchange rates variability. Economic crisis increased exchange market pressures (Stavarek, 2012). As a result, nominal and real exchange rates of countries from the group of "floaters" became much more volatile. The lack of credible nominal anchor made freely floated exchange rates much more sensitive to the market imperfections. Here again we observed the stabilizing effects of the euro adoption to the real exchange rate deviations during the crisis period in Slovenia and Slovak republic.

Figure 11.3 Volatility of exchange rates adjustments (2000M1-2011M12)

Note: Curves represent real exchange rate differentials calculated on 1, 3 a 6 month basis.
Source: Authors calculation.

C. Impulse-response function

In order to analyze effects of the real exchange rate volatility under different exchange rate arrangements in the European transition economies we estimate responses of industrial production and inflation to the negative (devaluation or depreciation) one standard deviation exchange rate shock employing monthly data for two subsequent periods 2000-2007 (model A) and 2000-2011 (model B).

In the Figure 11.4 we summarize impulse-response functions of the endogenous variables for the model with time series for the pre-crisis period (model A1) in the European transition economies.

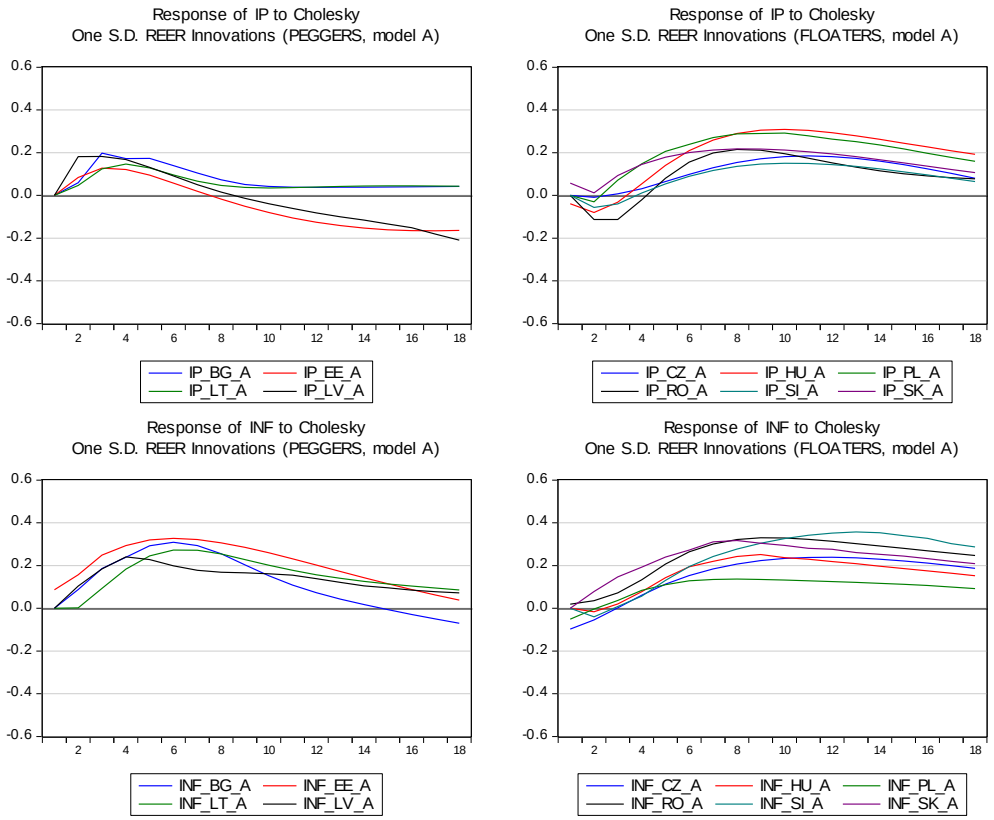


Figure 11.4 Responses of industrial production and inflation to REER shock (2000M1-2007M12) (Model A)

Note: Curves represent responses of industrial production (IP) and inflation (INF) to the one standard deviation negative exchange rate shock in each country from the group of European transition economies.

Source: Authors calculation.

The Figure 11.4 shows estimated responses of industrial production and inflation to the Cholesky positive one standard deviation negative REER shock (depreciation or devaluation of real exchange rate) in the European transition economies during the pre-crisis period. It seems to be clear that the negative exchange rate shock was followed by the *industrial production (IP)* increase in all ten European transition economies. This investigation is in line with a general empirical experience considering the exchange rate depreciation causes an increase in the real output through the net exports (current account surplus). At the same time we observed an interesting difference among countries in the length of the initial lag associated with the industrial production increase after the exchange rate shock in each particular country. Effects of the shock seem to vary across countries especially in the view of their exchange rate arrangement. In the group of "peggers" industrial

production increased after the negative exchange rate shock with just around one month lag. While the intensity of the shock seems to be quite similar in these group of countries, its durability slightly differs. Initial positive effect of the exchange rate shock died out within one year. Considering subsequent adjustment we may conclude that overall effect of the shock in the long run seems to be neutral. Situation is different when we focus on the results of industrial production responses to the negative exchange rate shock in countries from the group of "floaters". In comparison with countries with fixed exchange rate arrangement it seems that industrial production increased with slightly longer lag (around 2-4 months). Moreover, in some countries (i.e. Hungary, Romania and Slovenia) we experienced initial negative response of industrial production reflecting low price elasticity of external demand immediately after the shock (problem known as J-curve). Despite delayed effect of the exchange rate depreciation it is clear that the positive effect of the shock on industrial production seems to be more significant and durable in the group of "floaters" thought it has died out in the long run too.

In general, the negative exchange rate shock should be followed by an increase in the *inflation* provided distribution price chain across countries. Results seem to vary again for countries with different exchange rate arrangement. Countries with pegged exchange rates experienced a moderate trend of the inflation increase since the first month after the shock. Although a negative effect largely culminated within first six months after the shock, its pro-inflationary effect slightly decreased over the time and completely died out during the second year after the shock. On the hand, initial pro-inflationary effect of the negative exchange rate shock in the group of countries with flexible exchange rate arrangement seems to be reduced. However, negative effect of the shock increased during the second half of the year since the shock. At the same time, its impact on inflation subsequently fades out and became similarly neutral in the long run.

The one standard deviation negative exchange rate shock seemed to be neutral in determining the leading path of both industrial production and inflation in the long-run in all ten European transition economies. On the hand, it causes distorting effects across different exchange rate arrangements and thus reveals curious implications of the exchange rate regime choice.

In the Figure 11.5 we summarize impulse-response functions of the endogenous variables for the model with time series for the extended period (model B1) in the European transition economies. The Figure 11.5 shows estimated responses of industrial production and inflation to the Cholesky positive one standard deviation negative REER shock (depreciation or devaluation of real exchange rate) in the European transition economies during the extended period. Crisis period affected responses of *industrial production* to the exchange rate shock. In the group of "peggers" we observed generally more dynamic response (increase) of industrial production to the shock. This result may be addressed to more dynamic adjustments to changes in foreign competitiveness provided that economic crisis accelerated redistribution effects on the international level. Moreover, this shock in the group of "peggers", caused by sudden shifts in the exchange rate of the foreign anchoring currency, serves as a vehicle for transmission of impulses not originated in domestic economy and thus seems to have just a temporary effect. Despite its increased and more durable impact (in comparison with pre-crisis period) on industrial production in the short run, the overall cumulative effect of the shock in the long run seems to be neutral. On the other hand, crisis period slightly reduced the length of the lagged response (some countries even experienced immediate increase) in industrial production to

the negative exchange rate shock in the group of "floaters" reflecting higher sensitivity to the exchange rate related price effects (size of the effect mostly increased as well). At the same time, durability of the positive effects of the shock on industrial production increased only at negligible rate, confirming its long run neutrality.

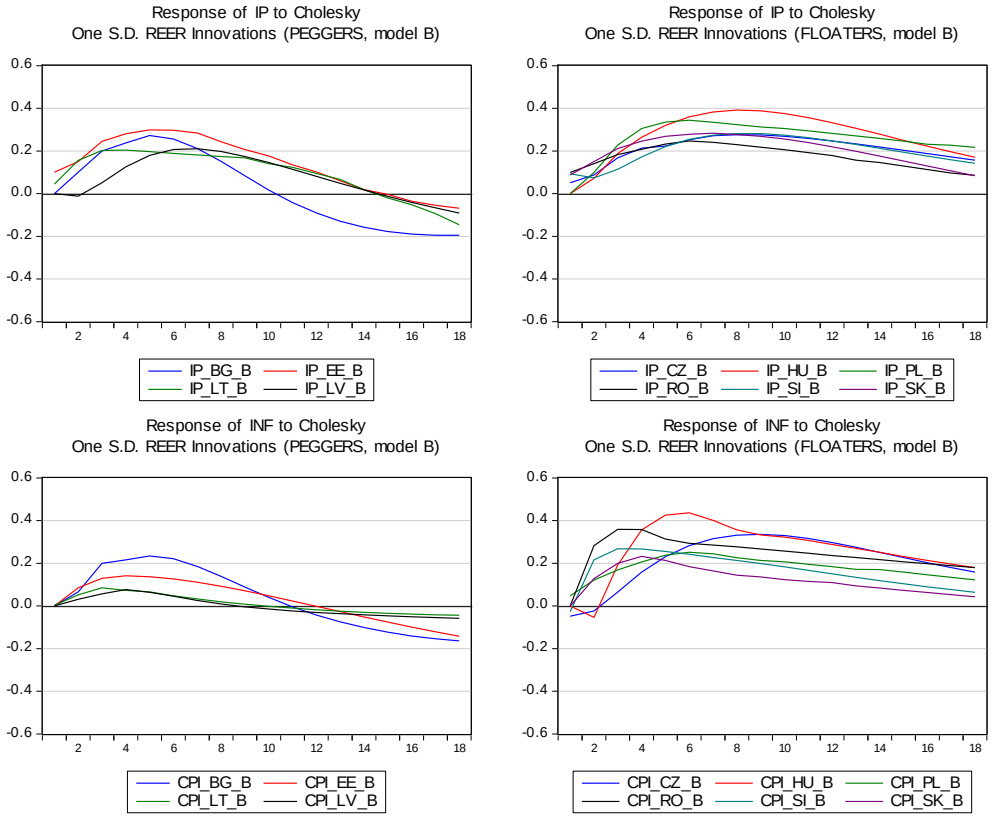


Figure 11.5 Responses of industrial production and inflation to REER shock (2000M1-2011M12) (Model B)

Note: Curves represent responses of industrial production (IP) and inflation (INF) to the one standard deviation negative exchange rate shock in each country from the group of European transition economies.

Source: Authors calculation.

Course of impulse-response functions of *inflation* during the extended period reflecting crisis contributions to the effects of unexpected exchange rate shifts reveals another crucial implication of the exchange rate regime choice. Besides generally reduced inflation pressures initiated by the negative exchange rate shock (in comparison with the pre-crisis period), countries from the group of "peggers" experienced considerably faster recovery of the price stability (negative effect of the shock to the price level died out much earlier) than in countries from the group of "floaters". It seems that the crisis period reduced a durability of the shock from the exchange rate sudden shift even more. We suggest that stabilizing effects of the exchange rate nominal anchor during the crisis period contributed to the overall reduction of price related effects associated with external price shocks. At the same time, crisis period increased vulnerability of the domestic price level to the unexpected shifts in the short-term leading path of exchange rate. While the total short-term contribution of the negative exchange rate shock to the price level is comparable in both periods, the overall effect of the shock culminated in most countries from the group of "floaters" with significantly reduced lag (during first

three months). In both groups of countries price effects of the one standard deviation negative exchange rate shock seems to be neutral in the long run.

11.7 Conclusion

Exchange rates determined main macroeconomic indicators in all ten European transition economies in the line with the general empirical investigations though we observed some specific implications of the distorting effects caused by the unpredicted exchange rate shifts during the crisis period that may be a subject of further academic discussion focusing on the wide causalities of the economic crisis. At the same time our results suggest some plausible causality between exchange rate regime and the way that the exchange rate shock affects industrial production and inflation. Thus, our investigations may be a relevant contribution to the fixed versus flexible exchange rate dilemma that seems to a crucial part of the discussion related to the possible implications of sacrificing monetary sovereignty in the Eurozone candidate countries.

Negative exchange rate shock had positive effect on industrial production in all ten European transition economies, though we experienced some differences across countries according to their exchange rate arrangement. Lagged response of industrial production as well as durability of the effect seems to be reduced in the group of "peggers". In comparison with countries with fixed exchange rate arrangement it seems that industrial production in the group of "floaters" increased with slightly longer lag, while its overall effect seems to be more significant and durable in this group of countries thought it has died out in the long run too. It seems that sudden exchange rate shifts under flexible exchange rate arrangement provides more convenient vehicle for price incentives associated with international redistribution effects. On the other hand exchange rate shifts under fixed exchange rate regime associated with volatility of the main foreign anchoring currency seem to have nearly immediate but significantly reduced effect on industrial production. Crisis period affected responses of industrial production to the exchange rate shock. In the group of "peggers" we observed generally more dynamic response (increase) of industrial production to the negative exchange rate shock. It seems that higher volatility on foreign exchange markets during the crisis period leads to more dynamic adjustments to changes in foreign competitiveness due to acceleration in redistribution effects on the international level. Crisis period slightly reduced the length of the lagged response in industrial production to the negative exchange rate shock in the group of "floaters" reflecting similarly higher sensitivity to the exchange rate related price effects.

Countries from the group of "peggers" experienced a moderate trend of the inflation increase since the first month after the shock. Although a negative effect largely culminated within first six months after the shock, its pro-inflationary effect slightly decreased over the time and completely died out during the second year after the shock. On the hand, initial inflation pressure of the negative exchange rate shock in countries from the group of "floaters" seems to be reduced. However, negative effect of the shock increased during the second half of the year since the shock. Crisis period was associated with generally reduced inflation pressures initiated by the negative exchange rate shock as countries from the group of "peggers" experienced considerably faster recovery of the price stability (negative effect of the shock to the price level died out much earlier) than in countries from the group of "floaters". It seems that the crisis period reduced a durability of the shock from the exchange rate

sudden shift even more. We suggest that stabilizing effects of the exchange rate nominal anchor during the crisis period contributed to the overall reduction of price related effects associated with external price shocks. At the same time, crisis period increased vulnerability of the domestic price level to the unexpected shifts in the short-term leading path of exchange rate. While the total short-term contribution of the negative exchange rate shock to the price level is comparable in both periods, the overall effect of the shock culminated in most countries from the group of "floaters" with significantly reduced lag (during first three months).

Acknowledgement

This chapter was written in connection with scientific project VEGA no. 1/0892/13. Financial support from this Ministry of Education's scheme is also gratefully acknowledged.

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Chapter 12

SHOULD SUB-SAHARAN AFRICA OIL EXPORTER COUNTRIES BORROW MORE IN U.S DOLLAR OR EURO TO STABILIZE THEIR BALANCE OF PAYMENTS? AN EMPIRICAL INVESTIGATION

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Abstract

This chapter investigates the vulnerability of oil exporter countries in Sub-Saharan Africa (SSA) to commodity price, exchange rate, and interest rate uncertainty. Although there are considerable differences among Sub-Saharan Africa nations, they do share a number of common characteristics: heavy dependence on primary commodity exports, heavy reliance on outside aid, large debt burdens, poor infrastructure, and lows level of education (see Husain and Underwood 1991, Claessens and Qian 1993). An alternative to macroeconomic policies is the use of financial hedging instruments to stabilize the balance of payments. The currency composition of a country's external debt can serve as a hedging instrument against changes in exchange rate, interest rate, and commodity price changes. Commodity price and exchange rate changes affect both exports and imports. Furthermore, if a country has debt obligations in currencies other than its own, then its debt servicing ability will be affected by changes in exchange rate and interest rate. This chapter focuses on how a country can minimize its exposure to commodity price, exchange rate, and interest rate movements by structuring optimally the currency composition of its external debt relative to the costs of servicing the debt. The high historical volatility of currencies and export and import prices has had serious implications for the government budgets of Sub-Saharan countries, their economic stability and social welfare. A recent survey by the World Bank revealed that 70 percent of foreign borrowers in developing countries do not hedge their interest rate or exchange rate exposures. SSA countries are particularly vulnerable because: (1) they have large international borrowing requirements and the resulting external debt is denominated in different currencies; (2) most of the external debt is in obligations with variable interest rates; and (3) their trade in primary commodities is significant. A country can improve the risk characteristics of their balance of payments by holding an adequate level of foreign exchange reserves and borrowing in appropriate currency denominations. The currency composition of its external debt is a policy tool (debt composition is endogenous). This empirical investigation has determined that the US Dollar denominated debt is more attractive and desirable for these countries, given their risk profiles and the important component of oil export earnings.

Keywords: balance of payments, debt, financial crisis, Sub-Saharan Africa oil exporter countries.

12.1 Introduction

In the decades after World War II, developing economies borrowed from richer countries and built up a substantial amount of debt [more than $2 trillion, *Eutopia* (CUA), Vol.4, No.1, p. 31, 1999]. Sub-Saharan African countries owe around ten percent of the total debt of all developing countries.

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This debt was at the center of the crisis in international lending that preoccupied economic policymakers throughout the world for a decade after 1982. Recently-developed financial products and techniques can be used as hedging tools for a country's asset and liability management, though effective risk management activities require a good knowledge of these instruments. Considerable expertise is required in understanding the risk structure of the economy, identifying which instruments are appropriate, and making or supervising the transactions. Setting up an appropriate institutional structure to undertake these tasks also requires a thorough understanding of the nature of risks and risk management instruments. Unfortunately, many developing countries lack the expertise for these operations. Substantial investment in information systems and human resources are necessary to train the staff; to introduce adequate reporting, recording, monitoring and evaluating mechanisms; and to establish internal control procedures. However, an alternative to these financing techniques and macroeconomic policies to minimize a country's exposure to exchange rates and commodity price movement is the use of foreign currency composition of the optimal debt portfolio as a hedging instrument first developed by Claessens (1988). Furthermore, the operational framework of the model was improved by Kroner and Claessens (1991). The principles that should govern these countries' debt management strategies should be the goals of improving their credit ratings, and limiting the impact of volatility in global markets by maintaining an optimal currency composition of the debt. The currency composition of the external debt can be used to minimize exposure to external price risk and thus to diminish the exposure of their budgets to external price shocks such as fluctuating exchange rates, interest rates and commodity prices. This chapter develops a debt composition strategy that minimizes the effect of exchange rate, commodity price and interest rate fluctuations on the balance of payments of a sub-Saharan Africa oil exporter country. The empirical work is based on historical data aimed at extracting useful relationships between the balance of payments and the relevant financial risks of Nigeria. This technique is also applicable to Angola, Cameroon, Chad, Republic of Congo, Equatorial Guinea, and Gabon since these countries share a number of common characteristics: heavy dependence on oil export earnings, significant reliance on outside aid, large debt burdens, poor infrastructure, and low levels of education. (See Figure 12.1 and Tables 12.1.1 and 12.1.5 in the appendix).

The structure of the chapter is as follows: Section 12.2 presents a discussion of the model and framework of analysis. Section 12.3 describes the data and econometric technique used in this study, while Section 12.4 includes the estimation results. Section 12.5 presents the calculation of the optimal debt composition. Section 12.6 contains a discussion and an evaluation of the estimated portfolios. Section 12.7 concludes and points out some policy implications for sub-Sahara Africa oil exporters.

12.2 Model and framework of analysis

Assumptions

1. The government can borrow externally by taking out a conventional loan at a rate of interest i* and/or the government can borrow by issuing bonds at an interest rate r* that mature in one period t and require a payment at the beginning of the next period [t+1].
2. The country can improve the risk characteristics of its balance of payments by holding an adequate level of foreign exchange reserves and borrowing in appropriate currency

denominations. The currency composition of its external debt is a policy tool (debt composition is endogenous, i.e.; derived from the ad hoc model).

3. The agent's problem is to choose a portfolio of bonds b_t^* and/or conventional debt d_t^* in different currencies such that the balance of payments is stabilized, optimized (in equilibrium) in each period t, that is: BOP = [Current Account] $_t$+ [Capital Account]$_t$+[Δ International Reserves]$_t$ = 0. Furthermore, we assume that Nigeria is only limited to conventional debt therefore no bond financing will be carried out in the statistical implementation e.g., b_t^*=0. (See Figure 12.1 in the appendix.) We also assume that Nigeria holds an adequate level of international reserves.
4. The regressions will be based on historical data (time series) aimed at extracting useful relationships between the balance of payments and risk factors (commodity price risk, exchange rate risk, interest rate risk). The shortcoming with this method is that it doesn't take into account future changes in the country's economic structure that may alter the country's risk exposure profile. The other method proposed in the finance literature is the measurement based on projections or simulation (Masuoka, 1993).

Calculating the optimal composition of debt

The model used in this study to estimate the optimal composition of debt for Nigeria is based on the work of Powell (1993), Kroner and Claessens (1991), and Claessens (1988). One main difference that has to be taken into account is the presence of the three risk characteristics in our model: commodity price risk, exchange rate risk, and interest rate risk. Furthermore, we allow all the interest rates to be variable over time. The general framework for defining the optimal composition of debt is to use the trade balance or resource balance. The framework allows for different variables to be considered as exogenous or endogenous. [See Claessens (1988)]

In this study, commodity sensitivities are exogenous and debt composition is endogenous. [Similar to Powell (1993)] Consider the trade balance as related to a set of commodity prices and interest rates as follows:

$$TB = \lambda_0 + \sum_{i=1}^{r} \lambda_i P_i + \sum_{j=r+1}^{s} \lambda_j P_j \qquad (12.1)$$

In equation (12.1), expressed in natural log, TB is the trade balance, P_i represents the set of commodity prices (P_{oil}, P_{cocoa}) in the case of Nigeria, and P_j represents the set of interest rates or exchange rates. The sensitivities of the trade balance to these prices are thus represented by λ_s. Although a number of these sensitivities may be exogenous, a number are endogenous. Claessens (1988) considers the case in which commodity quantities (and thus sensitivities) are exogenous, whereas the amount of debt denominated in a particular currency (and hence the sensitivity of the resource to that currency interest rate is endogenous).

