

Charles University in Prague

Faculty of Social Sciences
Institute of Economic Studies



MASTER THESIS

**The Impact of Euro Adoption on
Competitiveness: The comparison of Czech
Republic and Slovakia**

Author: **Bc. Oliver Polyák**

Supervisor: **prof. Ing. Oldřich Dědek CSc.**

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Declaration of Authorship

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Prague, May 15, 2012

Signature

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Abstract

The present master's thesis is focused on the impact of introducing the common European currency on competitiveness of a country. There has been a lot written about the possible effects of euro adoption on economies of the first eurozone participants. The contribution of this thesis is that we explore the impact of euro introduction on competitiveness of Slovakia, in comparison to the Czech Republic which still uses its own national currency.

Our findings suggest that most of the analyzed competitiveness indicators evolved largely in parallel in both countries. Positive trade effects brought about by the introduction of the euro are rather moderate – up to 5%. Slovak credit development was more favorable during the crisis, reflecting lower interest rates in eurozone. On the other hand, high contributions to European stabilization funds may hamper Slovak economic growth and negatively influence country's competitiveness in future.

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Author's e-mail	oliver.polyak@hotmail.com
Supervisor's e-mail	dedek@fsv.cuni.cz
Characters with spaces	91 306

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Abstrakt

Předkládaná diplomová práce zkoumá dopad zavedení společné evropské měny na konkurenceschopnost ekonomiky. Mnoho již bylo napsáno o možných efektech přijetí eura na ekonomiky prvních členů eurozóny. Přínosem této práce je, že se zabývá vlivem zavedení eura na konkurenceschopnost Slovenska, ve srovnání s Českou republikou, která stále používá svou národní měnu.

Naše zjištění ukazují, že většina ze sledovaných ukazatelů konkurenceschopnosti se vyvíjela obdobně v obou zemích. Pozitivní vlivy na export způsobené přijetím eura jsou poměrně malé – kolem pěti procent. Úvěrový vývoj byl na Slovensku příznivější během krize, reflektující nižší úrokové sazby v eurozóně. Na druhé straně, vysoké příspěvky do evropských stabilizačních fondů mohou zbrzdit ekonomický růst a do budoucna negativně ovlivnit konkurenceschopnost země.

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E-mail autora	oliver.polyak@hotmail.com
E-mail vedoucího práce	dedek@fsv.cuni.cz
Počet znaků včetně mezer	91 306

Master Thesis Proposal

Institute of Economic Studies
Faculty of Social Sciences
Charles University in Prague



Author:	Bc. Oliver Polyák	Supervisor:	doc. Ing. Oldřich Dědek CSc.
E-mail:	oliver.polyak@hotmail.com	E-mail:	dedek@fsv.cuni.cz
Phone:	00420728589893	Phone:	N/A
Specialization:	FFTaB	Defense:	June 2012
		Planned:	

Proposed Topic:

The impact of Euro Adoption on Competitiveness: The comparison of Czech Republic and Slovakia

Topic Characteristics:

1. The Euro adoption in Slovakia implied a positive trade effects
2. The absence of Euro helped the Czech Republic to attract more horizontal FDI
3. Euro accession improved economic stability in Slovakia

Hypotheses:

My thesis will focus on the impact of introducing the common European currency on a country's competitiveness. Since there is no agreed and generally accepted definition of competitiveness, and within the scope of this thesis it is not possible to include all the relevant factors that may possibly influence the level of competitiveness, I will explore the topic mostly from the macroeconomic point of view. The stability of the macroeconomic environment is important for business and, therefore, it is important for the overall competitiveness of a country. Although it is certainly true that macroeconomic stability alone cannot increase the productivity of a nation, it is also recognized that macroeconomic disarray harms the economy. The economy cannot grow in a sustainable manner unless the macroeconomic environment is stable. This issue has captured the attention of the public most recently through discussions on exit strategies to wind down deficit spending, and in the context of the recent buildup of sovereign debt. For the purpose of the work I will pick up some of the main macroeconomic indicators that serve as good competitiveness drivers, e.g. foreign direct investments inflow, volume of foreign trade the evolution of GDP growth,

Methodology:

Due to the lack of data for Slovakia under the Euro regime, I will try to assess the Euro adoption effect on other Western-European countries that have been using the common European currency since 2002. I will evaluate the impact of Euro by the panel data regression and other standard econometric methods.