This approach can be generalized as follows: Allow the sensitivity of the trade balance or resource balance to p parameters (for example, a set of interest rates or exchange rates) can be thought of as endogenous. Let $\mathbf{P}_n$ be the (1 $\times$ p) vector of such parameters and let **n** be the (1 $\times$ p) vector of endogenous sensitivities. Further, let there be q parameters (for example, a set of commodity prices) that can be thought of as exogenous, and let $\mathbf{P}_x$ be the (1 $\times$ q) vector of such

parameters and let **x** be the (1 × q) vector of exogenous sensitivities. Then the trade balance or resource balance may be reformulated as follows:

$$TB = \mathbf{P_n n'} + \mathbf{P_x x'}. \tag{12.2}$$

The optimal value for **n** can be obtained by differentiating the expression for the variance of the trade balance or resource balance with respect to the p endogenous variables. This results in p equations in p unknowns, which may be written in matrix form as **Bn = Ax'**, where **B** is the (p × p) variance-covariance matrix of the endogenous variables [that is, **B** = var (**n**)] and **A** is the (p × q) matrix of covariances between **n** and **x** [that is, **A** = cov (**n**, **x**)]. We can then solve for the optimal set of variables **n** (e.g., portfolio weight of each currency) as follows:

$$\mathbf{n} = \mathbf{B}^{-1}\mathbf{Ax}. \tag{12.3}$$

In the model, commodity sensitivities are exogenous and debt composition is endogenous. Hence, the first problem is to put values on the exogenous sensitivities (λ). The estimates in equation (1), λ_i (for Nigeria, they are λ_{oil} λ_{cocoa}) will become natural candidates for the commodity sensitivities in equation (2) since the oil and the cocoa are the main determinants of Nigeria's external account.

12.3. Data and estimation technique

The relevant data used in this investigation are primarily from the IMF database (International Financial Statistics, Balance of Payments Statistics), World Bank publication (World Debt Tables), and Bank of America (World Information Services Country Risk Monitor). All the variables were transformed into their natural log or first difference before the estimations were carried out in log form. The data are collected in US dollar or in Nigeria naira. Data from Nigeria main trading partners, when needed, were converted into US dollar or Nigeria naira at the prevailing nominal exchange rates. Quarterly data are used for the countries considered covering the period from the first quarter of 1976 to the last quarter of 2001. The choice of the period of the study from1976 to 2001 can be explained by two main reasons. Firstly, some of the series in the study were not available before 1976. The second reason is that Nigeria's main European trading partners dissolved their domestic currency systems in 2000 for the common Euro. The last four observations of the European exchange rates in 2001 represent an interpolation against the dollar. The trade balance variable is the difference between the exports and imports series. To avoid the negative sign in the log transformation of the trade balance, the export series is divided by the import series (terms of trade) before taking the natural log. Two dummies were created to capture unusual periods in the sample. The dummy variable D1 is used to capture economic, political, and institutional factors that shape Nigeria's trade balance function after 1980. The dummy variable D2 is used to capture any shift in Nigeria's trade balance function due to the reform of the exchange rate system and the elimination of prices control as part of the structural adjustment program (SAP) supported by the IMF and the World Bank in 1986. The models were estimated by way of three methods: (1) Ordinary Least Squares (OLS), (2) Generalized Least-Squares Estimation (GLS), and (3) Autoregression (AR). See Tables 12.2.1 through 12.2.3 for the statistics tests performed on the data.

12.4 Estimation results

The estimates are reported in Table 12.3 in the appendix. Table 12.3 shows that the price of crude oil is positively correlated to trade balance at 5% significance level. However, the price of cocoa is negatively correlated to trade balance at 10% significance level. There was a mixed result for the US dollar and the Deutsch mark. The US dollar has a positive impact on the trade balance while the Deutsch mark has a negative effect on the trade balance. Both results are insignificant.

12.5 Calculation of the optimal debt composition

Determination of exogenous and endogenous sensitivities

We consider the trade balance, also known as resource balance, as related to a set of commodity prices, exchange rates, and interest rates as follows (for more details on the framework of analysis, see section II)

In equation (12.1), the sensitivities of the trade balance to these prices are thus represented by λ_i, where i = 1… s. Although a number of these sensitivities may be exogenous, a number are endogenous. Claessens (1988) considers the case in which commodity quantities (and thus sensitivities) are exogenous, whereas the amount of debt denominated in a particular currency (and hence the sensitivity of the resource to that currency interest rate; $i_{\$}$, $i_{£}$, $i_{¥}$, i_{FF}, i_{DM}, i_{SF}) is endogenous.

This approach can be generalized as follows: Say the sensitivity of the trade balance to p parameters (for example, a set of interest rates) can be thought of as endogenous. Let $\mathbf{P}_n$ be the (1 × p) vector of such parameters and let **n** be the (1 × p) vector of endogenous sensitivities. Say there are q parameters (for example, a set of commodity prices) that can be thought of as exogenous, and let $\mathbf{P}_x$ be the (1 × q) vector of such parameters and let **x** be the (1 × q) vector of exogenous sensitivities. Then the trade balance may be reformulated as follows:

$$TB = \mathbf{P_n n'} + \mathbf{P_x x'}. \tag{12.4}$$

The values for **n** can be obtained by differentiating the expression for the variance of the trade balance with respect to the p endogenous variables (values of **n** that minimize the variance of the trade balance). This results in p equations in p unknowns, which may be written in matrix form as **Bn = Ax'**, where **B** is the (p × p) variance-covariance matrix of the endogenous variables [that is, **B** = var (**n**)] and **A** is the (p × q) matrix of covariances between **n** and **x** [that is, **A** = cov (**n**, **x**)]. We can then solve for the (minimum variance) set of variables **n** (e.g., λi_{FF}, $\lambda i_{\$}$, $\lambda i_{£}$, $\lambda i_{¥}$, λi_{FF} , λi_{DM}, λi_{SF}) portfolio weight of each currency as follows:

$$\mathbf{n} = \mathbf{B}^{-1}\mathbf{Ax}. \tag{12.5}$$

In our model, commodity sensitivities are exogenous and debt composition is endogenous. Hence, the first problem is to obtain values for the sensitivities labeled λ_i (that is, those that are exogenous, λ_{oil}, λ_{cocoa}). These values are collected from the original trade balance model corrected for multicollinearity and given in Table 12.4.3.

The estimates for λ^*_{oil} = 1.597 and λ^*_{cocoa} = -0.062 are used as the exogenous sensitivities in the portfolio calculations in equation (12.3) along with the calculated covariance matrix reported in sections 12.5.2 and 12.5.3. After obtaining the weights, a rescaling is also performed to make the portfolio weights equal to 1, that is, $\omega_{iFF} + \omega_{i\$} + \omega_{i£} + \omega_{i¥} + \omega_{iDM} + \omega_{iSF} = 1$.

Debt portfolio weights calculation

In this section, we compute three types of Debt Portfolio weights, and then we recommend the one that is the most appropriate for Nigeria given its balance of payments' risks structure.

Interest rate debt portfolio calculation (located in the appendix)

Tables 12.4.3, 12.4.10, and 12.4.11 (located in the appendix) show the feasible sets of calculated portfolios. The feasible portfolios in Tables 12.4.3, 12.4.10, and 12.4.11 are compared with the actual currency composition in Tables 12.5.1, 12.5.2, 12.5.3 and 12.5.4. We refer to the actual portfolio of Nigeria as the benchmark portfolio. There are several key factors, which define the composition of the portfolio: cost of borrowing and its variance, the correlation between asset and liability, and correlation among liabilities. The hedging portfolios are sensitive to the assumption of the stability of the covariance. Consequently, the estimates of optimal portfolio shares may change from period to period; if covariance changes over time.

12.6 Discussion and evaluation of the portfolios

Referring to Table 5.1, where the hedging interest rate debt portfolio is determined by the covariance matrix of interest rates (endogenous) and prices of oil and cocoa (exogenous) multiplied by the inverse of the covariance matrix among interest rates (endogenous) then multiplied by the vector of elasticities (sensitivities) of prices of oil and cocoa. For Nigeria, the interest rate portfolio consists of 12.4% French franc, 14.4% Pound sterling, 11.8% Swiss franc, 27.0% Deutsche mark, 4.4% Japanese yen, and 30.0% US dollar as compared to the benchmark portfolio (5.5% French franc, 22.0% pound, 0.0% Swiss franc, 21.5% mark, 6.0% yen, and 45.0% dollar). Interestingly, for Nigeria, dollar denominated debt is more desirable compared to non-dollar liabilities. The actual debt portfolio contains an excess of liabilities denominated in US dollar, pound sterling, and Japanese yen, French francs, Deutsche mark, and Swiss franc. By contrast, their currencies are substantially underrepresented in the benchmark portfolio.

Referring to Table 12.5.2, where the hedging exchange rate debt portfolio is determined by the covariance matrix of exchange rates (endogenous) and prices of oil and cocoa (exogenous) multiplied by the inverse of the covariance matrix among exchange rates (endogenous) then multiplied by the vector of prices elasticities (sensitivities) of oil and cocoa. For Nigeria, the exchange rate portfolio consists of -6.9% French franc (asset share), 21.8% pound sterling, 31.8% Swiss franc, -9.9% Deutsche mark (asset share), 30.2% Japanese yen, and 33.40% US dollar as compared to the benchmark portfolio (5.5% French franc, 22.0% pound, 0.0% Swiss franc, 21.5% mark, 6.0% yen, and 45.0% dollar). The actual debt portfolio contains an excess of liabilities denominated in US dollar, Japanese yen and pound sterling (almost close to optimal). The Swiss franc, by contrast, is substantially underrepresented or non-existent in the benchmark portfolio. On the contrary, the French

franc and the Deutsche mark emerge as the main asset shares for Nigeria in the exchange rate portfolio. It is, however, unlikely that a small country like Nigeria will be a lender in financial markets, given its recurrent foreign exchange shortages. The dollar debt is fairly much the same in both types of calculated portfolios (interest rate portfolio and exchange rate portfolio). As Table 12.4.7 shows, the total proportion of European currencies (French franc and mark) decreases as we move from interest rate debt portfolio to exchange rate debt portfolio. The decrease can largely be explained by the fact that an appreciation of the French franc and German mark against the Nigerian naira implies a higher servicing cost, thus reducing the demand to borrow in Euro (French franc and German mark) and lowering the amount of the Euro loans.

Referring to Table 12.5.3, the average hedging of interest rate and exchange rate debt portfolio is determined by the average of the weights of each currency in both the interest rate portfolio and the exchange rate portfolio. The empirical results established that Nigeria faces large exposures to oil price and exchange rate uncertainty and, to a lesser extent, to interest rate movement. Since the hedging portfolio is based on risk minimization, it makes sense to have a balanced debt portfolio that takes into account both the exchange rate risk and interest rate risk. In this regard, the average optimal interest rate and interest rate portfolio are more appropriate in designing a risk hedging portfolio. For Nigeria, the average hedging of interest rate and exchange rate portfolio consists of 11.2% in Euro (sum of 2.7% French franc and 8.5% Deutsche mark), 8.1% pound sterling, 21.8% Swiss franc, 17.2% Japanese yen, and 31.7% US dollar as compared to the benchmark portfolio of 27% in Euro (5.5% French franc and 21.5% Deutsche mark), 22.0% pound sterling, 0.0% Swiss franc, 6.0% yen, and 45.0% US dollar, respectively. The most striking feature of this portfolio is the heavy weight in the US dollar. This is not surprising because Nigeria's exports are largely made up of crude oil and primary commodities whose prices are closely related to the US dollar. Therefore, borrowing a large fraction in US dollars should provide a hedge for changes in terms of trade against currency fluctuations. The actual debt portfolio contains an excess of liabilities denominated in US dollar, pound sterling, French francs, and Deutsch mark. Swiss franc and Japanese yen, by contrast, are substantially underrepresented in the benchmark portfolio.

Referring to the last column in Table 12.5.4, the average debt portfolio of public and publicly guaranteed debt portfolio for each currency is determined by the actual weighted average for each currency over the period of the study from 1976 to 2001. The data is obtained from the World Bank World Debt Table. As the table shows, the actual debt composition of Nigeria is heavily skewed toward the dollar. The share of the dollar debt has averaged 45.0% over the period of the study. The dollar debts have come to be more attractive as oil became a more important component of Nigeria's export earnings. The sums of the shares of the European currencies (DM, SWF, and FF) for the same period are 27.0%. Nigeria began to borrow heavily in European commercial markets, with its total Eurocurrency commitments approaching $3 billion during 1978 and 1979. The share of the pound sterling has averaged 22.0%. Traditionally, the UK was the main financial provider for Nigeria. In 1970, Britain was Nigeria's biggest creditor with 61.0% of its external debt portfolio. Evidently, the movement in Nigeria's borrowing portfolio away from the British pound to US dollar has resulted in the increased macroeconomic links between Nigeria and the US. Over the same period, only 6.0 percent of Nigeria's external debt was contracted in Japanese yen. It is worth noting that, after the dollar, the Deutsche mark and the yen play the most important roles in the foreign exchange market. For

instance, in 1992, 38.0% of all foreign exchange transactions involved the Deutsche mark. The pound sterling, once second only to the dollar as a key international vehicle currency, has declined in importance. Over the same period, its share in world foreign exchange trading was just 14.0%.

12.7 Conclusion and policy implications

The empirical results establish that Nigeria faces large exposures to oil price and exchange rate uncertainty and, to a lesser extent, to interest rate movement. Since the hedging portfolio is based on risk minimization, it makes sense to have a balanced debt portfolio that takes into account both the exchange rate risk and interest rate risk. In this regard, the hedging based on average interest rate and interest rate portfolio (Table 12.5.3) is more appropriate for Nigeria in designing a risk hedging portfolio. Nigeria's optimal average interest rate and exchange rate portfolio consists of 2.7% French franc and 8.5% Deutsche mark (or 11.2% in Euro), 18.1% pound sterling, 21.8% Swiss franc, 17.2% Japanese yen, and 31.7% US dollar as compared to the actual benchmark portfolio (5.5% French franc, 22.0% pound, 0.0% Swiss franc, 21.50% mark, 6.0% yen, and 45.0% dollar). The most striking feature of this portfolio is the heavy weight in the US dollar. This is not surprising because Nigeria's exports are largely made up of crude oil and primary commodities whose prices are closely related to the US dollar. Therefore, borrowing a large fraction in US dollars should provide a hedge for changes in terms of trade against currency fluctuations.

Given the substantial difference between the hedging portfolio (calculated in Table 12.5.3) and the actual (benchmark) portfolio (Table 12.5.4), it would seem that the actual portfolio should result in a dramatic improvement in Nigeria's ability to hedge themselves against price risks. The analysis indicates that Nigeria's external debt composition is far from efficient or optimal. The model (Table 12.5.3) shows that Nigeria's external debt structure is not well balanced to hedge the foreign exchange and interest rate risks effectively. The actual debt portfolio (Table 12.5.4) contains an excess of liabilities denominated in US dollar, British pound, German mark, and French franc. The Japanese yen, by contrast, is substantially underrepresented in the portfolio. In addition, Nigeria needs to significantly improve the weight of the Swiss franc in its debt composition for effective hedging. The actual pound sterling share does not differ much from the optimal composition. The Euro liabilities could now replace the German mark and French franc denominated debt; thus lowering the expected cost of borrowing.

In the case of Nigeria and other sub Saharan Africa oil producers, a risk adverse economic agent, dollar liabilities do appear to have good risk-sharing characteristics. Dollar denominated debts become more attractive and desirable only as petroleum becomes a more important component of export earnings. However, all these results should be treated with caution. In particular, the covariances that are estimated may be unstable over time. Also, conducting the analysis over different time periods might give different results. In addition, the costs of rebalancing and the stability of the portfolio will determine an optimal "average" portfolio. The initial level of total external debt is not derived from the model. The model determines only the amounts or share of currencies to be borrowed in each period. Similar analyses can be conducted to find portfolios that hedge against changes in export prices, export values, import prices, and import values covering the period after the introduction of the Euro. The strong policy implication of this finding is that Nigeria and other sub-

Saharan Africa oil producers should attempt to link their debt-servicing payments to the outcomes of oil prices in order to stabilize their balances of payments. Their governments can adjust both monetary and fiscal policy to the requirements of internal stability or adjust them to the need of external balance. As a result, both tighter monetary policy and an increased budget surplus can correct inflationary pressure and external deficit, or both easier monetary policy and a reduced budget surplus tend to alleviate and recession and external surplus.

12.8 References

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*** International Monetary Fund (IMF), International Financial Statistics, Washington DC, 2008.

APPENDIX

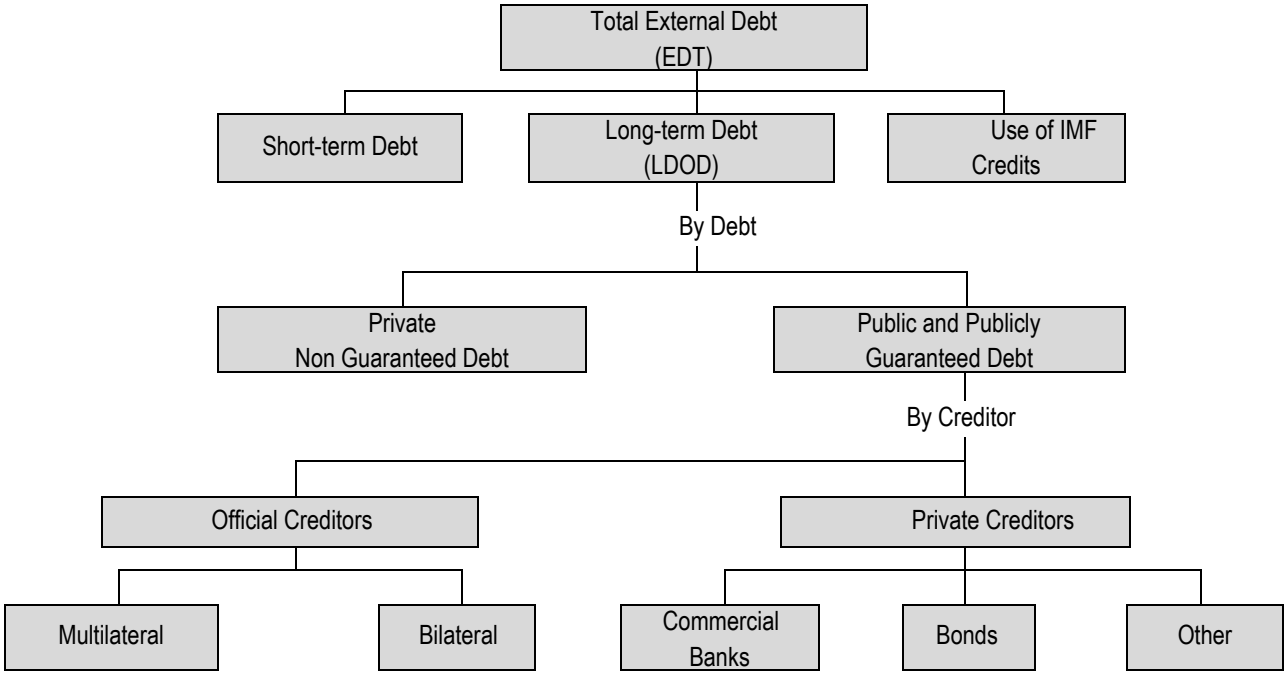

Figure 12.1 Debt stock and its components

Source: World Debt Table (The World Bank)

Table 12.1.1 Sub-Saharan Africa (SSA) oil exporters: income growth and demographic characteristics, 1995–2007

Sub-Saharan Africa (SSA) Oil Exporters: Income Growth and Demographic Characteristics, 1995–2007						
	Real per Capita GDP Growth	**Real GDP Growth**	**Real GDP per Capita;2000$ 2007**	**GDP ($ million) 2007**	**Population Growth**	**Population (Millions)**
Angola	6.9	10.7	5,026	61,356	3.00	16.3
Cameroon	0.2	3.0	679	12,912	2.80	18.8
Chad	3.9	6.9	1,401	7,095	3.10	9.5
Congo, Rep. of	1.4	4.3	1,170	9,977	2.60	3.8
Equatorial Guinea	26.6	36.1	13,412	10,485	5.40	1.2
Gabon	0.4	2.7	4,070	11,578	2.10	1.45
Nigeria	4.0	6.4	1,766	166,778	2.80	143.9

Source: International Monetary Fund (IMF), 2008.

Table 12.1.2 Sub-Saharan Africa (SSA): selected indicators, 2006-2007

	2006	**2007**
	Percent Change	
Real GDP	6.3	6.7
Of which: Oil exporters	7.5	8.9
Of which: Oil importers	5.8	5.7
Real non-oil GDP	7.8	7.7
Consumer prices (average)	7.3	7.1
Of which: Oil exporters	8.2	5.7

Of which: Oil importers	6.9	7.8
	4.3	4.6
	Percent of GDP	
Exports of goods and services	38.0	38.2
Imports of goods and services	34.7	36.4
Gross domestic saving	24.6	24.1
Gross domestic investment	21.6	22.2
Fiscal balance (including grants)	5.0	1.6
Of which: Oil exporters	11.7	5.0
Of which: Oil importers	1.5	-0.2
Current account (including grants)	0.5	-2.4
Of which: Oil exporters	10.9	3.8
Of which: Oil importers	-5.0	-5.8
Terms of trade (percent change)	9.8	6.0
Of which: Oil exporters	16.6	8.0
Of which Oil importers	6.3	4.9
Reserves (months of imports)	5.6	5.8
Memorandum items:		
Oil price (US$ a barrel)	64.3	71.1
GDP growth in SSA trade partners (in percent)	4.1	3.9

Source: International Monetary Fund (IMF), 2008.

Table 12.1.3 Table for Nigeria debt-service ratios, 1999-2002

	1999	**2000**	**2001**	**2002**
Debt Service to Export Ratio	30	15	17	18
External Debt to Export Ratio	226	189	158	155
External Debt to GDP Ratio	87	72	70	71
External Debt to Government Revenue	299	160	149	177
Debt Service to GDP Ratio	11	4	6	7
Debt Service to Government Revenue	38	18	13	17
Months of Imports covered by existing International Reserve assets (with gold)	2.9	3.4	3.9	3.4
Current Account Balance to GDP Ratio	-16.5	-9.4	-2.4	-11.7

Sources: Ministry of Finance; Debt Management Office (Nigeria)

Table 12.1.4 Exports and imports of major trading partners of Nigeria (in millions of US $)

Exports							
Destination	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
United States	4,595	5,610	6,107	4,135	4,220	9,409	8,345
Spain	1,036	1,509	1,416	876	876	2,189	1,747
India	572	1,248	1,086	1,014	1,005	1,246	1,345
France	734	1,260	653	673	684	1,055	1,073
Germany	626	643	786	289	189	463	627
Portugal	418	531	466	250	292	727	657
Ghana	352	388	430	443	439	545	588
Cote d'Ivoire	338	484	390	290	359	601	435
Subtotal	8,671(71)	11,673(72)	11,334(69)	7,970(70)	8,064(67)	16,235(75)	14,817(72)
World Total	**12,253(100)**	**16,151(100)**	**16,540(100)**	**11,369(100)**	**12,000(100)**	**21,685(100)**	**20,604(100)**

Imports							
Origin							
United States	662	898	896	902	709	789	1,053
United Kingdom	749	752	771	854	821	881	1,082
Germany	631	721	801	714	740	635	971
France	461	556	500	624	631	746	832
China: Mainland+Taiwan	303	289	576	695	687	1,000	1,411
Japan	193	341	235	252	271	318	487
Subtotal	2,999(52)	3,557(53)	3,779(54)	4,041(53)	3,859(51)	4,369(49)	5,836(51)
World Total	5,816(100)	6,774(100)	7,017(100)	7,574(100)	7,609(100)	8,842(100)	11,484(100)

Source: IMF, Direction of Trade Statistics-Share of total exports and imports, in percent, in parentheses

Table 12.1.5 Sub-Saharan Africa (SSA): country groupings

Resource-Rich		Non-Resource-Rich	
Oil	Non-Oil	Coastal	Landlocked
Angola	Botswana	Benin	Burkina Faso
Cameroon	Côte d'Ivoire	Cape Verde	Burundi
Chad	Guinea	Comoros	Central African Republic
Congo, Rep. of	Namibia	Gambia, The	Congo, Dem. Rep. of
Equatorial Guinea	São Tomé and Príncipe	Ghana	Ethiopia
Gabon	Sierra Leone	Guinea-Bissau	Lesotho
Nigeria	Zambia	Kenya	Malawi
		Madagascar	Mali
		Mauritius	Niger
		Mozambique	Rwanda
		Senegal	Swaziland
		Seychelles	Uganda
		South Africa	Zimbabwe
		Tanzania	
		Togo	

Source: International Monetary Fund (IMF), 2008.

Table 12.2.1 Augmented Dicker-Fuller (ADF) Unit Root Test for Ln data for Nigeria trade balance function variables (quarterly) at level and first difference

Variables	Level	Unit Root I(1)	First Difference	Unit Root I(0)
Trade Balance: **lnTB**	-3.913*	NO		
Price of Cocoa: **lncocoa**	-1.8851	YES	-5.196*	NO
Price of Crude Oil: **lnpoil**	-3.156**	NO	-7.604*	NO
US Lending Rate: **lniUS**	-2.089	YES	-2.593***	NO
UK Lending Rate: **lniUK**	-0.031	YES	-4.841*	NO
German Lending Rate: **lniGer**	-1.563	YES	-4.845*	NO
France Lending Rate: **lniFranc**	-0.743	YES	-4.406*	NO
Japan Lending Rate: **lniJapan**	-0.741	YES	-3.156**	NO
Japan Lending Rate: **lniSwissf**	-0.694	YES	-3.765*	NO
Naira per French Franc: **lnenaira_franc**	-0.563	YES	-7.083*	NO
Naira per Pound: **lnenaira_pound**	-0.348	YES	-8.898*	NO
Naira per Deutschmark: **lnenaira_mark**	-0.753	YES	-7.571*	NO
Naira per Yen: **lnenaira_yen**	-0.192	YES	-7.083*	NO
Naira per Dollar: **lnenaira_dollar**	-0.402	YES	-9.982*	NO
Naira per Dollar: **lnenaira_swissf**	-0.802	YES	-6.837*	NO

Variables	Level	Unit Root I(1)	First Difference	Unit Root I(0)
Trade Balance Residuals	7.319*	NO		
Critical values: *significant at the 1% level =-3.497, ** at the 5% level = -2.891, ***at the 10% level = -2.582				
lncocoa (Natural log of cocoa price), **lnpoil** (Natural log of oil price), **lniUS** (Natural log of US interest rate), **lniUK** (Natural log of UK interest rate), **lniGer** (Natural log of German interest rate), **lniFfranc** (Natural log of French interest rate), **lniJapan** (Natural log of Japan interest rate), **lniSwisfr** (Natural log of Swiss interest rate), **lnXFfranc** (Natural log of French franc exchange rate), **lnXpound** (Natural log of pound exchange rate), **lnXmark** (Natural log of mark exchange rate), **lnXyen** (Natural log of yen exchange rate), **lnXdollar** (Natural log of dollar exchange rate), **lnXSwisfr** (Natural log of Swiss franc exchange rate).				

Table 12.2.2 Autocorrelation diagnostics for the trade balance function

Note: $Y_t = \beta Y_{t-1}$; Ho: $\beta = 1$ or Ha: $\beta \neq 1$ I(1) → integrated One ; I(0) → integrated Zero If T-test statistic < Critical value → accept Ho ($\beta = 1$) → Unit Roots; I (1) → there is a trend If T-test statistic > Critical value → reject Ho ($\beta \neq 1$) → No Unit Root; I (0) → no trend**OLS**			
Variables	**B**	**SE**	**t**
(Constant)	13.337**	6.621	2.014
Lncocoa	-0.717***	0.536	-1.337
Lnpoil	1.938*	0.392	4.943
lniUS	-0.134	0.627	-0.213
lniUK	0.907	1.113	0.814
lniGer	-1.08	1.172	-0.921
lniFfranc	-2.308**	1.247	-1.850
lniJapan	-0.386	0.912	-0.423
lniSwisfr	1.909***	1.313	1.453
lnXFfranc	-0.545	1.299	-0.419
lnXpound	-1.334	1.088	-1.226
lnXmark	-0.162	1.314	-0.123
lnXyen	0.879	0.976	0.900
lnXdollar	-0.0512	1.853	-0.027
lnXSwisfr	0.692	1.165	0.593
d80	-0.825***	0.544	-1.516
D86	0.476	0.583	0.816
# observations	104		
R Square	0.460		
SE estimate	0.654		
Durb-Watson	1.986		
F-statistic (df1=16; df88)	4.634		
Critical Values: (1.282 at 10%); (1.645 at 5%); and (2.326 at 1%) **Significance**: ***Significant at the 10% level, **significant at the 5% level , *significant at the 1% level			
lncocoa (Natural log of cocoa price), **lnpoil** (Natural log of oil price), **lniUS** (Natural log of US interest rate), **lniUK** (Natural log of UK interest rate), **lniGer** (Natural log of German interest rate), **lniFfranc** (Natural log of French interest rate), **lniJapan** (Natural log of Japan interest rate), **lniSwisfr** (Natural log of Swiss interest rate), **lnXFfranc** (Natural log of French franc exchange rate), **lnXpound** (Natural log of pound exchange rate), **lnXmark** (Natural log of mark exchange rate), **lnXyen** (Natural log of yen exchange rate), **lnXdollar** (Natural log of dollar exchange rate), **lnXSwisfr** (Natural log of Swiss franc exchange rate, **d80** (Break 1980), **d86** (Break 1986)			

Note: Autocorrelation diagnostics for the Trade Balance: Function $\mathbf{ln\ TB_t} = \lambda_0 + \lambda_1 \mathbf{ln\ cocoa_t} + \lambda_2 \mathbf{lnpoil_t} + \lambda_3 \mathbf{ln\ iUS} + \lambda_4 \mathbf{ln\ iUK} + \lambda_5 \mathbf{ln\ iGer} + \lambda_6 \mathbf{ln\ iFranc} + \lambda_7 \mathbf{ln\ iJapan} + \lambda_8 \mathbf{ln\ Xfranc_t} + \lambda_9 \mathbf{ln\ Xpound} + \lambda_{10} \mathbf{ln\ Xmark_t} + \lambda_{11} \mathbf{ln\ Xyen} + \lambda_{12} \mathbf{ln\ Xdollar} + \lambda_{13} \mathbf{D1} + \lambda_{14} \mathbf{D2} + \varepsilon_t$

Table 12.2.3 Multicollinearity diagnostics for the variables in the trade balance function

(Quarterly data from 1976 to 2001)**OLS**						
	B	**Std. Error**	**t**	**Tolerance**	**VIF**	**Condition Index**
(Constant)	13.337**	6.621	2.014			1.000
lncocoa	-0.717***	0.536	-1.337	0.096	10.459	1.665
lnpoil	1.938*	0.392	4.943	0.230	4.341	10.347
lnius	-0.134	0.627	-0.213	0.128	7.809	11.249
lniuk	0.907	1.113	0.814	0.029	34.093	21.377
lniger	-1.08	1.172	-0.921	0.054	18.458	23.417
lnifranc	-2.308***	1.247	-1.850	0.048	20.872	34.789
lnijapan	-0.386	0.912	-0.423	0.022	45.580	63.143
lniswisfr	1.909	1.313	1.453	0.048	20.667	68.212
lnxfranc	-0.545	1.299	-0.419	0.001	1065.996	96.375
lnxpound	-1.334	1.088	-1.226	0.001	999.289	114.520
lnxmark	-0.162	1.314	-0.123	0.001	1247.728	118.179
lnxyen	0.879	0.976	0.900	0.001	1047.647	151.059
lnxdollar	-0.0512	1.853	-0.027	0.001	2735.517	165.485
lnxswisfr	0.692	1.165	0.593	0.001	1268.309	269.668
D80	-0.825***	0.544	-1.516	0.107	9.379	282.281
Critical Values: (1.282 at 10%); (1.645 at 5%); and (2.326 at 1%) **Significance**: ***Significant at the 10% level, **significant at the 5% level , *significant at the 1% level						
lncocoa (Natural log of cocoa price), **lnpoil** (Natural log of oil price), **lniUS** (Natural log of US interest rate), **lniUK** (Natural log of UK interest rate), **lniGer** (Natural log of German interest rate), **lniFfranc** (Natural log of French interest rate), **lniJapan** (Natural log of Japan interest rate), **lniSwisfr** (Natural log of Swiss interest rate), **lnXFfranc** (Natural log of French franc exchange rate), **lnXpound** (Natural log of pound exchange rate), **lnXmark** (Natural log of mark exchange rate), **lnXyen** (Natural log of yen exchange rate), **lnXdollar** (Natural log of dollar exchange rate), **lnXSwisfr** (Natural log of Swiss franc exchange rate, **d80** (Break 1980)						

Note: Multicollinearity diagnostics for the variables in the Trade Balance Function: $\ln TB_t = \lambda_0 + \lambda_1 \ln cocoa_t + \lambda_2 \ln poil_t + \lambda_3 \ln iUS + \lambda_4 \ln iUK + \lambda_5 \ln iGer + \lambda_6 \ln iFranc + \lambda_7 \ln iJapan + \lambda_8 \ln Xfranc_t + \lambda_9 \ln Xpound + \lambda_{10} \ln Xmark_t + \lambda_{11} \ln Xyen + \lambda_{12} \ln Xdollar + \lambda_{13} D1 + \lambda_{14} D2 + \varepsilon_t$

Table 12.3 Estimates of the trade balance original model corrected for multicollinearity

(Quarterly data from 1976 to 2001) **Independent Variables**	**Dependent Variable: lnTrade balance: lnexport- lnimport** **GLS (Prais –Winsten estimation)**
Constant	7.216** (1.864)
Price of Crude Oil: **ln poil**	1.597* (4.524)
Price of Cocoa: **ln cocoa**	-0.062*** (-1.389)
Exchange Rate: **ln XXbasket**	0.056 (0.861)
Exchange Rate: **ln MXbasket**	0.109 (0.937)
US Lending Rate: **ln iUS**	0.102 (0.254)
German Lending Rate: **ln iGer**	-0.343 (-0.604)

D1-Break-80	-0.739* (-2.391)
Number of observations	104
Adjusted R-squared	0.575
Std. Error of the Estimate	0.066
Durbin-Watson (DW)	1.970
F-statistic (Df1=7; df2=96)	7.644*
t-statistics are in parentheses **Critical Values**: (1.282 at 10%); (1.645 at 5%); and (2.326 at 1%) **Significance**: ***Significant at the 10% level, **significant at the 5% level , *significant at the 1% level	
lncocoa (Natural log of cocoa price), **lnpoil** (Natural log of oil price), **lniUS** (Natural log of US interest rate), **lniGer** (Natural log of German interest rate), **lnXXbasket** (Natural log of export exchange rate composite), **lnXXbasket** (Natural log of export exchange rate composite, **D1** (=1 for period > 1980; otherwise, 0)	

Note: *Estimates of the Trade Balance Original Model Corrected for Multicollinearity:* $\mathbf{ln\ TB_t} = \lambda_0 + \lambda_1\ \mathbf{ln\ cocoa_t} + \lambda_2\ \mathbf{ln\ poil_t} + \lambda_3\ \mathbf{ln\ iUS} + \lambda_4\ \mathbf{ln\ iGer} + \lambda_5\ \mathbf{ln\ XXbasket} + \lambda_6\ \mathbf{ln\ MXbasket} + \lambda_7\ \mathbf{D1} + \varepsilon_t$ (Quarterly data from 1976 to 2001)

Table 12.4.1 Covariance matrix among endogenous variables (interest rates)

covariance matrix among endogenous variables (interest rates)							
		lniswf	lnius	lnifranc	lniuk	lniger	lnijapan
	lniswf	1.078	0.084	0.323	-0.242	-0.798	-0.319
	lnius	0.084	0.377	-0.254	-0.013	-0.346	0.33
	lnifranc	0.323	-0.254	1.781	-0.144	-0.272	-0.776
	lniuk	-0.242	-0.013	-0.144	1.244	-0.445	0.01
	lniger	-0.798	-0.346	-0.272	-0.445	1.888	-0.212
	lnijapan	-0.319	0.33	-0.776	0.01	-0.212	0.813

Table 12.4.2 Covariance between endogenous (interest rates) & exogenous (prices of oil and cocoa) variables

covariance between endogenous (interest rates) & exogenous (prices of oil and cocoa)			
		Lncocoa	lnpoil
	lniswf	0.061	0.09
	lnius	0.01	-0.013
	lnifranc	-0.004	-0.066
	lniuk	-0.098	-0.015
	lniger	0.138	-0.244
	lnijapan	0.036	0.068

Table 12.4.3 Elasticity of cocoa and oil

Elasticities, λ^*_{cocoa}, and λ^*_{oil}		
	lncocoa	-0.062
	Lnpoil	1.597

Table 12.4.4 Un-scaled portfolio weights

n = B^{-1}*A*x = un-scaled portfolio weights	
λiswf	-0.22984
λius	-0.58525
λifranc	-0.24108
λiuk	-0.2805
λiger	-0.52578
λijapan	-0.08556
Total	-1.94801

Table 12.4.5 Un-scaled portfolio weights

ω = scaled portfolio weights, where ω_{iff},+ $\omega_{i\$}$+$\omega_{i€}$+ $\omega_{i¥}$+ ω_{idm}+ ω_{isf} =1	
ωiswf	11.8%
ωius	30.0%
ωifranc	12.4%
ωiuk	14.4%
ωiger	27.0%
ωijapan	4.4%
Total	100%

Table 12.4.6 Covariance matrix among endogenous variables (exchange rates)

		lnXFfr	**lnXuk**	**lnXsf**	**lnXgm**	**lnXye**	**lnXus**
	lnXFfr	1.926	1.097	0.544	-1.868	0.193	-2.012
	lnXuk	1.097	1.421	0.792	-1.105	-0.144	-2.097
	lnXsf	0.544	0.792	1.131	-0.679	-0.483	-1.372
	lnXgm	-1.868	-1.105	-0.679	1.937	-0.213	2.091
	lnXye	0.193	-0.144	-0.483	-0.213	0.777	-0.24
	lnXus	-2.012	-2.097	-1.372	2.091	-0.24	3.909

Table 12.4.7 Covariance between endogenous (exchange rates) & exogenous (prices of oil and cocoa) variables

		Cocoa	oil
	lnXFfr	0.076	0.135
	lnXuk	0.028	0.134
	lnXsf	-0.005	0.04
	lnXgm	-0.097	-0.105
	lnXye	-0.002	0.018
	lnXus	0.034	-0.241

Table 12.4.8 Elasticity of cocoa and oil

Elasticities, λ^{*}_{cocoa}, and λ^{*}_{oil}		
	Lncocoa	-0.062
	Lnpoil	1.597

Table 12.4.9 Un-scaled portfolio weights

$n = B^{-1}*A*x$ = un-scaled portfolio weights	
λXFfr	0.096844
λXuk	-0.30858
λXsf	-0.44582
λXgm	0.140968
λXye	-0.42864
λXus	-0.47289
Total	-1.41812

Table 12.4.10 Scaled portfolio weights

ω = scaled portfolio weights, where $\omega_{iff,} + \omega_{i\$} + \omega_{i£} + \omega_{i¥} + \omega_{idm} + \omega_{isf} = 1$	
ωxffr	-6.9%
ωxuk	21.8%
ωxsf	31.4%
ωxgm	-9.9%
ωxye	30.2%
ωxus	33.4%
Total	100.0%

Table 12.4.11 Average optimal interest rate and exchange rate debt portfolio (%)

French Franc	2.7
Pound Sterling	18.1
Swiss Franc	21.8
Deutsche Mark	8.5
Japanese Yen	17.2
U.S. Dollars	31.7
Total	100.0

Table 12.5.1 Optimal interest rate debt portfolio (%)

French Franc	12.4
Pound Sterling	14.4
Swiss Franc	11.8
Deutsche Mark	27.0
Japanese Yen	4.4
U.S. Dollars	30.0
Total	100.0

Table 12.5.2 Optimal exchange rate debt portfolio (%)

French Franc	-6.9
Pound Sterling	21.8
Swiss Franc	31.8
Deutsche Mark	-9.9
Japanese Yen	30.2
U.S. Dollars	33.4
Total	100.0

Table 12.5.3 Average optimal interest rate and exchange rate debt portfolio (%)

French Franc	2.7
Pound Sterling	18.1
Swiss Franc	21.8
Deutsche Mark	8.5
Japanese Yen	17.2
U.S. Dollars	31.7
Total	100.0

Table 12.5.4 Actual currency composition of long-term debt of Nigeria (%)

	1970	**1980**	**1990**	**1995**	**2000**	**Average 1976-2001**
French Franc	0.0	1.0	11.0	14.0	1.0	5.5
Pound Sterling	61.0	3.5	14.0	13.0	1.5	22.0
Swiss Franc	0.0	0.0	0.0	1.0	0.0	0.0
Deutsche Mark	18.0	28.0	18.0	18.0	1.0	21.5
Japanese Yen	1.0	2.5	10.0	16.0	2.0	6.0
U.S. Dollars	20.0	65.0	47.0	38.0	94.5	45.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note: The actual currency composition is calculated from the World Debt Data Publication

Chapter 13

THE IMPACT OF THE GLOBAL ECONOMIC CRISIS ON THE INDEBTEDNESS OF THE SOUTHEAST EUROPEAN COUNTRIES

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THE IMPACT OF THE GLOBAL ECONOMIC CRISIS ON THE INDEBTEDNESS OF THE SOUTHEAST EUROPEAN COUNTRIES

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Abstract

The aim is to research the effects of the global economic crisis on the countries of the Southeast Europe, with a special emphasis on the level and sustainability of foreign debt. The level of foreign indebtedness has resulted from structural problems in the SEE's i.e. internal and external imbalances. They have been faced with: increase in domestic spending (personal and public), higher growth of import than export, uncompetitiveness of domestic production and export, unfavorable production structure that has resulted in a weak recovery after crisis. In comparison with PI(I)GS the research shows that SEE countries are less indebted and they also have a smaller share of public debt in their GDP's. Econometric analysis indicates the importance of balance of payment disequilibria as determination of foreign debt. Current account deficit, FDI inflows and occurrence of crisis have positive influence on foreign debt, while budget deficit does not have significant impact.

Keywords: debt crisis, foreign debt, Southeast Europe, current account deficits, PIIGS.