The gravity model of trade will be used to estimate the impact of both trade and FDI. The gravity model has been used extensively to explain bilateral trade. The original form of the gravity model states that exports from country i to country j is a function of the product of their GDPs and of all factors that determine the cost of exporting from i to j . This means that exports from country i to country j depend positively on the economic size of i and j and negatively on the cost of trade:

$$\text{Exports}_{ij} = (\text{GDP}^i * \text{GDP}^j) / (\text{Trade cost}_{ij})$$

I will estimate euro effects on trade and FDI for two different time periods, 2004-2008, which is viewed as a transition period, when Slovak national currency still was used as unit of account, and 2009-2011. This means that the estimates measure how much the euro increased trade between the average of 2000-2003 on one hand and the average of 2004-2008 and 2009-2011 on the other relative to the same differences in trade for the control group, after controlling for other factors.

Data on trade in may be taken from the United Nations Comtrade database, other data could be retrieved from OECD, Eurostat, IMF and national statistical offices.

Regarding the third hypothesis, I will examine it based on my own exploration of the topic and an in-depth literature review, following up the development of the macroeconomic indicators such as GDP, bond yields, volatilities of inflation and consumption.

Outline:

1. Introduction to the topic
2. Trade effects
 - A Literature review
 - B Gravity model explanation
 - C Interpretation of results
2. FDI inflows
 - A. Literature overview
 - B. Interpretation of results
3. Macroeconomic stability
 - A. Topic exploration
 - B. Data interpretation
 - C. Conclusions
4. Summary and conclusions

Core Bibliography:

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Author

Supervisor

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Acronyms

CDS	Credit Default Swap
CEPII	Centre d'études prospectives et d'informations internationales
EU	European Union
EMU	Economic and Monetary Union
ERM II	Exchange rate mechanism II
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
IMD	Institute for management development
IMF	International Monetary Fund
NBER	National Bureau for Economic Research
NBS	National Bank of Slovakia
OECD	Organisation for Economic Cooperation and Development
PAS	Business alliance of Slovakia
WEF	World Economic Forum

1 Introduction

„A continental currency, with a dual metallic and fiduciary base, resting on all Europe as its capital and driven by the activity of 200 million men: this one currency would replace and bring down all the absurd varieties of money that exist today, with their effigies of princes, those symbols of misery.” Victor Hugo, 1855

The present master's thesis is focused on the impact of introducing the common European currency on a country's competitiveness. The dream of a currency unit embracing and unifying disparate peoples and filling the wealth gap between economies has been of concern to policymakers and economists throughout centuries. The establishment of the Economic and Monetary Union (EMU) on 1 January 1999 was an important milestone in the process of economic integration in Europe. Naturally, great expectations have been laid on this new institution, hoping that, by increasing trade and foreign investments between the member states, it would increase welfare, enhance resource allocation, and help to make Europe more competitive.

There has been a lot written about the possible effects of euro adoption on economies of the first participants. The objective of the current thesis is, however, to explore the impact of introducing the common European currency on competitiveness of Slovakia, in comparison to the Czech Republic which still uses its own national currency – the koruna. Euro changeover has undoubtedly been one of the largest integration steps for Slovakia in the previous decade. This step affected all of the country's inhabitants. Neither professional studies nor public declarations published in the period before the introduction of the euro dealt with detailed expectations associated with its impact on competitiveness of Slovak businesses and the country as a whole. The work should thus somewhat contribute to the discussion over the costs and benefits of the eurozone membership. Indeed, this is a very actual topic, considering the flaws in the governance framework underlying the functioning of the euro area revealed by the recent global economic and financial crisis followed up by the European sovereign debt crisis. Since there is no agreed and generally accepted definition of competitiveness, the current writer cannot hope to cover all the possible implications of the question. Within the scope of this thesis, it is not possible to include all the relevant factors that may

possibly influence the level of competitiveness and thus the topic is explored mostly from the macroeconomic point of view. Some of the main macroeconomic indicators that serve as good competitiveness drivers will be selected and the overall macroeconomic performance of the country will be assessed. These measures are in line with the scoreboard - indicators and thresholds - chosen by European Commission (2012) in its Alert Mechanism Report as to provide a “reliable signaling device for potentially harmful imbalances and competitiveness losses at an early stage of their emergence.” Identified measures are particularly foreign direct investments, volume of foreign trade, the evolution of GDP, development of export market shares, real exchange rates, price stability etc. Relevance of these drivers will be adequately justified later on in the paper. Based on the extensive literature review and own empirical research, the paper should address and verify several questions. For instance: “Did the euro adoption in Slovakia imply a positive effect on trade? Has the euro accession improved economic stability in Slovakia?”