13.1 Introduction

The global financial crisis was resulted from the weaknesses of supervision of banking and financial system, but also their effects reflects some omissions from domestic economic policy. The most affected countries were characterized with the long pre-crisis period with the expansionary fiscal policy and high inflow of foreign investments (Obstfeld 1994). In the south, peripheral countries, of Europe, the financial crisis has grown even into a debt crisis. Some of the European Union member states (and Eurozone members) are facing problems with the increasing debt and inability to service it. The group of countries that have faced the worst consequence of crisis are popularly known as PI(I)GS: Portugal, Ireland, Italy, Greece and Spain. Because of the importance to protect the stability of the common currency, which is important for trade and activity of the single European market, the rest of the euro area as well as the EU, along with the International Monetary Fund (IMF), are helping them with great amounts of money. It is interesting that most of these countries are geographically located in the south (only Ireland is in the west) and that the countries in the south have similar features and their crises have similar causes.

In southern Europe, however on its eastern side, there are: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, (FYRo) Macedonia, Montenegro, Romania and Serbia. The Southeast Europe (SEE) are in various stages of the transition process, and at the same time depend on the trade with the EU member states and the investments coming from these countries. Their status with respect to acquiring the EU membership is different: while Romania and Bulgaria are the EU members, among

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other countries, Croatia is closest to a full membership. Apart from their relations to the EU, they have a lot in common: high unemployment rates, external imbalances, huge trade deficits, low or moderate economic growth.

Usually the debt issues have been considered as a problem of the developing countries (Eaton and Fernandez, 1995). This is why the researches of the implications of debt size and its servicing have been done on the groups of developing countries or on individual countries belonging to these groups. The concept of debt overhang was introduced by Krugman (1988) which explain potential limitation of high foreign debt on the economic growth. The debt crisis can be the main reason for the growth collapse because high levels of debt create pressures on consumption in the future due to the return of debt and interest payments and also may affect the investment attractiveness of the country, both for local and foreign investors. Sachs (1989) indicates that the foreign debt imposes a disincentive to investment and growth in the debtor economies because parts of the returns to investment are taken away from the domestic economy in the form of payments to foreign creditors. Karagöl (2004) pointed that high external debt is not necessarily restrictive to country's economic growth and the effects depend on its efficiency. The problem arises when a country is unable to service its obligations, mainly due to insufficient revenues generated by exports of goods and services. Thus, the high debt of the countries that achieved high export growth and balanced foreign trade is not problematic. However, when countries have high current account deficits and at the same time a high level of indebtedness, such situation may lead to potential problems with the repayment of loan rates. It is particularly important for the developing countries to borrow rationally and to invest these funds in new production and employment.

The aim of this chapter is to: compare European "South" (PIIGS countries vs. SEE countries); research the effects of the global economic crisis on the countries of Southeast Europe, with a special emphasis on the level and sustainability of their foreign debt. The level and dynamics of foreign indebtedness depend on the current account deficits that are the main common feature of SEE countries. Based on the failure of key economic policies of PIIGS countries, the possible existence of similar indicators in the SEE countries is analyzed. The econometric methods (panel data analysis) are used to quantify the impact of different economic variables on the level of indebtedness. The chapter consists of five sections. The literature overview is given in the section 13.2. Section 13.3 analyses the characteristics of SEE countries and compare them with the PIIGS countries. Research is done in the section 13.4 and conclusion in the section 13.5.

13.2 Literature overview

There are many reasons (causes) for the crisis in Europe such as: structural difference between the countries of euro area, common monetary policy and different monetary transmission mechanism, faster development of financial integration than financial supervision (Boone 2009). Allevanda and Hardiman (2010) warn about the mistakes of internal policies of the countries of the European periphery, as well as about the external, European context of the chain of events. Introducing the euro stimulated credit activity and fiscal expansion, while the coordination capacities were very weak. The escalation of crisis in some Euro area countries points to a number of unresolved difficulties at the heart of European policies.

Global financial crisis has contributed to an increase of external debt because the SEE countries, as the other European countries, has been helping the economic recovery, rescuing banks and companies, which significantly affected the amount of their budget deficits and increasing public debt. It is therefore important to investigate the characteristics of their economies and the impact of the global economic crisis on the level of their indebtedness.

The researches of the external debt indicators in Europe was done on individual or a group of Central and Eastern Europe countries while the analysis of debt in the SEE region are very rare. From this group of countries only Croatia is included in the analysis with other CEE countries, and also it was analysed individually (Babić *et al.* 2003, Mihaljek 2003, Kersan-Škabić and Mihovilović 2004, Šonje 2007, Galinec 2007; Krtalić and Benazić, 2008, Andrijević-Matovac and Jošić 2010). The comparison of debt indicators with the CEE countries has found that: Croatia is the most indebted country- it has the highest external debt-to-GDP ratio, high foreign debt per capita, excessive share of external debt in income from exports and imports, and is exposed to the risk of inability to service its external debt. Further growth of external debt at its present pace must not be allowed.

Manzocchi (1997) stressed the importance and positive impact of foreign capital in the process of transition due to insufficient domestic savings. He analyzed the determinants of external borrowing of CEE countries and found out that fiscal imbalances creates a saving-investment imbalance that is financed through foreign credit; stock of foreign debt and the export growth rate positively influenced on the new borrowing and these three variables can explain a half of the variability of net foreign borrowing.

Vlahinić-Dizdarević *et al.* (2006) analyzed the macroeconomic situation in the SEE countries and pointed out the problem of current account deficits and the indicators of the stock and flow of foreign debt. They conclude that Croatia, Bulgaria, Serbia and Montenegro have the worst indicators and belong to the group of severely indebted economies.

Laušev *et al.* (2011) have applied panel logit models to a set of macroeconomic, financial and political variables to assess the debt rescheduling probabilities of 15 Eastern European countries during the transition period (1990-2005). Their findings suggest the need to reduce government expenditure, attract FDI, increase export revenues and keeping a good repayment record result in low debt rescheduling probabilities.

Cocozza *et al.* (2011) researched the reflection of global economic crisis on the SEE economies and they found out that SEE countries are applying very similar pattern of strong capital inflows and robust growth, but also emphasized a key difference in macroeconomic policies i.e. some countries adopted expansionary (and procyclical) fiscal policies. It increases external vulnerabilities and compromised the ability to discretionarily use the fiscal instrument in a countercyclical fashion.

Jurcic *et al.* (2012) using VAR methodology has researched the interdependence between the factors which led to a sharp increase of foreign debt in Croatia and find out the causal relationship in the direction from budget and merchandise trade deficit to gross external debt.

13.3 The characteristics of the Southeast Europe

Do SEE countries have a problem with excessive indebtedness? What is the situation in their current account and how do the financial crisis and slowing economic activities affect the possibility of

achieving equilibrium in the balance of payments? Could they face a debt crisis and the devaluation of national currencies?

The SEE region is interesting for several reasons.[57] These countries are undergoing their transition processes whose integral part refers to the progressive liberalization of trade and investment flows. Foreign capital is a necessary foundation for the development of scarce resources of domestic savings and underdeveloped domestic financial market. However, it is at the same time sensitive to external and internal shocks. The external ones refer to the recession abroad, the financial system in crisis abroad causing capital to become more expensive and less available. The internal shocks are the result of inadequate management of economic policies within individual countries, which can result in low or negative rates of GDP growth, high inflation, excessive consumption, high trade and budget deficits, etc.[58] Both reasons lead to the withdrawal of a part of the capital or a reduced inflow of the capital. Then the investment cycle in the countries that have based their development on foreign capital comes to a halt. The loss of confidence of foreign investors caused the Asian crisis (1997), the Argentine crisis (2002), so it's only logical to wonder whether the SEE countries should fear a debt or a currency crisis. Due to their association with the EU member states and a high level of investments that arrived to these countries mostly from the EU, it is realistic to expect that they are faced with the lack of capital that causes the economic growth to slow down. The Western Balkan countries have started to feel the impact of the crisis through the trade and financial transmission channels. The countries that have strong trade and investment relation with the EU were affected earlier and the effect has been more pronounced.

Although the countries of the region experienced relatively high growth rates during the 2000s until the global economic crisis, their GDP per capita is still low when compared to the EU.[59] Croatia has reached a level of 60% of the EU average, which represents the highest GDP per capita in the region. Even Romania and Bulgaria as the EU members recorded a lower GDP per capita than Croatia. At the same time, the PIIGS countries have a much greater degree of convergence with the EU, including Ireland which in 2011 recorded GDP per capita which was 28% higher than the EU-27 average, while Italy and Spain have the average GDP per capita, and Greece and Portugal have GDP per capita at 90 or 80% of the average GDP. The accelerator of high growth rate was spending (public and personal), financed through borrowing on the international and domestic markets. The largest contribution to growth is provided by services, especially financial intermediation, telecommunications, transportation and trade (in Croatia and Montenegro even tourism). All of these sectors began to develop strongly with the liberalization of trade and investment flows and foreign capital has had a significant role in this development. The industrial production in the region has been volatile, so that the investments in the manufacturing sector have not had a key role in initiating the growth of the countries of Southeast Europe. According to the newest forecasts by European Commission

[57] Greece, as the member of the EU and the euro area, geographically belongs to this region and it experienced the greatest crisis of all EU member states. In this area there are Romania and Bulgaria as the two least developed EU member states that since their accession to the EU in 2007 have been placed under special surveillance mechanism due to certain problems that remain insoluble in these countries. Other countries of the SEE region that are not EU members have the ambition to become its members (i.e.all the countries of the region are candidates or potential candidates for EU membership).

[58] Internal reasons may be of political nature: political instability, frequent changes of legislation, ethnic conflicts, etc.

[59] The growth is boosted both domestic consumption and investments. Domestic credit growth was very rapid as a result of restructuring of banking sector in ownership of reputable foreign financial institutions and access to financial market until 2008 improved significantly. (European Commission, 2009)

(European Commission, 2012) the euro area will have negative growth -0.3% in 2012, and the EU zero growth. For PIIGS predictions are: Greece -4.4%, Spain -1.0%, Italy -1.3%, Portugal -3.3%, Ireland 0.5%.

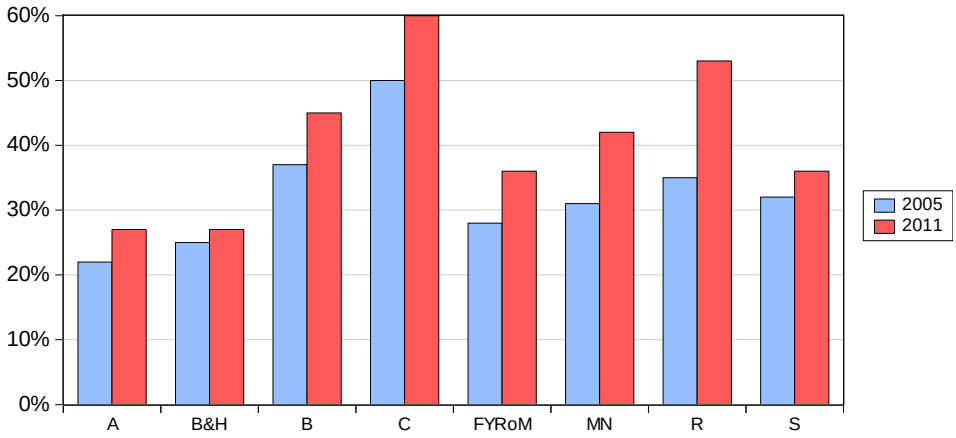

Figure 13.1 GDP per capita of Southeast European countries (EU-27 = 100)

Source: Gligorov, V. et.al. (2012), New Divide(s) in Europe?, Current Analyses and Forecasts, Economics Prospects for Central, East and Southeast Europe, WIIW, No. 9; Eurostat (2012), GDP per capita in PPS, http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tec00114

Considering the characteristics of the EU as well as potential future members, Gligorov *et al.* (2012) discusses about a possible new divide in Europe which will be build-up of external imbalances prior to the crisis. Table 13.1 provides a comparison of selected economic indicators of PIIGS and SEE countries.

Table 13.1 Selected economic indicators for PIIGS and SEE countries

	Inflation (CPI in %)		Unemployment (in %)		Public debt (in % of GDP)		Budget balance (in % of GDP)		Current account (in % of GDP)		Gross external debt (in % of GDP)	
	2007	2011	2007	2011	2007	2011	2007	2011	2007	2011	2007	2011
Portugal	2.4	3.6	4.6	12.9	68.3	101.6	-3.2	-5.8	-10.1	-7.6	194.1	220.9
Ireland	2.9	1.2	3.9	14.4	24.8	108.1	0.1	-10.3	-5.3	-0.6	810.9	1071.0
Italy	2.0	2.9	9.0	8.4	103.1	120.5	-1.6	-4.0	-2.4	-3.9	111.4	116.5
Spain	2.8	3.1	10.5	21.7	36.2	69.6	1.9	-6.6	-10.0	-4.1	148.5	164.9
Greece	3.0	3.1	10.7	17.7	107.4	162.8	-6.8	-8.9	-14.6	-9.3	138.5	185.9
Albania	2.9	3.5	13.5	14.0	53.9	60.0	-3.5	-5.0	-10.5	-14.1	28.4	46.8
Bosnia and Herzegovina	1.5	3.7	29.0	27.6	29.7	39.0	1.2	-2.5	-10.7	-8.6	18.1	25.5
Bulgaria	8.4	3.4	6.9	11.2	17.2	17.1	1.2	-2	-25.2	1.9	94.3	91.0
Croatia	3.4	2.3	9.6	13.5	32.9	43.9	-2.4	-5.0	-7.2	0.0	77.7	100.7
FYRoM	34.9	3.9	34.9	31.0	32.3	35.0	0.6	-2.5	-7.1	-5.5	47.6	64.7
Montenegro	4.2	3.1	19.3	20.0	27.5	44.0	6.7	-3.0	-40.2	-16.7	17.2	30.0
Romania	4.8	5.8	6.4	7.3	12.8	32.0	-2.9	-4.5	-13.4	-4.2	47.0	72.9
Serbia	7.0	11.0	18.8	23.0	30.9	45.0	-2.0	-5.0	-17.7	-7.5	60.2	72.7

Source: Eurostat (2012), Main tables, http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/ and Gligorov, *et al.* (2012), New Divide(s) in Europe?, Current Analyses and Forecasts, Economics Prospects for Central, East and Southeast Europe, WIIW, No. 9.

It is obvious that the PIIGS countries have much higher levels of total external debt, but also of public debt in GDP, than the SEE countries. Both groups of countries had an increase in external debt in 2011 when compared to 2007 when the global financial crisis began. Their common features are the current account deficits, and the highest one was recorded in Montenegro, while Ireland and Greece had the highest budget deficits in 2011[60]. The unemployment rates are also rising, in the PIIGS group Spain has the highest unemployment rate, and in the group of the countries of Southeast Europe Macedonia. SEE countries have very high trade deficits which reflect a very small export base and unfavorable competitiveness. These countries rely on major transfers in the form of remittances from their nationals living and working abroad and thus partly offsetting the high trade deficits.

Table 13.2 Indicators of indebtedness for Southeast European countries

		ED/export (%)	Debt service/export in %)	Short-term to external debt stocks (%)	Multilateral to external debt stocks (%)	Reserves to external debt stocks (%)	Reserves to imports (months)
Albania	2000	130.5	3.4	3.4	39.8	60.4	5.1
	2005	100.3	3.9	7.5	42.3	70.1	4.4
	2010	113.6	11.1	12.1	32.1	53.6	4.5
Bosnia and Herzegovina	2000	123.4	14.2	1.8	45.6	17.9	1.4
	2005	147.2	6.8	13.5	27.5	40.9	3.8
	2010	124.0	19.9	12.3	23.6	51.8	5.2
Bulgaria	2000	153.2	17.7	12.9	13.8	31.3	5.1
	2005	88.8	22.4	28.3	15.7	55.4	4.7
	2010	169.5	14.2	32.0	4.8	35.8	6.7
Croatia	2000	130.2	26.2	30.8	19.9	30.8	5.3
	2005	170.2	25.0	13.2	12.5	28.9	5.1
	2010	262.4	41.9	12.8	9.4	23.3	7.2
FYRoM	2000	87.5	8.2	3.7	38.8	31.3	2.3
	2005	11.9	10.3	26.9	30.8	45.1	4.2
	2010	131.8	15.2	35.4	19.2	39.2	4.2
Montenegro	2000	…	…	…	…	…	…
	2005	…	…	…	…	…	…
	2010	92.5	5.9	12.0	35.8	35.8	2.3
Romania	2000	89.7	20.1	6.8	30.1	30.4	2.8
	2005	113.1	20.1	19.1	14.4	55.6	5.5
	2010	204.7	31.2	20.6	11.0	39.5	8.2
Serbia	2000	…	…	39.6	12.5	4.5	…
	2005	…	…	13.9	22.1	36.3	…
	2010	231.3	30.9	8.7	15.0	41.3	7.5

Source: World Bank (2012), Global Development Finance: Summary and Country Tables, http://data.worldbank.org/data-catalog/gdf-tables

Unemployment in SEE is result of structural imbalances, loss of competitiveness, changing of some industrial production and insufficient labor market efficiency. There is also a high level of "grey" economy so the real unemployment rate is not as high as statistics show.

Table 13.2 shows the selected external debt indicators of the countries of Southeast Europe. We already noticed from the previous analysis that the countries of the region are not faced with excessive foreign indebtedness. The level of external debt in GDP higher than 80% of GDP (which is considered to be the limit when the country is becoming over-indebted) can be seen only in Croatia

[60] The current account deficit is a consequence of growing demand in the SEE that resulted in higher increase of import than export. These countries have not been recovered from the breakdown of former Yugoslav and loss of former market and **their** production structure is not sufficiently adapted to the requirements of the developed Western markets.

and Bulgaria, while Romania and Serbia are approaching the critical level fast. Croatia, Romania and Serbia have a share of external debt in exports of over 200%, which is considered a threat to the liquidity of the country (when the indicator exceeds 200%). The problem in servicing external debt also exists when the debt service/export ratio is more than 20%, and this is the case only in Croatia, Romania and Serbia. There are significant differences even in the structure of debt, so that the PIIGS countries have a high share of public debt in GDP (from 70% in Spain to 163% in Greece), while the share of public debt in the SEE countries is lower (from 17% in Bulgaria to 60% in Albania). The criteria of the value of reserves suggests that the foreign exchange reserves are sufficient if they cover the amount of three months of imports, which shows that all the analyzed countries except Montenegro have a sufficient level of foreign exchange reserves. In the period from 2000 until 2011, in all the countries, the share of short-term debt in total debt increased, and in most countries the reduction of multilateral debt can be seen. The growth of short-term debts affects the vulnerability of economy in the situation when investors change the country's risk perception. Based on the analyzed indicators it can be concluded that most SEE countries are not over-indebted.

13.4 Research

13.4.1 Methodology

There are many indicators that can influence on the indebtedness. The impact of the financial crisis on the movement of foreign debt will be carried out using the basic indicators of the internal and external balance. Indicators of external balance are the current account deficit, the FDI inflows and occurrence of crisis and an indicator of internal balance is budget deficit. All variables are expressed in percentage in GDP. The choice of variables is result of the analysis of macroeconomic indicators where we found out that external imbalance can have an important role in influencing on the debt increase.

Budget deficit is a measure of domestic fiscal discipline and can be threatened as indicators of internal balance of public sector. The budget deficit is the result of higher public spending than the budgetary revenue and positively affects the level of external debt since the government borrows in the domestic and international markets. We expect the positive influence of budget deficit on external debt.

If the current account deficit is financed by FDI inflows and if the country's net external position does not change, then the current account deficit does not lead to the increase of external debt. However, the current account deficit will have stronger and more negative implications in the situation of a reduced inflow of foreign capital. This is precisely what happens in the situation of crisis when countries still record current account deficits, and the inflow of foreign investments is significantly reduced. Therefore, a positive correlation between the increase in CA and external debt is expected. Countries obtain the funds necessary for investments either by borrowing abroad or through FDI. If the country is attractive and receives a lot of FDI, there will be less need for foreign borrowing, this is why we expect a negative correlation between these two variables.

The crisis was included as a dummy variable and is expected to have a positive effect on foreign debt, i.e. the countries resorted to higher borrowing during the crisis in 2008, 2009 and 2010.

It is customary to take foreign exchange rate as a determinant of external indebtedness, but most countries in the region have some form of fixed exchange rates and because of this it cannot be expected impact of exchange rate to foreign debt.[61] Gligorov *et al.* (2012) found out that real exchange rate developments had little or no impact in reaching external equilibrium or even went in an unexpected direction. It will be also desirable to look at the data of credit ratings (Moody's and Standard and Poor's) or the interest rate spread between domestic bonds and bonds of selected countries that are not experiencing problems (e.g. Germany or USA). This differential shows the cost of refinancing governments on the market. Countries with higher risks face higher costs of financing the budget deficit. The problem is in unavailability of long term data for the SEE countries.

The dataset regards the period 2001-2010 for eight SEE countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, (FYRo) Macedonia, Montenegro, Romania and Serbia. Data sources are: Eurostat and The Vienna Institute for International Economic Studies (WIIW).

Considering that the sample has a cross-sectional dimension, represented by countries (i = 1; : : : ;N) and a longitudinal dimension, represented by a time series (t = 1; : : : ; T periods) panel data method will be used (Hsiao, 2003). The sample comprises an unbalanced panel, i.e., there are some time periods missing for some units in the population of interest.

The relationship between external debt and its determinants is as follows:

$$Extdebt/GDP_{it} = \alpha + \beta_1 Budgdef_{it} + \beta 2FDI/GDP_{it} + Cadef_{it} + dummy\ crisis_{it} + \varepsilon_{it} \quad i=1...N;\ t=1...T$$

Where dependent variable is the share of external debt in GDP and independent variables are budget deficit, FDI, current account deficit all expressed as a share of GDP and dummy crisis taking the value of 1 in 2008 marking the beginning of financial and economic crisis.

Traditionally, panel data models are estimated by the following methods: pooled OLS (POLS), random effects (RE) and fixed effects (FE). In cases when strict exogeneity cannot be verified, alternative models are necessary to deal with possible problems of simultaneity and reverse causality (Baum et al, 1995). Arellano and Bond (1991) have proposed a dynamic panel General Method of Moments (GMM) estimator which is an IV estimator that uses all past values of endogenous regressors as well as current values of strictly exogenous regressors as instruments (Roodman, 2009; Blundell and Bond, 1998).

13.4.2 Results

The model was first estimated using fixed and random effects to account for unobserved heterogeneity. From Table 13.3 specification testing for effects versus OLS (LM and Likelihood ratio test) indicates that the effect models, fixed (FE) and random effects (RE) are preferable to OLS. The result of the Hausman test indicates that regressors are uncorrelated with random error and that not just FE, but also RE, is consistent and could be used for estimation. The estimated coefficients are similar, but the significance between the two models is different. In FE estimation, only budget deficit

[61] Montenegro has implemented a full scale euroization, Bosnia and Herzegovina and Bulgaria apply currency board systems, Macedonia and Croatia have adopted a managed floating regime but the changes in exchange rates have been slight, so the exchange rates act as fixed; Romania applies flexible exchange rate system.

and dummy crisis appear to influence external debt. However, in RE estimation the current account deficit further influence the rising external debt of the analyzed countries.

Table 13.3 Fixed vs. random estimation

EXTDEBT/GDP	Fixed effect	Random effect
Budgdef	1.904926 (1.99)	1.89118 (2.01)
Cadef	0.650294 (1.46)	0.820038 (1.90)
FDI in GDP	0.206588 (0.42)	0.182805 (0.38)
Dummy crisis	9.266276 (1.96)	8.870195 (1.90)
No. of obs.	74	74
LR test	16,01 (p-value=0,00)	
LM test		87.31 (p-value=0,00)
Hausman		3.19 (p-value=0,52)

Source: author's calculation.

To test the assumption of strict exogeneity of regressors and ensure that the estimation by random and fixed effects is valid, tests of strict exogeneity as proposed by Wooldridge (2002) were applied. The test suggest the rejection of the null hypothesis of strictly exogenous regressors (at 10% significance level), indicating the need of an estimation method that appropriately addresses the problem of endogenous independent variables. Furthermore, FE estimation is subject to autocorrelation which indicate that there are missing dynamics from the model. Since omitted dynamics are absorbed in the error term, it is likely that static model will be miss-specified with biased standard errors and inconsistent coefficients, which may results in misleading and unreliable economic interpretation. Hence, we proceed with the estimation of a dynamic panel model using GMM dynamic panel estimator.

The motivation for dynamic panel is to overcome the above mentioned limitations of static panel analysis. Other advantages of GMM are that distributional assumptions, such as normality and homoscedasticity, are not required and that it enables us to control for unobserved heterogeneity of the same individuals over time.

Fisher unit root test for unbalanced panel data, as proposed by Maddala and Wu (1999), were employed to test the null hypothesis that all variables in the cross sectional dimension are not stationary. This is necessary in order to decide between difference and system GMM.

Table 13.4 provides the result of unit root test for each variable in the model. The results using Chi-square statistics point that all variables except FDI contain unit root. Thus, the use of System GMM is warranted.

We used xtabond2 command in STATA developed by Roodman (2009). Here, we provide only the result of the preferred model obtained by introducing one lag of dependent variable, and max number of lags for endogenous variable, in our case budget deficit. Other regressors are treated as exogenous.[62]

[62] Other estimation including GDP growth as endogenous variable were also run, but the model failed to satisfy instrument validity.

Table 13.4 Panel Unit Root Test - Fisher

	budgetdeficit	cadeficit	extdebt	FDI in GDP
ADF	13.2832	13.7068	21.1905	27.48

Source: author's calculation.

The diagnostic test Diagnostic tests of the model 1 reported at the end of the table pointed out in favour of the hypothesis of proper identification: m1 statistics, which measure the first order autocorrelation, are negative and significant and the m2 statistics, which measure the second-order autocorrelation, are not significant. Moreover, the null hypothesis of Sargan test could not be rejected. This means that the instruments used are not correlated with the errors and can be used in the model.

Table 13.5 Dynamic panel estimation

EXTDEBT /GDP	System GMM
Lag extdebt/GDP	0.8554463 (14.57)
budgdef	-0.2289153 (-0.35)
cadef	0.5485791 (1.87)
FDI in GDP	0.6630776 (2.10)
Dummy crisis	6.901343 (1.96)
No. of obs.	67
No. of instruments	59
m1	-2.89 (0.00)
m2	-0.75 (0.45)
Sargan test	65.72 (0.11)
DIF Sargan	12.43 (0.71)

Source: author's calculation.

The lagged dependent variable is highly significant and positive indicating that the effect of history on current external debt is persistent. Budget deficit, changed the sign and significance level in dynamic estimation. It seems that budget deficit is not the main determinant of external debt in South East Europe and it is also the case in the USA (IMF, 2011). On the other hand, current account deficit has statistically positive coefficient together with FDI. This indicates that lack of competitiveness on international markets and foreign investors are the main generator of external debt. Given recent financial and economic crisis, countries have faced severe contraction in economic activity, and thus the need for external financing is even more accentuated to cover persistent deficits as indicated by positive and significant dummy crisis. What is surprising is the positive coefficient of FDI which at least in theory should reduce the demand for external borrowing. It seems that FDI which largely went to financial sector and trade generated external debt in order to finance its investment, i.e. credit expansion in the host country.

In order to check the validity of the coefficient on the lagged dependent variable, the checking procedure suggested by Bond is conducted. As presented by Roodman (2009) OLS regression with the lagged dependent variable is likely to be positively correlated with the error, biasing its coefficient estimate upward, while FE regression with lagged dependent variable is likely to biased its coefficient

downward. Good estimates of the true parameter should therefore lie in or near the range between these values (0.85 and 0.54). These bounds provide a useful check on results from theoretically superior estimators. The coefficient on lagged dependent variable from the preferred dynamic model is 0.85, which is in the robustness checking range.

13.5 Conclusion

The SEE countries during the transition were faced with insufficient domestic savings and domestic capital to promote economic activities. At the same time they started to liberalize their trade and financial flows, increase competition in domestic market and foreign direct investments started to flows in a privatization of domestic firms and, rarely, in establishing new firms. In a period of strong economic growth on a global scale there was a possibility of cheap borrowing on international financial markets. The situation has changed during and after the global financial crisis, when capital has become scarce and expensive.

The SEE countries are in a way similar to countries - EU member states - that have also passed the transition process or the countries that based their growth on consumption and FDI inflows. But the SEE countries have attracted relatively modest amounts of FDI (in per capita terms) because they began to open their economies later (compared with CEE). Also, although they were borrowing, external debt in most countries is not too high. Regarding the debt stock and flow indicators, debt problems could arise in Croatia, Serbia, Bulgaria and Romania.

Econometric analysis showed that the level of debt is positively affects by the accumulated debt, FDI inflows, the CA deficit and the appearance of crisis. Given that these countries do not have high budget deficits, the deficit was not proved to be statistically significant variable in the determination of external debt.

Unexpectedly, the FDI inflow leads to a rise of external debt. It is a result of the structure of FDI in these countries that is oriented to service sector which stimulates consumption and import. Although the SEE countries belongs to the "south" they are not at risk of debt crises like some of the PIIGS countries because they have significantly lower share of the public debt in total debt, but the conditions of borrowing for this countries were worse even before the crisis (higher interest rates in relation to the EU) which is now positive because otherwise they would be higher exposed to greater inability to service its debts. These findings confirm the hypothesis that too early and rapid liberalization of trade and financial flows lead to external imbalances that may become a burden on future development of the SEE countries.

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Chapter 14

MAIN SOURCES OF FINANCE FOR DEVELOPMENT: RETROSPECTIVE VIEW ON THE EVOLUTION OF PRE-CRISIS IDEAS

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MAIN SOURCES OF FINANCE FOR DEVELOPMENT: RETROSPECTIVE VIEW ON THE EVOLUTION OF PRE-CRISIS IDEAS

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Abstract

The chapter provides the overview of the ideas on the sources of finance for development which were widely discussed by international community before the crisis in order to achieve the Millennium Development Goals. This set of ideas remains the starting point for further discussion on the issue and political action in the post-crisis world.

Keywords: development, finance, millennium development goals.

14.1 Introduction

Recent years were marked by growing attention to the role of finance in the process of economic development. The topic is not new by itself and could be traced back to Marx (1954: ch. 24), Schumpeter (1983) and Hicks (1969) with relation to the formation and development of the capitalist market economy. The modern research and relevant policy debate provide further insight into multifaceted issue of development finance primarily in such two important areas as interrelationships between financial systems development and economic growth and the available sources of finance for development in the modern globalizing world.

The present essay focuses on the second aspect of the research and policy debate – the range of sources of development finance. The United Nations Millennium Declaration opened the new horizons in the efforts of international community to alleviate poverty and speed up the economic, social and human development in the third world (United Nations (2000)). It set out the number of certain goals which should be achieved within the predetermined time period. In 2003 the set of concrete indicators was agreed in order to monitor the progress towards Millennium Development Goals (MDG) (United Nations (2003)). Such ambitious development policy goals raise the question of the relevant financing mechanisms for their practical implementation. In accordance with the rough estimates of High Level Panel chaired by Mr. Ernesto Zedillo in 2001 the additional resources needed to meet the Millennium Development Goals only in the form of official development assistance amount to $50 billion per year in comparison with the level achieved at the turn of the millennium (Zedillo el al. (2001)). This caused subsequent important political debate and different initiatives in the area of financing the progress towards MDG.

The essay further proceeds as follows. In part 2 we will examine the domestic sources of finance and evaluate their potential impact on the development processes in the third world and transition economies. In part 3 we will turn to the external sources of financing and discuss some new

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financial initiatives which were put forward at the turn of the millennium to support the Millennium Development Goals. Finally, conclusion will provide the summary of major findings from our review of the issue.

14.2 Domestic sources of finance

As pointed out in Zedillo el al. (2001: 4): "The primary responsibility for achieving growth and equitable development lies with the developing countries themselves. This responsibility includes creating the conditions that make it possible to secure the needed financial resources for investment. It is the actions of domestic policymakers that largely determine the state of governance, macroeconomic and microeconomic policies, the public finances, the condition of the financial system, and other basic elements of a country's economic environment". Although the conditions listed in this citation are important for funding from both domestic and foreign sources we may state that it's worth to exploit efficiently the domestic financing sources to the most possible extent. This was again stressed in the Monterrey Consensus which formulated the political agenda on financing for development (United Nations (2002)). But what factors affect the saving behavior in the developing countries?

The third world has relatively low income per capita level and this circumstance requires paying special attention to creation of the favorable conditions for saving by economic agents (households, businesses and governments) and subsequent transfer of funds to private and public investors for capital formation and infrastructure development. In addition there are significant differences among the third world countries that also affect saving behavior.

Schmidt-Hebbel and Serven (1995) and Edwards (1995) provided thorough overview of the saving behavior in the world which allows drawing important policy implications for the third world as well. The major findings revealed the following important economic interrelationships:

- positive correlation between saving rate and income per capita level across countries[64];
- positive correlation between saving rate and growth rate across countries;
- positive correlation between domestic saving rate and investment rate across countries;
- absence of significant link between saving rate and income inequality.

These conclusions clearly indicate that the process of economic development is associated with the increase in the national saving rate (though the causal interrelationships might be more complicated at different stages) and therefore the domestic sources of finance matters for the development process.

Reinhart and Talvi (1998) provided in their study of the interrelationships between domestic and foreign savings (capital inflows) the literature review which outlined major factors which impact the saving rates in the developing countries. These factors (based on the reduced-form saving equations) include demographic factors, level of financial deepening, GDP per capita growth, foreign saving (capital inflows) and some others. The authors pointed out that trend saving rates in Asia were significantly higher than those in Latin America due to the greater financial deepening in the former than in the latter (it is worth to note that available empirical evidence doesn't show any difference in

[64] This link is not valid for countries with the high income per capita level that is those which are at the high stage of economic development.

household preferences in intertemporal consumption between Asia and Latin America![65]). Another important observation is that the economic growth spurs domestic savings and not vice versa – this is important limitation for development policy.

The only notable exception in the Latin America is the Chilean economy where the saving ratio amounted to 24-26% of GDP and this experience is analyzed in detail in Murande (1998). The study reveals number of interrelationships but from the policy perspective we would single out the importance of social security reform and the establishment of pension funds system in 1981 which turned out to affect positively the saving rate. This confirms that more developed and deep financial system helps to mobilize domestic financial resources.

The group of poorest countries is characterized by its own features in saving behavior and some important insights from the relevant empirical literature are provided in Rosenzweig (2001). The economic environment in such countries combines *low and highly volatile incomes* with the *absence of complete insurance and credit markets* which leads to the situation when savings are made mainly for smoothing consumption in the short run under income volatility and liquidity constrains while the anticipated life-cycle savings are simply not feasible (the so-called "precautionary" savings). At the same time it's necessary to point out that microfinance activities in the third world give additional opportunities for saving by the poor and therefore additional opportunities for mobilization of domestic financial resources.[66]

The domestic sources however have their limits for the process of economic development. First, it's difficult to finance "the take-off" via only domestic sources since they are extremely limited at this stage (or nearly absent in the case of the poorest countries). Second, the relatively low income per capita poses certain limits on the voluntary private savings. Third, there is some empirical evidence for the long historical periods that the absence of the access to the global capital markets have adverse effect for the economic development of the countries in the periphery of the world economy (Taylor (1998)).

14.3 External sources of finance

As was already mentioned the present political agenda for the financing of development in order to achieve the Millennium Development Goals was set by the International Conference on Financing for Development in Monterrey in 2002 (United Nations (2002)). The Monterrey Consensus includes important statements on the external financing issues for the developing countries. For the purposes of our analysis the external sources of finance could be broadly split into following groups: international private income and capital flows, official development assistance and sustainable official external debt financing and debt relief for developing countries. We will proceed further with the review of the above mentioned three groups.

[65] The exception is the group of poorest countries where the income is near the subsistence level and the savings are not responsive to interest rates.

[66] One concrete example of saving process in combination with lending process under community group schemes in Thailand is described in Boonyabancha (2001). The general overview of microfinance could be found in: Arun and Hulme (2005)

14.3.1 International private income and capital flows

Net financial flows from the private sector to the developing world and transition countries in 2004 amounted to $ 192 billion in equity (2.7% of GDP) and $ 109 billion in debt (1.4% of GDP). The data shows that equity flows have much more stable character than debt flows (World Bank (2005: 16)).

Foreign direct investment (FDI) is one of the most important components of private financial flows. The clear advantages of this financing form include that it doesn't increase the debt burden of the developing countries; it contributes to capital formation in the recipient countries and subsequent income and tax generation; it has such complimentary benefits as entrepreneurship, management and technology which are brought to the recipient countries by the parent companies; and they are not subject to rapid inflow and sudden outflow in times of financial crises.

However the FDI is the private sector phenomenon and they are impacted by the economic criteria of the private business. Therefore it's not easily accessible by all parts of the developing world and less of all by the poorest countries and regions. In accordance with the World Bank data the net FDI inflow to developing and transition countries in 2004 of $ 165.5 billion had the following split among the regions: East Asia and Pacific - 63.6; Latin America and Caribbean - 42.4; Eastern Europe and Central Asia - 37.6; Sub-Saharan Africa - 11.3; South Asia - 6.5; Middle East and North Africa - 4.1. The percentage structure among regions is as follows:

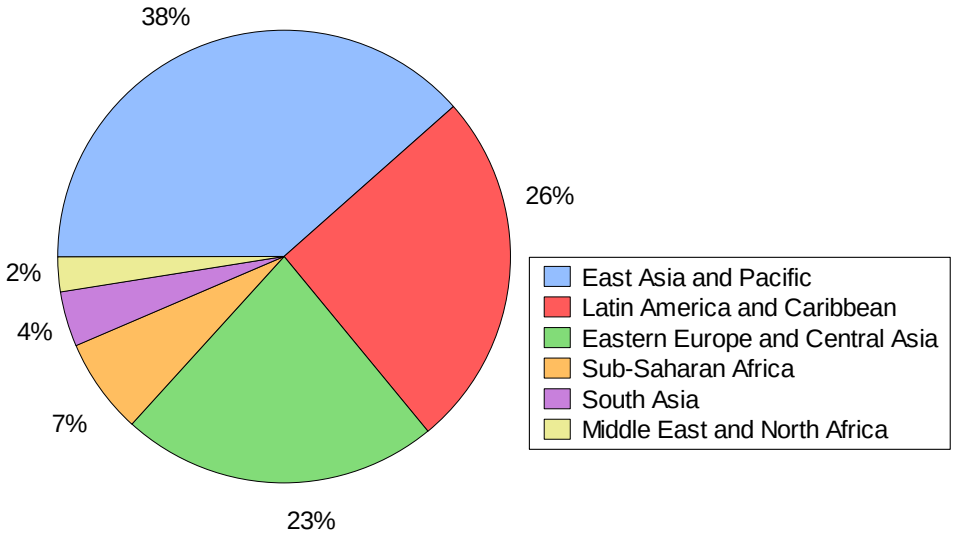

Figure 14.1 FDI Regional structure (%)

It's quite obvious that from the purpose of the poverty reduction task this form of foreign financing has certain limitations. The same limitations may be also attributed to *foreign portfolio investment* and different forms of *foreign private borrowing*[67] (these forms are also subject to additional disadvantage related to rapid flight in the time of financial distress).

At the same time the new phenomenon emerges relating to financial interdependence between the developing and transition countries themselves. In the fast growing developing and transition countries their own businesses start to export capital in search of business opportunities

[67] In the balance of payments statistics this refers to other investment within the capital account.

abroad (this is the case for Brazil, China, India, Malaysia, Mexico, South Africa and the Russian Federation) (World Bank (2005: 16-17; 98-99)). Therefore the richer and faster growing developing and transition countries become the source of FDI for the less developed countries (for example the bulk of FDI to Mongolia originates from China and Russia).

In order to attract the private capital flows the recipient countries need to follow certain rules which are transparent and clear to multinational businesses. They include the rule of law and proper contract enforcement, respect for the property rights, stable regulatory framework, internationally recognized accounting standards and sound macroeconomic policy. Certain efforts are required from the donor countries as well. These efforts include different forms of export promotion, risk guarantees for investment (United Nations (2002: 5-6)).

Remittances to developing and transition countries became an important part of available financing in recent decades which in 2004 is estimated at $ 125.8 billion. This form of financing also doesn't contribute to the debt burden of developing countries; it's more accessible to different parts of the third world and it have clear positive effect on the poverty reduction within its recipients (from 2001 to 2004 the share of low-income countries in total sum of remittances rose from 28% to 35% and remittances amounted to more than 5% of GDP in poor countries) (World Bank (2005:28-29: 95).

But remittances are by their nature the current income and so its effect on capital formation and subsequent wealth generation and economic development is not straightforward since it depends of its split between consumption and saving. The transfer of remittances to the recipients is still associated with substantial cost and since bulk of it is made via informal channels it's not easy meat for the taxmen in the developing countries[68].

Securitization of future private flows (primarily remittances in case of poor countries) represents the innovative financing vehicle which is available for developing countries (World Bank (2005: 108). This financing mechanism uses the offshore collection account which is under management by a trustee as a security for borrowing by local banks. The funds due to the local bank are channeled to this account from which the principal and interest are paid to the creditors (bondholders or commercial lenders) and the residual funds are transferred to the local bank. The proper structuring of the borrowing arrangements allows to exclude the convertibility risk and the default risk by the local financial institution and therefore to get better credit rating and cheaper financing. This financing mechanism allowed El Salvador, Mexico and Turkey to raise nearly $ 2, 3 billion in the period 1994-2000.

14.3.2 Official development assistance (ODA)

Official development assistance plays extremely important role especially for the poorest countries in the development world. "… ODA is defined by the Development Assistance Committee (DAC) of the Organization for Economic Cooperation and Development (OECD) as aid grants and concessional loans made by donor governments and multilateral agencies for the purpose of promoting economic development and welfare." (World Bank (2005: 22)). It's considered by the World Bank to be the most reliable measure of the resources available for development financing. The Monterrey Consensus includes the appeal to the rich industrialized countries to allocate 0.7% of GNP

[68] The interrelationships between remittances, financial development and growth are discussed in Giuliano and Ruiz-Arranze (2005)

to ODA to developing countries and 0,15-0,2% of GNP to least developed countries as development assistance (United Nations (2003: 9-10)). With respect to this declaration donor countries set their own targets to achieve the goal. Thus members of the European Union set the target to increase ODA from 0.35% of their GNI in 2003 to 0.39% in 2006 (World Bank (2005: 24)). In 2003 the ODA reached the sum total of $ 69 billion (of which $ 49.9 billion was provided by G7 countries and $ 19.1 billion by other donor countries; $ 49.8 billion was provided on bilateral basis and $ 19,2 billion on the multilateral basis), the nominal increase by 18% on y-o-y basis means 5% in real terms. ODA represent approximately 1% of the GDP of the recipient developing countries and 2% of GDP for the poorest recipient countries (World Bank (2005: 22-24)).