The remainder of this thesis is organized as follows. Chapter 2 briefly discusses the concept of country competitiveness and attempts to derive some of its main macroeconomic indicators. Chapter 3 reviews the empirical evidence and achieved results regarding the impact of the euro adoption on foreign trade in selected countries with an emphasis on Slovakia and the Czech Republic. Chapter 4 addresses the development of other major competitiveness indicators identified, such as foreign direct investment, export market shares, real effective exchange rate etc. Finally, Chapter 5 concludes.

2 Concept of competitiveness

Before introducing different perspectives of competitiveness, the dictionary definitions of competition are stated initially. The word competition has its origin in early 17th century from Latin *competitio*, meaning ‘rivalry’. Oxford Dictionary defines competitiveness as the activity or condition of striving to gain or win something by defeating or establishing superiority over others. Webster dictionary defines the term as an effort of two or more parties acting independently to secure the business of a third party by offering the most favorable terms.

While applied extensively to countries, the term competitiveness is not uniformly measured or defined. Classical economists evaluated the competitiveness amongst nations using statistics on the factors of production: land, capital, natural resources and labor. Ricardo’s famous theory on comparative advantage, which is still valid today, was indeed an early attempt to understand how nations compete (Garelli, 2002). After two hundred years, the question still does not have a definite answer and the term seems to mean different things to different researchers - some emphasize a country’s low costs or the level of its exchange rate, others a country’s technological leadership, its growth rate or productivity (Boltho, 1996; Fröhlich; 1989; Porter, 1998).

Overall stability of the macroeconomic environment is also an important precondition for a competitive country. Although it is certainly true that macroeconomic stability alone cannot increase the productivity of a nation, it is also recognized that macroeconomic disarray harms the economy, i.e. the economy cannot grow in a sustainable manner unless the macroeconomic environment is stable (WEF, 2010). Yet another opinion is that “competitiveness is a meaningless word when applied to national economies and therefore its practical usage is not justified”. Though it is recognized by many researchers, the most well-known advocate of this position is the US economist Paul Krugman (1990, 1994, 1996). Perhaps the most systematic research of the topic was done by Trabold (1995), who highlighted four important aspects of competitiveness: ability to sell (export ability), ability to attract (investments), ability to adjust and ability to earn. This approach sees ability to earn (level of earnings) as the most general indicator of country’s competitiveness, whereas ability to export,