It takes many different forms and aims at different development objectives. The clear advantage is that substantial part of it doesn't increase debt burden while concessional loans are provided on favorable terms in comparison with the standard terms. However it was subject to numerous criticisms due to the fact that it might contribute to dependency culture and is subject to corruption and inefficient use both by the donors and the recipients.

Several initiatives on the innovative forms of development finance as part of ODA to raise additional funds for financing development were put forward in recent years (and Monterrey Consensus clearly indicates the importance of search for such sources and their promotion). *International Finance Facility (IFF)* proposal was put forward by the UK Government in order to secure necessary financing to meet Millennium Development Goals within set time framework (HM Treasury (2005)). The idea of this financing mechanism is not much different from that of the World Bank or regional development banks but the proposal doesn't imply establishment of new bureaucratic authority but relies on the existing institutions to generate the flow of additional funds to the developing countries within the set time framework.

The financing mechanism is designed as follows. The donor countries pledge stream of future payments to IFF on regular intervals and then execute these payments in accordance with their pledges and announced time schedules. The pledges are legally binding, each donor is ultimately responsible for their own payments and the failure to execute pledged payments should be treated as sovereign default. The pledges by the donor countries allow the IFF to borrow at the world capital markets via bond issuance. The IFF should be structured as high-quality borrower which is able to raise funds at the lowest possible price. The funds raised by the IFF are disbursed to the recipient countries for financing development needs. Therefore the revenue stream of the IFF consists of the donors' payments (it's proposed that the major part of disbursements to the recipient countries is made in grant form and directed to the poorest countries) and the expenses consist of interest payments on the issued bonds.

The borrowing under the IFF would be economically justified if it meets two economic tests: a) the rate of return of the facility should exceed the target rate of return for public investment in the donor countries where the investment resources would be raised; b) the rate of return of the facility should exceed the target rate of return for public investment in the recipient countries where the funds would be actually invested. It's estimated at the moment that both criteria would be met if the IFF gets the AAA credit rating and the target rate of public investment in the developing countries is approximately 8% pa.

The IFF allows securing necessary additional financing especially for the poorest countries. However launching of the facility requires substantial negotiations efforts between the donor countries and recipient countries on establishment of relevant procedures and setting the major directions for investment of the funds. The legally binding nature of the pledges might create legal problems in donor countries since public funds have to be committed for a long period in advance. As usual the question of the efficient use of funds and ability of the recipient countries to absorb the additional aid flows should be thoroughly discussed.

The Monterrey Consensus called for the International Monetary Fund to consider the *additional issuance of Special Drawing Rights* and their disbursement among developing countries for development financing purposes. This proposal might provide additional liquidity for the countries in need. But such issuance is subject to global inflationary risks and absence of clarity in the refund mechanisms (SDC (2005)).

Table 14.1 Revenue potential

TAX	REVENUE POTENTIAL
Tobin tax	$ 50 billion at the rate of 0,02%
Spahn's currency transaction tax	€17-20 billion at the rate 0,02%
Carbon Tax	$ 130 billion
Kerosene tax	$ 20 billion
Maritime tax	$ 20 billion
Arms sales tax	$ 2,5 - 5 billion
Byte tax	$ 50 billion per year

Source: (SDC (2005)).

Global taxes have the highest potential for revenue which could be used for the development financing purposes. Table 14.1 provides an overview for the estimated revenue potential.

The global taxes are seen as the vehicle to achieve the certain social goal (reduce currency speculation, arms transfer, environment destruction, etc.) and to raise revenue for development purposes which doesn't put unduly burden on developing countries themselves.

However the main obstacle lies in political sphere and primarily in the opposition from the United States to implementation of the global taxes. The Law passed by the US Congress in 1997 in fact makes illegal for the US Government to participate in the global taxation efforts (SDC (2005: 20))[69].

Such additional proposals as *global lottery, global premium bond and emigration tax* could be seen as complimentary vehicles for development financing due to unclear revenue potential which is much less in comparison with other mechanisms discussed.

14.3.3 Sustainable official debt financing and debt relief

The external official lending provided by international institutions (primarily IMF, World Bank and the regional development banks) and foreign governments on the standard conditions are also of great importance to the development world and transition countries. It helps to overcome the narrow

[69] The in-depth discussion of each tax could be found in SDC (2005) and Carnegie Council on Ethics and International Affairs el al. (2003)

domestic debt market and thus to reduce the crowd-out effect in case of the public borrowing, to reduce cost of borrowing and to get access to external finance in the emergency situations (including the situations of the balance of payments problems). The Monterrey Consensus urges both creditors and debtors to monitor the external debt situation and to take mutually acceptable steps for resolution of the unsustainable debt traps. It also recognizes the importance of debt relief measures which might be taken via London and Paris Clubs and other forums of debt negotiations.

The clear disadvantage relates to necessity to service the debt (to pay off the principal and the interest) and the wide spread inefficiency of public spending in the third world countries. The debt relief may potentially create moral hazard problems and increase irresponsibility on both sides - lenders and borrowers.

There was significant fall in net official lending flows in the last years primarily due to the repayment of the loans to the IMF by China, India, Thailand, Argentine, Indonesia and the Russian Federation. Therefore there was clear decrease in significance of the official lending on standard terms in comparison to the ODA. Different economic indicators show the improvement in the external debt situation of the developing and transition countries though there is diversity of conditions among countries. Thus the share of public sector debt in total external debt declined from 82% in 1990-1995 to 69% in 1996-2003 and the external public debt/GDP ratio declined from 31% to 27% (World Bank (2005: 69)).

14.4 Conclusion

The Millennium Development Goals pose serious challenge for the international community and tests its commitment to promotion economic and social development and poverty eradication in the third world. The ability to raise necessary funds is one of the crucial tasks for the success of the whole story.

The analysis provided in the essay shows that successful implementation of the MDG requires reliance on the diversified sources of finance – both from private and official sources each of which has its own strengths and weaknesses. The developing countries bear the primary responsibility for creation of favorable conditions for mobilization of financial resources and their subsequent efficient use for private and public investment.

The most serious potential from the point of view of availability of resources relates to foreign direct investment, remittances from abroad, different forms of official development assistance (including some recent proposals for innovative financing). However practical implementation of these sources and their support requires permanent efforts from the developed countries (primarily OECD countries) as well with regard to mobilization of necessary resources, stimulation of private flows via public/private partnerships, risk guarantee mechanisms and other applicable tools.

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Chapter 15

DEBT AND OWNERSHIP

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Abstract

While recent economic processes, including those involved in the global crisis have many important financial aspects to them that deserve scrutiny, only one of those phenomena, i.e. debt, could be chosen as the subject of the present study. The aforementioned phenomenon will be considered at two levels, leaving out the question of personal debt, for reasons which will become clear below.

The first section brings out what constitutes the crucial underlying mechanism of the debt, and financial crisis in general, which, it will be seen, is closely related to the content of motto to the present chapter. The next two sections illuminate the relevance of the debt problem to the economy and society at large. Whilst, as will be seen, one might point to some voices drawing attention to the presumable dramatic consequences of growing indebtedness apparent in both corporate and public sector, in one key respect those commentaries are wanting; namely, as the subsequent sections will show, those empirical processes have a deep-seated theoretical content that can be brought to light only by theoretical means. The said theoretical framework will constitute the subject of the fourth section of the chapter. All in all, an application of that framework to the topic under consideration should end up in a novel, if not an eye-opening view of not only debt as such, but also related socio-economic relations.

Keywords: debt, ownership, global crisis.

> *The public debt becomes one of the most powerful levers of primitive accumulation. As with the stroke of an enchanter's wand, it endows barren money with the power of breeding and thus turns it into capital, without the necessity of its exposing itself to the troubles and risks inseparable from its employment in industry or even in usury. The state creditors actually give nothing away, for the sum lent is transformed into public bonds, easily negotiable, which go on functioning in their hands just as so much hard cash would. But further, apart from the class of lazy annuitants thus created, and from the improvised wealth of the financiers, middlemen between the government and the nation – as also apart from the tax-farmers, merchants, private manufacturers, to whom a good part of every national loan renders the service of a capital fallen from heaven – the national debt has given rise to joint-stock companies, to dealings in negotiable effects of all kinds, and to agiotage, in a word to stock-exchange gambling and the modern bankocracy.*
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> Karl Marx, Capital, vol. I, ch. 31.

15.1 Introduction

While recent economic processes, including those involved in the global crisis have many important financial aspects to them that deserve scrutiny, only one of those phenomena, i.e. debt, could be chosen as the subject of the present study. The aforementioned phenomenon will be considered at two levels, leaving out the question of personal debt, for reasons which will become clear below.

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The first section brings out what constitutes the crucial underlying mechanism of the debt, and financial crisis in general, which, it will be seen, is closely related to the content of motto to the present chapter. The next two sections illuminate the relevance of the debt problem to the economy and society at large. Whilst, as will be seen, one might point to some voices drawing attention to the presumable dramatic consequences of growing indebtedness apparent in both corporate and public sector, in one key respect those commentaries are wanting; namely, as the subsequent sections will show, those empirical processes have a deep-seated theoretical content that can be brought to light only by theoretical means. The said theoretical framework will constitute the subject of the fourth section of the chapter. All in all, an application of that framework to the topic under consideration should end up in a novel, if not an eye-opening view of not only debt as such, but also related socio-economic relations.

15.2 Rent-seeking

Debt crisis is, of course, but one salient aspect of a broader financial crisis and it is useful to precede an analysis of the former by laying out some pertinent facts necessary for understanding its origin. Note that the following analysis is closely related to the discussion of economic ownership in a later section.

Although, to be sure, Mancur Olson was not the only researcher concerned with rent seeking, he coined a useful concept of distributional coalitions as primary social groups engaged in that activity. the distribution of income and wealth, Olson contended, can become as important an issue as wealth creation and growth (Olson 1982: 44). Distributional coalitions encompass organized groups of special interests, their advisors, and lobbyists whose attempts at rent-seeking redistribution have the effect of reducing overall economic wealth. This kind of particularism diverts effort (p. 175) from wealth creation to distribution of income and wealth, which is, it may be added, a far more realistic picture than the image of Western, and in particular American society, as dominated by universalistic values, propagated by the functional school in sociology.

There are grounds to believe that a similar politico-economic mechanism has been at work lately, as a key factor in the worst financial crisis in the post–World War II era, and ensuing economic recession of global proportions In slightly different terms, Johnson and Boone (2011) point to a “common problem underlying the economic troubles of Europe, Japan, and the US: the symbiotic relationship between politicians who heed narrow interests and the growth of a financial sector.”
This leads to what they call the “doomsday cycle” (Boone and Johnson 2011) - “Bailouts have encouraged reckless behavior in the financial sector, which builds up further risks - and will lead to another round of shocks, collapses, and bailouts.”

At the heart of the problem lies the modern financial infrastructure, which makes it possible to borrow exceedingly, and dangerously risky, great sums relative to the size of a firm or an economy. But those risks have been to a large extent, at least in the financial, and oligopoly sector in general, socialized, while profits realized through over-risky investments remain private.
The expectation of bailouts has become built into the system, in terms of government and central bank support.

The authors recall LTCM, and later vehicles of its ilk such as the Bear Stearns High-Grade Structured Credit funds - which had positive returns 40 months in a row before going Kaboom - that became living proof of Michael Milken's inauspicious admonition that "leverage is not a business model." Long-Term Capital Management due to the small spread in arbitrage opportunities had to leverage itself highly to make money.

At the beginning of 1998, the firm had equity of $4.72 billion and had borrowed over $124.5 billion with assets of around $129 billion, for a debt to equity ratio of over 25 to 1 (Lowenstein 2000:191). It had off-balance sheet derivative positions with a notional value of approximately $1.25 trillion, most of which were in interest rate derivatives. In the same 1998, the chairman of Union Bank of Switzerland resigned as a result of a $780 million loss due to problems at Long-Term Capital Management (Markham 2002).

Owing to its over-leverage and a financial crisis in Russia (i.e. the default of government bonds) which caused a flight to quality, the fund sustained massive losses and was in danger of defaulting on its loans. The fund held huge positions in the market, reaching as much as 5% of the total global fixed-income market. LTCM had borrowed massive amounts of money to finance its leveraged trades. Had LTCM gone into default, it would have triggered a global financial crisis, caused by the massive write-offs its creditors would have had to make. But this wasn't the only reason why Alan Greenspan, head of the US central bank and by the same token the most powerful financier in the world, rounded up the banks that had lent cash to the troubled fund, cracked heads together and forced them to stump up enough to bail it out. This was quite a lot of money - $3.65 billion in fact (Greenspan 2007:195). But Greenspan was quite clear that LTCM would get as much as it takes. And it is difficult to avoid suspicion this has nothing to do with the circumstance that Greenspans chums, including a former vice-chair of the US central bank were up to their necks in it.

In September 1998, the fund, which continued to sustain losses, was bailed out with the help of the Federal Reserve and its creditors and taken over. A systematic meltdown of the market was thus prevented (Definition of LTCM).

The same scenario, only that with other actors casting, has been repeated more recently several times, usually with a common justification of "too big to fall" Such justifications, however, can be self-defeating in that at times the claims on the system may become more than can ultimately be paid. Politicians do not care a dime for reasons which are accounted for by the theory of public choice. What can be dead risky for the system constitutes a great opportunity for members of the political estate. It enables them to buy favor and win re-election. They reckon that the problems will become apparent no sooner until the next party or coalition takes charge. And the aforementioned authors hit the nail in the head in pointing to the ownership nature of common interests shared by the social groups involved. "For bankers and financiers of all kinds, this is easy money and great fortune – literally" (Johnson, Boone 2012)

This is much more than just anecdotal evidence, impressive as it may be. Three researchers studied six bills before the crisis and found that aggregate campaign contributions from the financial industry played a significant role in the vote results for these bills (Mian, Sufi, and Trebbi 2010). Those institutions noted positive abnormal returns around the announcement of the bailout programme. The extent of rent-seeking was further highlighted through their examination of how bailout funds were

distributed, as they found that being a lobbying lender was associated with a higher probability of being a recipient of these funds (Igan and Mishra 2011).

The modern credit system and financial sector generally, are the essential factor in the reproduction and development of the capitalist economy. The crux of the matter is, however, notably in recent decades the financial system has increasingly transformed itself from an efficient mechanism of capital allocation into an equally effective, but without any of the beneficial effects pertaining to the Smithian "invisible hand", rent-seeking machinery that draws support from politicians, as it suits their private interests and encourages harmful public policies.

15.3 Imminent corporate tsunami?

The reader of financial press may nowadays easily come across gloomy predictions: "credit markets are about to be hit by a veritable tsunami of maturing corporate debt. Standard & Poor's estimates that the companies in Europe, the US and the major Asian economies require a combination of refinancing and new money to fund growth over the next four years of between $43 trillion and $46 trillion. The wall of maturing debt is unprecedented, raising the prospect of further, extreme difficulties in credit markets" (Warner 2012).

"Massive amounts of corporate debt issued between 2003 and 2007 will come due over the next four years, and companies' inability to refinance their debt will leave them stuck with high interest payments, dragging down corporate earnings and forcing some companies into bankruptcy. Standard & Poor's estimates that 807 speculative grade issues were originated in the US from 2006 through 2009, and while only 82 (11%) of those bonds have defaulted, an alarming number of these issues still have below investment-grade ratings and are very much at risk of default" (Scott 2012). And indeed, "a new study from Standard & Poor's illustrates the extent to which junk bonds have come to dominate the market for nonfinancial US corporate bonds.

Since 1981, the number of US-based 'AAA' rated nonfinancial companies has dropped from 61 to four, while the number of speculative-grade companies (those rated 'BB+' and lower) has risen to more than half 2,902 US-rated companies. Currently, 64%, or 1,421, of nonfinancial ratings in the US are classified as speculative grade. According to Standard & Poor's, bBorn This Way: Acceptance Grows For New Speculative-Grade Companies Through 30 Years Of LBOs, Bank Loans, And Falling Interest Rates.' It is arguable that this explosion of low-rated debt and the ensuing vast leverage was one of the key factors in the credit crisis that erupted in 2008, and from which the world economy is still suffering.

It is no accident that among several factors contributed to the diminished creditworthiness of US companies over the past three decades, two that, according to commentators, stand out constitute salient characteristics of stockholder capitalism, driven exclusively by the shareholders' interest, epitomized by the US economy and its Anglo-Saxon relatives (cf.: Tittenbrun 2012): MAXIMISATION OF the ratio of assets to capital (Surplus capital reduces the return on shareholder equity and acts as a drag on earnings per share); "a search for yield on the part of investors as interest rates declined, and increasing comfort on the part of company management in taking on debt to increase shareholder value through dividends, acquisitions, and leveraged buyouts (LBOs)" (Seeking Galpha 2010).

15.4 Living beyond their means

If the crisis looms large on the corporate front, what one should make of the sword of Damocles hanging over many governments? “Fears about the ability of several European countries to serve their debt obligations in the spring of 2010 led to substantial increases in the yields of sovereign debt issued by these countries. The European Union along with the European Central Bank and the International Monetary Fund reacted by designing a rescue package worth €750 billion.” (ft 2012) The notion of government (public, or national) debt, as commonly understood, is broader than such conceived sovereign debt, as it comprises also internal debt-owed to lenders within the country Sovereign debt usually refers to government debt that has been issued in a foreign currency. This much is recognized by the author of the following definition, cited here for its final-at first blush uncontroversial-claim regarding the identity of the debtor. “In order to raise money, a government will issue bonds in a currency that is not the government's - and sells those bonds to foreign investors. This is what makes the debt external, as purchasers are from outside the country. The currency chosen for the sovereign debt is usually a strong one, in that its value is higher than other currencies.

Bonds, of course, are instruments of debt to be paid back at a certain time - that can be as long as ten years or as short as one year - with the original investment plus interest. Bonds issued by a government in a foreign currency are called sovereign bonds. It's important to note, sovereign debt is technically owed by a government and not the citizens of the country issuing the sovereign bonds. It's not the national debt“. (Koba 2011)

From the socio-economic point of view, however, focusing on the government as the locus of the relationship involved is unsatisfactory, as it glosses over fictitiousness of juridical concepts of “legal persons” such as the corporation, university or state. the scholars who subscribe to, as well as draw on the intellectual tradition represented by Karl Marx, Max Weber, Georg Simmel, Eugen von Böhm-Bawerk and other members of the Austrian school of political economy, who all have in common a tendency to distrust overgeneralized or reified concepts and step beyond formalistic fetishized legal notions to those relations that form the economic and social background of law, are by definition committed to this socio-economic perspective, which in this particular instance obligates one to deconstruct the notion of government as the purported debtor, nay, prompts one to scrutiny the very nature of debt relationship.

Regarding the former objective, that the above-mentioned approach is actually inadequate is seen by some commentators, as exemplified by the following passage: “Public debt is also sometimes referred to as government debt. It is a term for all of the money owed at any given time by any branch of the government. It encompasses public debt owed by the federal government, the state government, and even the municipal and local government.

Public debt is, in effect, an extension of personal debt, since individuals make up the revenue stream of the government. Public debt accrues over time when the government spends more money than it collects in taxation. As a government engages in more deficit spending, the amount of public debt increases.

Public debt can be made up of all sorts of different types of debt. A great deal of public debt is external debt, which is money that is owed by the government to foreign lenders, either in the form of international organizations, other governments, or groups like sovereign wealth funds which invest in

government bonds. Public debt is also made up of internal debt, where citizens and groups within the country lend the government money to continue operating. In some ways, this is a lot like lending to oneself, since ultimately the responsibility for public debt falls back on the very people lending money" (whysgeek2012).

This is true as far as it goes, but the problem is, it does not go far enough. And we do not have in mind the use of the term public debt to refer "not only to money directly owed, in the form of securities that can be collected on, by a government, but also on the pool of money owed in the form of services and payments promised. For example, pension payments the government may owe to its employees, or contracts the government has entered into but has not yet paid, may also be included in some calculations of public debt." (whysgeek 2012). While for certain economic purposes lumping together of those two types of relations may be useful, from our socio-economic perspective it would be a counterproductive measure, obfuscating the important distinction.

The gist of the matter is, in terms of socio-economic ownership taxes represent nothing other than property relations. Corporate income taxes represent society's share, realized by the medium of state taxation, in ownership of the means of production, while payroll taxes signify a similar share in the ownership of labor power; similar considerations apply in relation to property taxes etc. This is the case because members of society have free access and in fact use parks, roads, libraries, museums and other objects built by the state. With appropriate modifications the same PRINCIPLE applies in the case of local taxes and facilities accessible to local communities.

15.5 What is economic ownership?

In order to answer that question, it is useful to review a range of common treatments of debt and equity modes of financing. We are thus told that "borrowing limits the business' future obligation of repayment of the loan, because the lender does not receive an ownership share in the business." Concomitantly, "the main disadvantage to equity financing is that the investors become part-owners of the business, and thus gain a say in business decisions. Equity investors are looking for a partner as well as an investment, or else they would be lenders, venture capitalist" (Jefferson 2001).

Thus, in the mainstream view the distinction between debt and equity financing lies in the fact that it is only former that is tied to ownership, the distinctive feature of the latter being the ability to make business decisions. The following formulation expresses the same idea in another way: "As ownership interests become diluted, managers face a possible loss of autonomy or control" (Jefferson 2001).

Correspondingly, "advantages to Debt Financing" consist of it being able to "Maintain ownership: When you borrow from the bank or another lender, you are obligated to make the agreed-upon payments on time. But that is the end of your obligation to the lender. You can choose to run your business however you choose without outside interference". (Richards 2012)

On the other hand, "disadvantages to equity financing are that "The investor will require some ownership of your company and a percentage of the profits. You may not want to give up this kind of control". (nfib 2012)

The foregoing shows that, broadly speaking, there exist two possible approaches to the definition of ownership, leaving aside casus of hybrid definitions. These two approaches consist in,

respectively, conceiving of property as control or decision-making, and as benefit rather than use alone, which is the notion subscribed to by the present author. In this regard it follows in the footsteps of such thinkers as Simmel or Hegel. A more extensive treatment of this view can be found in my two recent books (Tittenbrun 2011; 2012), and at this point we shall confine ourselves to an indirect proof of its validity, consisting in demonstrating that the alternative view is untenable. This notion is indeed erroneous, as it refers to consequences or preconditions of what Berle and Means call beneficial ownership (1969:8), and not to this ownership as such.

That the alternative treatment is mistaken can be most easily shown on a number of specific examples. The circumstance that an executive of a public library makes a concrete decision on where, say, Russian literature should be stored, and which room should accumulate English fiction and poetry and so on and so forth does not, to be sure, transform them into an owner of these resources and the building itself. Similarly, while city authorities may take a decision that a definite street must be closed to traffic, it does not renders them private owners of the street involved. The list of such illustrations of our point- which is that it is this ability to benefit, as distinct from the ability to control, that constitutes the substance of ownership- might be multiplied. It is this ability to benefit, as distinct from the ability to control that constitutes the substance of ownership. In many cases these two aspects coincide with each other, but this is not necessarily the case and those who benefit need not be those who control or make decisions concerning the use of given objects. Because the users themselves do not decide on the admission hours to a botanical garden or because there is a state institution that manages public forests, the objects in question do no cease to be common property (because everyone can enjoy them). The fact that the state grants access to fish in rivers and lakes does not turn the fisheries in question into government property.

A number of facts related to debt bolsters the validity of its framing in ownership, i.e. benefit terms, showing that - in common-sense terms-the boundary line between debt and equity is anything but clear-cut, For one, convertible bonds allow investors to convert the bond into equity. This structural affinity is being acknowledged in corporate reports, as exemplified by Atlantic Power Corp., which completed its “common share conversion in November 2009. As a result, Cdn $347.8 million ($327.7 million) of subordinated notes were extinguished and our entire monthly distribution to shareholders is now paid in the form of a dividend as opposed to the monthly distribution being split between a subordinated notes interest payment and a common share dividend during the year ended December 31, 2009.

A debt obligation is considered secured (by collateral - such as real estate, accounts receivable, inventory, savings, life insurance, stocks and bonds, or the item purchased with the loan), if creditors have recourse to the assets of the company on a proprietary basis or otherwise ahead of general claims against the company. In a similar vein, one way of classifying government securities is by the source of the revenue to repay them. “General obligation bonds” will be repaid with revenue collected by taxing the public; “revenue bonds” will be repaid with revenue collected from specific user fees, such as bridge or highway tolls.

The aforementioned distinction is also rendered on a somewhat different basis: “productive debts are those which are fully covered by assets of equal or greater value. If the borrowed money is invested in the construction of railways, irrigation projects, power generations, etc. It adds to the productive capacity of the economy and also provides a continuous flow of income to the government.

The interest and principal amount is generally paid out of income earned by the government from these projects. Productive loans are self-liquidating. Generally, such loans should be repaid within the lifetime of property. Thus, such loans do not cause any net burden on the community" (Akrani, 2011). Thus, in certain, and numerous at that, cases debt relationships could be equated with property relations even on a common-sense basis, as they consist in receiving income from some specific means of economic activity, which is precisely the substance of economic ownership. Lest we be misunderstood on a highly controversial subject, let us immediately recall that, as noted above, it is not the specific character of definite means of production, or other form of economic action that determines the proprietary nature of the income stream involved. And, referring back to Jefferson's treatment of business creditors and partners as two irreconcilable economic characters, it is fair to say that such a view overlooks the so-called silent partners, which case perfectly fits our situation, but not without reservations, to be sure, as in some contexts creditors may take an active part in corporate management and supervision.

15.6 Public-private partnerships

Be that as it may, the foregoing allows for shedding new light on the issues that have begun to be discussed in the section on "Living Beyond Their Means". It is by no means much trumpeted weaker links in the Eurozone that are prone to serious debt problems. The financial crisis that began in late 2007, and its widespread aftershocks, led to a dramatic increase in the public debt of most advanced economies, with many of them experiencing their highest levels of debt since World War II. This was in large part due to the huge stimulus programs in countries around the world, in addition to government bailouts, recapitalizations and takeovers of banks and other financial institutions. Another contributing factor to the increased debt was the decrease in tax revenues.

Table 15.1 Interest payments on external debt, public and publicly guaranteed (PPG) (INT, current US$)

Rank	Country	(% of GDP)	Date of Information	Rank	Country	(% of GDP)	Date of Information
1.	Japan	211.70	2011 est.	73.	Slovakia	43.30	2011 est.
2.	Saint Kitts and Nevis	200.00	2011 est.	74.	Bosnia and Herzegovina	43.30	2011 est.
3.	Greece	161.70	2011 est.	75.	Slovenia	42.00	2011 est.
4.	Lebanon	134.00	2011 est.	76.	Panama	41.80	2011 est.
5.	Iceland	128.30	2011 est.	77.	Argentina	41.40	2011 est.
6.	Jamaica	125.50	2011 est.	78.	Czech Republic	40.70	2011 est.
7.	Italy	120.10	2011 est.	79.	Thailand	40.50	2011 est.
8.	Eritrea	118.50		80.	Turkey	39.90	2011 est.
9.	Singapore	118.20	2011 est.	81.	Yemen	39.40	2011 est.
10.	Portugal	112.80	2011 est.	82.	Ukraine	39.00	2011 est.
11.	Ireland	105.40	2011 est.	83.	Romania	38.60	2011 est.
12.	Belgium	99.70	2011 est.	84.	Armenia	38.60	2011 est.
13.	Barbados	95.90	2011 est.	85.	Sweden	37.50	2011 est.
14.	Sudan	93.70	2011 est.	86.	Bolivia	36.60	2011 est.
15.	Canada	87.40	2011 est.	87.	Lithuania	36.30	2011 est.
16.	United Kingdom	86.30	2011 est.	88.	Taiwan	36.30	2011 est.
17.	Belize	84.80	2011 est.	89.	Ghana	36.20	2011 est.
18.	Sao Tome and Principe	84.70		90.	Tanzania	36.10	2011 est.
19.	France	84.70	2011 est.	91.	Malawi	36.10	2011 est.
20.	Egypt	83.40	2011 est.	92.	Dominican Republic	36.00	2011 est.
21.	Sierra Leone	82.90		93.	New Zealand	35.70	2011 est.
22.	Germany	81.80	2011 est.	94.	Cuba	35.40	2011 est.

Rank	Country	(% of GDP)	Date of Information	Rank	Country	(% of GDP)	Date of Information
23.	Hungary	80.60	2011 est.	95.	Mexico	35.40	2011 est.
24.	Sri Lanka	79.40	2011 est.	96.	Bangladesh	35.20	2011 est.
25.	Bhutan	78.90	FY 10/11 est.	97.	Syria	35.20	2011 est.
26.	Burundi	78.40		98.	Mozambique	34.90	2011 est.
27.	Dominica	78.00	2009 est.	99.	Venezuela	34.90	2011 est.
28.	Cape Verde	74.20		100.	Senegal	34.60	2011 est.
29.	Austria	73.60	2011 est.	101.	South Africa	34.10	2011 est.
30.	Israel	72.80	2011 est.	102.	Korea, South	33.60	2011 est.
31.	Nicaragua	70.50	2011 est.	103.	Honduras	33.50	2011 est.
32.	Malta	70.40	2011 est.	104.	Qatar	33.10	2011 est.
33.	Spain	68.10	2011 est.	105.	Trinidad and Tobago	32.70	2011 est.
34.	United States	67.70	2011 est.	106.	Benin	31.10	
35.	Cyprus	65.80	2011 est.	107.	Hong Kong	30.10	2011 est.
36.	Cote d'Ivoire	65.30	2011 est.	108.	Moldova	29.30	2011 est.
37.	Netherlands	65.20	2011 est.	109.	Macedonia	28.20	2011 est.
38.	Morocco	64.00	2011 est.	110.	Zambia	27.60	2011 est.
39.	Guyana	62.10	2011 est.	111.	Namibia	26.80	2011 est.
40.	Pakistan	60.10	2011 est.	112.	Australia	26.80	2011 est.
41.	Albania	59.70	2011 est.	113.	Rwanda	24.60	2011 est.
42.	Chad	58.80		114.	Guatemala	24.50	2011 est.
43.	Norway	57.50	2011 est.	115.	Indonesia	24.40	2011 est.
44.	Jordan	57.50	2011 est.	116.	Uganda	23.50	2011 est.
45.	Mauritius	57.30	2011 est.	117.	Papua New Guinea	22.10	2011 est.
46.	Vietnam	57.30	2011 est.	118.	Ecuador	22.10	2011 est.
47.	El Salvador	57.30	2011 est.	119.	Gabon	20.60	2011 est.
48.	Poland	56.70	2011 est.	120.	Peru	19.90	2011 est.
49.	Brazil	54.20	2011 est.	121.	Nigeria	17.90	2011 est.
50.	Bahrain	54.00	2011 est.	122.	Bulgaria	17.50	2011 est.
51.	Malaysia	53.20	2011 est.	123.	Angola	17.40	2011 est.
52.	Switzerland	52.40	2011 est.	124.	Luxembourg	16.90	2011 est.
53.	Uruguay	51.00	2011 est.	125.	Botswana	14.50	2011 est.
54.	Philippines	50.90	2011 est.	126.	Cameroon	13.90	2011 est.
55.	Kenya	49.90	2011 est.	127.	Paraguay	13.70	2011 est.
56.	Tunisia	49.00	2011 est.	128.	Saudi Arabia	13.00	2011 est.
57.	Fiji	48.80		129.	Kazakhstan	12.40	2011 est.
58.	Finland	48.60	2011 est.	130.	Iran	12.00	2011 est.
59.	India	48.50	2011 est.	131.	Chile	9.20	2011 est.
60.	Aruba	46.30	2005	132.	Uzbekistan	8.40	2011 est.
61.	Seychelles	45.40	2011 est.	133.	Russia	8.30	2011 est.
62.	Belarus	45.30		134.	Algeria	8.10	2011 est.
63.	Serbia	45.10	2011 est.	135.	Gibraltar	7.50	2011 est.
64.	Montenegro	45.00	2011 est.	136.	Kuwait	6.50	2011 est.
65.	Latvia	44.80	2011 est.	137.	Estonia	5.90	2011 est.
66.	Costa Rica	44.70	2011 est.	138.	Wallis and Futuna	5.60	2004 est.
67.	Colombia	44.60	2011 est.	139.	Kosovo	5.60	2011 est.
68.	Denmark	44.20	2011 est.	140.	Azerbaijan	5.50	2011 est.
69.	Croatia	43.90	2011 est.	141.	Equatorial Guinea	4.60	2011 est.
70.	Ethiopia	43.70	2011 est.	142.	Libya	4.20	2011 est.
71.	China	43.50	2011 est.	143.	Oman	4.10	2011 est.
72.	United Arab Emirates	43.50	2011 est.	144	Liberia	3.30	

Note: Public and publicly guaranteed long-term debt are aggregated. Public debt is an external obligation of a public debtor, including the national government, a political subdivision (or an agency of either), and autonomous public bodies. Publicly guaranteed debt is an external obligation of a private debtor that is guaranteed for repayment by a public entity. Interest payments are actual amounts of interest paid by the borrower in foreign currency, goods, or services in the year specified. Long-term external debt is defined as debt that has an original or extended maturity of more than one year and that is owed to nonresidents by residents of an economy and repayable in foreign currency, goods, or services. Data are in current US dollars. World Bank.

In line with the aforementioned interpretation of taxation, it is pointed out that "a portion of taxes received by governments is used in paying off the public debt. This can have a damaging impact on the long-term growth of a country with high debt, as the government has to commit a significant portion of its resources to paying the interests on debt, instead of investing in RD, schools, healthcare, infrastructure and other areas that could facilitate longer-term growth" (Ventura, Aridas 2012).

Public debt as a percent of GDP in OECD countries as a whole went from hovering around 70% throughout the 1990s to more than 100% in 2011 and is projected to grow to almost 110% of GDP by 2013, possibly rising even higher in the following years.

The rise in public debt has been experienced not only by countries with a history of debt problems - such as Japan, Italy, Belgium and Greece - but also in countries in which it was fairly low before the crisis - such as the US, UK, France, Portugal and Ireland. In many analysts' opinion, this high level of debt is unsustainable in many countries. And indeed, recall that throughout 2010 and 2011 speculators were betting on defaults by Greece, and possibly Italy and Portugal. Even countries viewed as being in principle able to cope with the high amount of debt - especially, the United States - are highly dependent on their major creditors such as China and Japan, who thus pose a real danger, being able to turn off the financing faucet and stop buying US Treasuries. It is no accident that another leading country of shareholder capitalism, i.e., The UK, too, has experienced a substantial increase in its debt level.

Table 15.2 Public debt (most recent) by country (latest available data)

Rank	Countries	(% of GDP)	Date	Rank	Countries	(% of GDP)	Date
1.	Zimbabwe	241.6	2010	66.	Slovakia	41.0	2010
2.	Japan	225.8	2010	67.	Mozambique	40.8	2010
3.	Saint Kitts and Nevis	185	2009	68.	Sweden	40.8	2010
4.	Lebanon	150.7	2010	69.	Malawi	40.4	2010
5.	Greece	144.0	2010	70.	Czech Republic	40.0	2010
6.	Iceland	123.8	2010	71.	Panama	40.0	2010
7.	Jamaica	123.2	2010	72.	Bolivia	39	2010
8.	Italy	118.1	2010	73.	Ethiopia	39.3	2010
9.	Singapore	102.4	2010	74.	Bangladesh	39.3	2010
10.	Belgium	98.6	2010	75.	Yemen	39.1	2010
11.	Ireland	94.2	2010	76.	Bosnia and Herzegovina	39.0	2010
12.	Sudan	94.2	2010	77.	Ukraine	38.4	2010
13.	Sri Lanka	86.7	2010	78.	Switzerland	38.2	2010
14.	France	83.5	2010	79.	Lithuania	36.7	2010
15.	Portugal	83.2	2010	80.	Slovenia	35.5	2010
16.	Egypt	80.5	2010	81.	Romania	34.8	2010
17.	Belize	80 %	2010	82.	Cuba	34.4	2010
18.	Hungary	79.6	2010	83.	Republic of Macedonia	34.2	2010
19.	Germany	78.8	2010	84.	Canada	34.0	2010
20.	Nicaragua	78.0	2010	85.	Taiwan	33.9	2010
21.	Dominica	78.0	2009	86.	South Africa	33.2	2010
22.	Israel	77.3	2010	87.	Senegal	32.1	2010
23.	United Kingdom	76.5	2010	88.	Syria	29.8	2010
24.	Malta	72.6	2010	89.	Guatemala	29.6	2010
25.	Austria	70.4	2010	90.	Papua New Guinea	27.8	2010
26.	Netherlands	64.6	2010	91.	Indonesia	26.4	2010

Rank	Countries	(% of GDP)	Date	Rank	Countries	(% of GDP)	Date
27.	Spain	63.4	2010	92.	Trinidad and Tobago	26.4	2010
28.	Côte d'Ivoire	63.3	2010	93.	Honduras	26.1	2010
29.	Jordan	61.4	2010	94.	Gabon	25.8	2010
30.	Cyprus	61.1	2010	95.	Algeria	25.7	2010
31.	Brazil	60.8	2010	96.	New Zealand	25.5	2010
32.	Mauritius	60.5	2010	97.	Venezuela	25.5	2010
33.	Ghana	59.9	2010	98.	Moldova	25.0	2010
34.	Albania	59.3	2010	99.	Zambia	24.1	2010
35.	Bahrain	59.2	2010	100.	Korea, South	23.7	2010
36.	United States	58.9	2010	101.	Peru	23.6	2010
37.	Seychelles	58.8	2010	102.	Ecuador	23.2	2010
38.	Morocco:	58.2	2010	103.	Paraguay	22.8	2010
39.	Bhutan	57.8	2009	104.	Botswana	22.6	2010
40.	Guyana	57.0	2010	105.	Australia	22.4	2010
41.	Vietnam	56.7	2010	106.	Uganda	20.4	2010
42.	Philippines	56.5	2010	107.	Angola	20.3	2010
43.	Uruguay	56.0	2010	108.	Namibia	20.0	2010
44.	India	55.9	2010	109.	Hong Kong	18.2	2010
45.	El Salvador	55.0	2010	110.	China	17.5	2010
46.	Croatia	55.0	2010	111.	Cameroon	16.8	2010
47.	Poland	53.6	2010	112.	Saudi Arabia	16.7	2010
48.	Malaysia	53.1	2010	113.	Iran	16.2	2010
49.	Kenya	50.9	2010	114.	Luxembourg	16.2	2010
50.	Argentina	50.3	2010	115.	Kazakhstan	16.2	2010
51.	Pakistan	49.9	2010	116.	Bulgaria	16.2	2010
52.	Tunisia	49.5	2010	117.	Nigeria	13.4	2010
53.	Turkey	48.1	2010	118.	Kuwait	12.6	2010
54.	Norway	47.7	2010	119.	Qatar	10.3	2010
55.	Denmark	46.6	2010	120.	Russia	9.5	2010
56.	Aruba	46.3	2005	121.	Uzbekistan	9.0	2010
57.	Latvia	46.2	2010	122.	Estonia	7.7	2010
58.	Finland	45.4	2010	123.	Gibraltar	7.5	2008
59.	Colombia	44.8	2010	124.	Chile	6.2	2010
60.	United Arab Emirates	44.6	2010	125.	Wallis and Futuna	5.6	2004
61.	Costa Rica	42.4	2010	126.	Azerbaijan	4.6	2010
62.	Thailand	42.3	2010	127.	Oman	4.4	2010
63.	Dominican Republic	41.7	2010	128.	Equatorial Guinea	4.1	2010
64.	Mexico	41.5	2010	129.	Libya	3.3	2010
65.	Serbia and Montenegro	41.5	2010		Weighted average	49.6	

Source: "Public debt by country", CIA World Factbooks 18 December 2003 to 28 March 2011. Retrieved from http://www.NationMaster.com/red/graph/eco_pub_deb-economy-public-debtb_printable=1.

Whilst it is true that there are some countries in the Euro area - Austria, Germany, the Netherlands, Luxembourg and Finland, for example - whose debt levels are rather moderate, the scale of problems in some other countries of the Euro zone - especially, but not exclusively, Greece, Portugal and Italy - has provoked what has come to be called a "crisis of confidence" in the Euro area as a whole and in the sustainability of the Euro as a single currency.

Japan's economy is a special case; it has been troubled since the 1990s. Debt as a percent of GDP broke through the 100% mark as early as in 1997 and has risen steadily since then. It is now projected to reach over 220% in 2013, a high for OECD countries and more than double the average.

What is specific about this huge indebtedness is the fact that Most of Japan's debt has been financed by Japanese investors, although this is slowly changing, as the savings rate of Japanese households is shrinking. For the last two decades, Japan's government has been running large deficits, borrowing and then spending the savings of the young. When the elderly finally demand their savings back in the form of pensions, the government will need to reduce its budget deficit of 8% of GDP and start running a sizeable budget surplus. Unless there is a sudden burst of romance and fertility, there will be far fewer Japanese taxpayers in the future to pay this debt.

The government has not been willing to raise taxes in a timely manner to match its spending. The latest agreement is for a modest (5%) increase in the retail sales tax, which would only be fully implemented in 2015. Why would it do so in the future when the burden on the remaining workers will need to be ever larger? Japan is saved from immediate pressure by the fact that about 95% of its government debt is held by domestic residents. As long as these investors are satisfied with very low - or perhaps negative - real rates, this situation can continue. But sooner or later, Japan's dreadful fiscal mathematics will catch up with the government. There is no sign yet of a broad loss of confidence, but major shifts in market sentiment are not typically signaled in advance. "(Johnson, Boone 2012)

Clearly, the aforementioned fact becomes all the more important, when rendered in a new light, i.e. in ownership terms. It is a far cry between the possibility of maintaining the financial independence in the situation wherein a major portion of a country's sovereign debt's is owed to domestic and foreign investors, when it is known that those relations mean, respectively, the ownership of the economy by the country's own citizens, and a mixture of foreign - corporate, financial and sovereign - interests. A case in point is US, wherein approximately 47% of the government debt was foreign owned as of January 2011 - a percentage that has been steadily increasing throughout the decade. In light of our theoretical framework, it is easy to see why some analysts consider the percent of foreign-owned debt as more critical to an economy's longer-term health than total debt. Specifically, as of July 2012, $5.3 trillion or approximately 48% of the debt held by the public was owned by foreign investors, the largest of which were China and Japan at just over $1.1 trillion each.

This does not mean that, as pointed out above, it is China's or Japan's governments that should be treated as owners of the American means of economic activity; in a sociological sense, one speaks of a government, corporation, foundation, etc. as owners, or more generally subjects of action, only tentatively and metaphorically, in some cases sociologically conceived beneficiaries of debt income may in fact be state officials or politicians, but even in this instance a sociological dissection or deconstruction is needed to establish those real, as distinct from juristic, beneficiaries. in the majority of cases, though, it can be surmised that the government acts as an intermediary only, and not as a locus of appropriation, albeit social distribution of economic benefits allocated by the government need to be examined on an individual basis.

Take a specific case of Japan. Taxes consist of national tax (income tax, corporation tax, etc.), which is paid to the national government, and local tax, which is paid to the local government of the place of residence. The ratio of taxation burden, which is the ratio of national and local taxes to national income, was 18.3 percent in fiscal 1975. This ratio gradually increased thereafter, reaching 27.7 percent in fiscal 1990. Since then, however, the ratio has decreased due to the decline in tax revenue arising from the recession that ensued after the bubble economy ended, showing 21.2 percent in fiscal 2003. In fiscal 2012, it was 22.7 percent in terms of national and local taxes combined

(13.0 percent for national tax and 9.8 percent for local tax). It should be noted that Japan's ratio is lower in comparison with other major industrial countries. Nevertheless, there is a possibility that the taxation burden will become heavier due to an increase in welfare and pension-related spending as the population ages. The size of the general account budget for fiscal 2012 was 90.33 trillion yen, a decrease of 2.08 trillion yen (2.2 percent) from the initial budget of fiscal 2011. This is equivalent to 18.8 percent of the fiscal 2012 GDP, forecasted by the government at 479.6 trillion yen. In fiscal 2012, major expenditures from the initial general account budget include national debt service (24.3 percent), which is a measure of holders of government bonds or bondholders' ownership share in the Japanese economy, social security (29.2 percent), local allocation tax grants, etc. (18.4 percent), education and science (6.0 percent), and national defense (5.2 percent). (Statistics Bureau), the remaining items expressing public ownership, as even tax grants are purportedly assigned to local communities rather than to special interest groups or private businesses. It is noteworthy that Some non-OECD countries - notably the so-called emerging BRIC countries (Brazil, Russia, India and China) - are currently not found in a critical situation as regards their debt levels.

The opposite is the case as far as the largest "old" industrialized nations are concerned that, according to A recent study by the World Competitiveness Center of Swiss business school IMD, will suffer a "debt curse" lasting decades - in the worst case lasting until 2084. The IMD defines "bearable" public debt as being 60% or less of GDP and estimates the "time horizons" in which the nations will revert to bearable public debt, assuming they gradually reduce their budget deficits to reach equilibrium by 2015 and devote 1% of their GDP to repayment of debt. The 10 nations with longest time horizons are Japan (2084), Italy (2060), Portugal (2037), Belgium (2035), US (2033), Iceland (2032), Greece (2031), France (2029), Germany (2028), UK (2028).

Again, within the ownership framework introduced above it is significant that of those, Japan, Italy and Belgium's creditors are mainly domestic institutions. However, Greece and Portugal have a higher percent of their debt in the hands of foreign creditors, which is seen by analysts as being more difficult to sustain". (Ventura - Aridas, 2012)

Having outlined this broad global background, we may discuss the debt situation of some individual countries in some more detail. Thus, The UK Government forecasts that national debt will soar to a mind-boggling £1.5 trillion by 2016. To put that figure in perspective, the UK went bust in 1976 running a budget deficit of 6% of GDP. In 2012 that deficit is going to top 8.9%. The current level of national debt amounts to £16,763 for every man, woman and child. That's more than £36,814 for every person in employment. Every household will pay £1,927 this year; just to cover the interest in 2012 the interest on the national debt will cost £44.8 billion a year. That's more than the nation spends on defense, and not much less than the entire education budget. (McBride, 2012)

How serious is the situation, may be gleaned from David Cameron's recent speech, who warned that Britain's "whole way of life" would be disrupted for years by the most drastic public spending cuts in a generation as he said that, unless such cuts were made, annual interest payments on the UK's "staggering" debt would rise to around £70bn a year within five years. £70bn means spending more on debt interest than we currently do on running schools in England plus climate change plus transport. Interest payments of £70bn mean that for every single pound you pay in tax, 10 pence would be spent on interest" (Macalister 2012). The above estimates clearly show how important a role in socio-economic life of a country can be played by debt-mediated ownership. The

data reproduced below highlight additionally what its effects may mean for an individual member of a society.

In the largest world economy, the national debt has recently passed the $16 trillion mark for the first time. That's more than $50,000 for every man, woman and child in the US. The staggering amount is $16,015,769,788,215.80, to be exact. That is why $16 Trillion divided by 330 Million people (legal that is) works out to $53,330.00 per person.

There is an average of 4 people per household in the USA. The Mean Income in the USA per household is almost $60,000.00 a year.SO to pay off the debt without interest will take 100% of the average Household income for 3.5 YEARS.“ (Kim 2012), and, mind you, this is the richest country in the world. “The national debt held by the public reached $10 trillion by the end of fiscal 2011. In 2011, these interest payments claimed $230 billion, or about 6 percent of the budget” (Center on Budget and Policy Priorities 2012).

And yet another juxtaposition that neatly captures the ownership share of the debt relation: “US Federal Tax Revenues: $2.242 Trillion Net Interest on Debt: $225 Billion. So around, 9+% goes towards Interest (Answers Intrnational). This means, in other words, that nearly 10 percent of the largest economy on the planet is effectively owned by “silent owners”, that is to say, domestic and foreign holders of various debt securities. CBO projects that interest will top as much as 18% of revenue in 2018 and 20% in 2020. But even this is not the end of the story, since under more adverse scenarios than the CBO considered, including higher interest rates, Moody's projects that debt service could hit 22.4% of revenue by 2013.“ (Moody's Jed Graham Investor's Business Daily May 5, 2010). In 2015, the estimated interest due - $533 billion - is equal to as much as a third of the federal income taxes expected to be paid that year.

What is more, the law of compound interest and of the credit market combined cause that the threat of implicating itself in the Vicious Circle becomes real-the country depends heavily on borrowing to fund its expenses. But the more debt it racks up, the more likely it becomes that creditors could demand a higher interest rate for making new loans.

Higher rates in turn make it harder to pay off the underlying debt because more and more money is going to pay off interest. “And as more money goes to interest, creditors may become concerned that the country can't pay down its principal and lawmakers will have less to fund all the things government is supposed to do.” (Sahadi, 2012)

To put this unstated bundle of ownership relations another way, according to figures in President Obama's new budget plan interest payments on the national debt will quadruple in the next decade and every man, woman and child in the United States will be paying more than $2,500 a year to cover for the nation's past profligacy. Starting in 2014, net interest payments will surpass the amount spent on education, transportation, energy and all other discretionary programmes outside defense. In 2018, they will outstrip Medicare spending. Only the amounts spent on defense and Social Security would remain bigger under the president's plan.

The soaring bill for interest payments is one of the biggest obstacles to balancing the federal budget, pushing the White House and Congress to come up with cuts deeper than previously imagined. Without interest payments, the president's plan would balance the budget by 2017. But net interest payments that year are expected to reach $627 billion, up from $207 billion in the current fiscal year. Think of dividends on the all-national stock, as effectively interest payments are

synonymous with those. Even with the cuts in Obama's budget, relief would not come until 2021, when the deficit as a percentage of gross domestic product would stop rising and plateau at 3.4 percent.

The explosion of interest payments comes from a double whammy of economic factors. First, the nation's debt is growing faster than the economy. Second, interest rates are rising. Over the next decade, net interest payments will amount to nearly 80 percent of the debt added, an indication of how past borrowing is forcing the country deeper into debt. Kenneth Rogoff, an economics professor at Harvard University and former chief economist at the International Monetary Fund put it briefly: "We're running a gigantic deficit, and we're not growing very fast. We're on a dramatically unsustainable path."

The deficit issue exemplifies exempli the significance of sociological concept of nation as a collective owner of a common pool of resources composed of multiple generations; the Obama administration's latest forecasts starkly illustrate the phenomenon of generation shifting, moving today's costs to future taxpayers. The borrowing the United States did over the past decade - to pay for the 2001 tax cut, the wars in Iraq and Afghanistan, and propping up the economy during the steep 2009 downturn - is coming due this decade.

Whilst the outlook in the Obama budget proposal for fiscal year 2012 is poor, mildly speaking, it could get even worse. So far, interest payments have been relatively low because of the willingness of global investors to lend the US government money at abnormally low interest rates. But that could change.

As N. Gregory Mankiw, a Harvard economics professor and former chairman of President George W. Bush's Council of Economic Advisers has said, "The scary scenario - which I am not predicting but is a real possibility - is an incident of capital flight, where investors lose confidence in the US, causing interest rates to rise precipitously and pushing the budget deficit even further into the red“. (Mufson, 2011)

The threat caused by the debt burden may be also put that way-“Long-term budget projections indicate the United States faces insolvency over the next few decades under the current tax and entitlement regime. Unless appropriate legislative action is taken, the national debt will become unsustainable, growing at a faster rate than GDP and commanding a growing percentage of government revenues to pay the interest. As the United States emerges from a deep recession, it must maintain a tricky policy balance, experts say. Alongside short-term measures aimed at sustaining the economic recovery, such as the payroll tax cut extension, the government must achieve medium-term fiscal consolidation likely involving higher taxes and lower spending to lessen its massive debt.” (Masters, 2012)

According to Congress' budget referee, US public debt would balloon to twice the size of the nation's economy in 25 years if current tax and spending policies are extended.

It is instructive to compare that figure with another one, for an economy of comparable size-Japan currently has a debt-to-GDP ratio of just over 200 percent and has been stuck in an economic quagmire for well over a decade (Lawder, 2012).

Another way of looking at the vicious circle facing the US is as follows: large budget deficits and growing debt would reduce national saving, leading to higher interest rates, more borrowing from abroad, and less domestic investment - which in turn would lower the growth of incomes in the United

States. Taking those effects into account, CBO estimates that gross national product (GNP) would be lower under the extended alternative fiscal scenario than it would be if debt remained at the 61 percent of GDP it would reach in 2022 under the extended baseline scenario. The reduction in GNP would lie in a broad range around 4 percent in 2027 and in a broad range around 13 percent in 2037. Rising debt also would have other negative consequences beyond those estimated effects on output. It would:

- Result in higher interest payments on that debt, which would eventually require higher taxes, a reduction in government benefits and services, or some combination of the two.
- Restrict policymakers' ability to use tax and spending policies to respond to unexpected challenges, such as economic downturns or financial crises.
- Increase the probability of a sudden fiscal crisis, during which the government would lose its ability to borrow at affordable rates. (CBO 2012)

15.7 Silent corporate partners

A theoretical derivation of the notion of creditors as part owners has been laid out above. Similarly, deliberations on the corporate sector parallel to those advanced above regarding the public debt crisis have been also presented in the section entitled "Imminent Corporate Tsunami?". However, what is as yet missing in the picture is a range of empirical examples which would lend credibility to the aforementioned theoretical thesis. To provide such an evidence-based illustration is the aim of the present section.

Atmos Energy Corporation:

- Paid $360.1 million for scheduled long-term debt repayments, including our $350 million 7.375% senior notes that were paid on their maturity date on May 15, 2011, or three times as much as the amount of cash that was pocketed by the shareholders, for the corporation;
- Paid $124.0 million in cash dividends which reflected, by the way, a high payout ratio of 60 percent of net income.

During the fiscal year ended September 30, 2009, the corporation:

- Paid $407.4 million to repay its $400 million 4.00% unsecured notes;
- Repaid net $284.0 million short-term borrowings under its credit facilities;
- Paid $121.5 million in cash dividends which reflected an even higher payout ratio of 64 percent of net income, and despite this, the latter amount was several times as low as the debt expenses, which reflects the relative importance of two respective property relations.

Let us compare the situation in the aforementioned regard of DTE Energy, another utility company, whose Interest expense amounted to, respectively, $494, $549, and $545 m in 2011, 2010, and 2009. On the other hand, dividends on common stock were of lower, but comparable size, as they amounted to, correspondingly, $389m, $360m, and $348 m. In the case of International Power our analysis will be taken one step further inasmuch as the share of public related to private ownership will be considered in this instance.

The pattern revealed thanks to the socio-economic perspective sketched above is interesting enough, as according to it in 21 income tax expense alone amounted to €618m, and by the same token, thus measured share of public ownership was higher than Net interest expense of €670 m. The full-year dividend amounted to 11.0 euro cents per ordinary share, representing a payout ratio of 40%

of pro forma underlying earnings per share. Thus, the total dividend amounted to around €509 m, or substantially less than the share of public ownership mentioned above, or the share accounted for by the debt holders, for that matter.

And, consistent with the policy of not making our task easier (in fact, the reverse is t true, as utilities are known for their high dividend payouts), the next company also comes from that sector. American Power Inc. bore the following Interest Expenses in 2011, 2010 and 209: $42m, $52m, and $84m. The second main ownership relation was represented by dividends Paid on Common Stock to the tune of: $892, $and 820m in corresponding years.

In the above case it would be fair to say that it is equity holders rather than debt holders who have the upper hand as far as the distribution of corporate revenue is concerned. But at the opposite extreme, there is not that rare, as it might seem to the initiated, case, starkly illustrating our point, supplied by Active Power Inc., which tells its stockholders: "We have never declared or paid cash dividends on our capital stock. We currently intend to retain any earnings for use in our business and do not anticipate paying any cash dividends in the foreseeable future. With dividends missing, the main revenue claimants remain the corporation's creditors, and indeed in 2011 interest expenses amounted to $225000.

Let us turn to Chesapeake Utilities Corporation. This sector has been chosen for analysis because of its common generous dividend policies. The corporation in question paid out in 2011 4 quarterly dividends of $0.330, per share $0.345, 0.345, and 0.345 per share, which gives an amount of about $1 per share annually, which is hardly impressive. To be sure, to be fir, one should add to those modest sums capital gains, but the latter (In 2011, between March 31 and December 21, i.e. dates the dividends have been paid, the corporation's stock price rose from $ 42.47 to $ 44.53) have not been particularly impressive either. Meanwhile, the company's outstanding long-term debt consists of fixed-rate senior notes, secured debt and 8.25% Convertible Debentures Due 2014, paying thus generous interest.

The carrying value of outstanding long-term debt, including current maturities, was $118.5 million at December 31, 2011. For comparison, As of February 29, 2012, 9,576,780 shares of common stock were outstanding, which, based on the market price would be valued at 957678043.35, which, to be sure, gives a higher amount than the former one, but there is a caveat that such conceived notion of debt, and thus economic ownership relations mediated by debt is seriously under-estimated, as it leaves out some important types of corporate debt. What kind of weight might carry such a debt, and indeed, referring back to earlier conceptual considerations, what extent of economic power pertains to the holders of the debt involved, is shown by the following excerpt from the corporate report: "Our ability to obtain adequate and cost-effective capital depends on our credit ratings, which are greatly affected by our financial performance and the liquidity of financial markets. A downgrade in our current credit ratings could adversely affect our access to capital markets, as well as our cost of capital.

Our financial condition would be adversely affected if we fail to comply with our debt covenant obligations. Our long-term debt obligations and committed short-term lines of credit contain financial covenants related to debt-to-capital ratios and interest-coverage ratios. Failure to comply with any of these covenants could result in an event of default which, if not cured or waived, could result in the

acceleration of outstanding debt obligations or the inability to borrow under certain credit agreements. Any such acceleration would cause a material adverse change in our financial condition".

That the above corporation does not constitute any exceptional case, is shown by Atlantic Power Corp., whose report says: "As of December 31, 2011, our consolidated long-term debt represented approximately 59.1% of our total capitalization, comprised of debt and balance sheet equity. Our current or future borrowings could increase the level of financial risk to us and, to the extent that the interest rates are not fixed and rise, or that borrowings are refinanced at higher rates, then cash available for dividends could be adversely affected".

Specifically, as of February 24, 2012, the corporation had $72.8 million outstanding under our revolving credit facility, $192.2 million of outstanding convertible debentures, $333.8 million of outstanding non-recourse project-level debt, and $1.1 billion of unsecured notes. Covenants in these borrowings may also adversely affect cash available for dividends. In addition, some of the projects currently have non-recourse term loans or other financing arrangements in place with various lenders. These financing arrangements are typically secured by all of the project assets and contracts as well as our equity interests in the project.

The report goes on to say that "the terms of these financing arrangements generally impose many covenants and obligations on the part of the borrower. For example, some agreements contain requirements to maintain specified historical, and in some cases prospective debt service coverage ratios before cash may be distributed from the relevant project to us. In many cases, an uncured default by any party under key project agreements (such as a PPA or a fuel supply agreement) will also constitute a default under the project's term loan or other financing arrangement. Failure to comply with the terms of these term loans or other financing arrangements, or events of default thereunder, may prevent cash distributions by the particular project(s) to us and may entitle the lenders to demand repayment and/or enforce their security interests, which could have a material adverse effect on our business, results of operations and financial condition. In addition, failure to comply with the terms, restrictions or obligations of any of our revolving credit facility, convertible debentures or unsecured notes or any other financing arrangements, borrowings or indebtedness, or events of default thereunder, may entitle the lenders to demand repayment, accelerate related debt as well as any other debt to which a cross-default or cross-acceleration provision applies and/or enforce their security interests, which could have a material adverse effect on our business, results of operations and financial condition. Our failure to refinance or repay any indebtedness when due could constitute a default under such indebtedness. Under such circumstances, it is expected that dividends to our shareholders would not be permitted until such indebtedness was refinanced or repaid

In addition, the report of Chesapeake Utilities Corp. refers implicitly to bankers as another category of silent partners to their business, the complication being that there arises a need to assess in what proportion a given stream of income is divided between bank managers and shareholders. An increase in interest rates, without the recovery of the higher cost of debt in the sales and/or transportation rates we charge our utility customers, could adversely affect future earnings. An increase in short-term interest rates would negatively affect our results of operations, which depend on short-term lines of credit to finance accounts receivable and storage gas inventories, as well as to temporarily finance capital expenditures. Regarding this question of corporate governance, recall that

under certain regimes, of which most notable example is provided by German banks, bankers may exercise an effective supervision over the business activities of corporations.

15.8 Conclusion

The major contribution of the present chapter consists in revealing a theoretically accessible, socio-economic dimension of creditor-debtor relations that are, in actual fact, economic property relations. In conclusion, let us look from that angle at the picture of gross government debt for the world as a whole. The clock <http://debtclock.s3.amazonaws.com/index.html>covers 99% of the world based upon GDP. It uses latest available data and assumes that the fiscal year ends in December. It should also be noted that Debt figures are derived from national definitions and hence may vary from country to country. For simplification, the sum total amounts to thirty-nine trillion dollars in round numbers. This works out to around $10,000 for each person on the globe. In other words, if we were ever to consider paying this debt off, that's how much we'd have to collect, on average, from each person. Given that we'd do well to collect $10,000 apiece from the richest few people in the richest few countries, and given that over half the world's people have no income at all at a level that would interest a tax man (less than $1000 per year gross), paying off this debt seems out of the question. This means that the unfortunate mortals will have to continue to pay interest on it forever, which will result in significant international cash flows with attendant distorting effects on the economy, polity, and society. Interest might be estimated at $500 per year per person.

This would seem manageable, on the average, for a while at least, especially since it is the richest countries which owe the most. The problem, of course, is that debt is growing faster than population or prosperity, which means that the current pattern of development, as based on a particular ownership pattern, is unsustainable.

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List of Tables

List of Figures

Title: Financial Aspects of Recent Trends in the Global Economy (FINART) Volume I

Editor: Rajmund Mirdala

Reviewers: Jean-Pierre Allegret
Kosta Josifidis
David Carfi
John Hudson
Giovanni Battista Dagnino

Published by: ASERS Publishing
Craiova, Romania
asers@asers.eu
http://www.asers.eu

Typesetting: Arial Narrow

Edition: First
Printed in: Universitaria Printing House,
Brestei Street, 156A, Craiova, Romania
Number of pages: 302
Official webpage: http://www.asers.eu/asers-publishing/books.html

ISBN-L: 978-606-93129-5-7
Print ISBN: 978-606-93129-6-4
Online ISBN: 978-606-93129-9-5

Financia

ISBN-L: 978-606-93129-5-7
Print ISBN: 978-606-93129-6-4
Online ISBN: 978-606-93129-9-5

www.asers.eu

This book is important reading for anyone interesting by the implications of the financial globalization. The different contributions offer an in-depth analysis of the recent trends in globalization including debates related to the governance of the world economy and the implications of the crisis for the European integration. This book offers invaluable information for a wide range of audience; from academics to policy makers and anyone interested in learning about the multiple dimensions of the financial globalization.

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The book provides an interesting overview of recent problems associated with financial crisis and large scale of related implications. Contributing authors challenged particular problems with not easy task to highlight and observe a large complex of crisis related issues in many areas of the real and financial world in global economy. Different ideas and problems are discussed providing in-depth insight into financial crisis effects.

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Very interesting and stimulating book on some of the most followed and important research themes of recent financial aspects in global economy. The authors go deep inside into reasons and perspectives of the present economic and financial crisis: from globalization and financial contagion to growth design and monetary policy; from global imbalances debt constraints to risk management in financial markets. The book ends in a section devoted to eurozone perspectives, with a particular eye to the crisis of euro's governance, to the monetary union and the role of the monetary policy, to the banks financing growth, to the fiscal policy and the external constraints in the eurozone. Readers find here intriguing and original volumes to read, about unavoidable current financial aspects of global economy.

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The final crisis is the most important event to affect economics in decades. These two volumes cover this crisis and how economics and economists are responding to it. The chapters vary from the theoretical to the empirical, from those with a focus on policy to more general principles and from those which concentrate on a specific country or group of countries to more general analyses. They are a timely addition to the literature.

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This new two-volume publication "Financial Aspects of Recent Trends in the Global Economy" covers a range of extremely timely issues, such as discussions of several aspects at the origin of the widespread financial and economic crisis (i.e., state imbalances, debt constrains, and oscillating exchange rates), as well as the recent development in financial markets practices and the Eurozone prospects. For its inherent content and specific design, the book is without doubt a suggested reading to all the ones who want to plunge into a deeper and more informed understanding of various relevant financial facets and perspectives of our globalizing world.

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