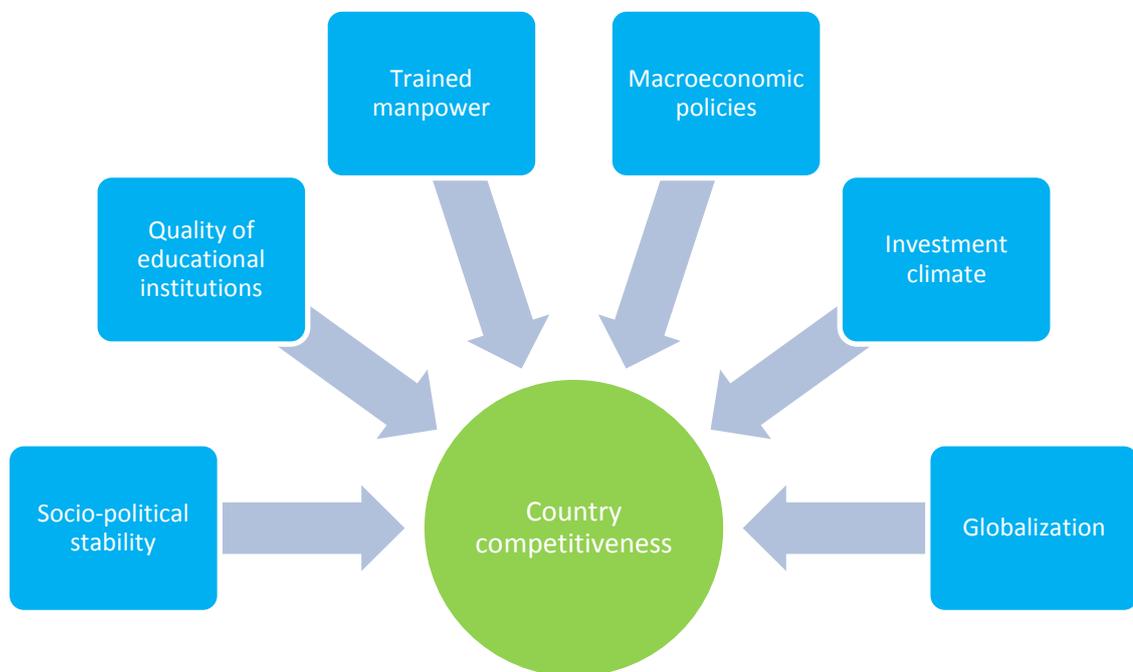
attractiveness (location) and ability to adjust are seen as factors. At the same time, in regard to foreign direct investments, ability to export and attractiveness function as independent indicators of competitiveness of a country. The most general indicator of national competitiveness – ability to earn, can be related to the GDP per capita. However, evaluation of competitiveness based solely on the comparison of average level of income per capita would be a reduction of reality to the problem of modelling and of comparative analysis of growth. Trabold explains that ability to create wealth is more important than the wealth itself, because it guarantees the substitution in case the wealth is lost. Thereby, the important aspects that should be evaluated to forecast country's competitiveness are also investments in technology and education.

Marsch and Tokarick (1994) identify real exchange rates based on consumer price indices, export unit values in manufacturing, normalized unit labor costs in manufacturing, the relative price of traded to non-traded goods, and the ratio of normalized unit labor costs to value-added deflators in manufacturing as the main competitiveness indicators. However, they admit that all competitiveness indicators possess shortcomings, and that no single criterion provides an unambiguous evaluation of competitiveness. "Therefore, no one indicator may be elevated to the status of the best indicator. [N]one of the indicators works well uniformly across countries." Authors of the prestigious Global Competitiveness Report think competitive economies are those that have in place factors driving the productivity enhancements on which their present and future prosperity is built. They define competitiveness as "the set of institutions, policies, and factors that determine the level of productivity of a country" (WEF, 2010). Michael E. Porter (2005), a preeminent professor of strategy and competition at Harvard Business School defines competitiveness drivers as following:

Almost everything matters for competitiveness. The schools matter, the roads matter, the financial markets matter and customer sophistication matters. These and other aspects of a nation's circumstances are deeply rooted in a nation's institutions, people and culture. This makes improving competitiveness a special challenge, because there is no single policy or grand step that can create competitiveness, only many improvements in individual areas that inevitably take time to accomplish. Improving competitiveness is a marathon, not a sprint. How to sustain momentum in improving competitiveness over time is among the greatest challenges facing countries.

In his 1998 speech, Porter said it is solely productivity that defines competitiveness of a nation. “No other definition makes sense,” he adds. Interestingly, he claims exports based on low wages and cheap currency do not support an attractive standard of living. Porter thus brushes off the common belief that lowering wages or exchange rates help countries to become more competitive. The former implies that firms are not competitive and cannot support a high standard of living. The latter is just one of the signs that the nation is not competitive and “the quality of its goods and services cannot support current prices. (...) The only definition of competitiveness, and the only way to build prosperity in an economy, is improving productivity,” Porter concludes. Figure 1 depicts the complexity of the issue in question.

Figure 1: Country Competitiveness Module



Source: Own elaboration based on IndiQuest Research

The US President’s Commission on Industrial Competitiveness established by the Reagan administration in its 1985 report identifies nation’s competitiveness as a “degree to which it can, under free and fair market conditions, produce goods and services that meet the test of international markets while simultaneously expanding the real incomes of its citizens.” This definition was later adopted also by OECD, though in a shorter form. The position that competitiveness comes hand in hand with rising standard of living and employment is expressed also by European Commission (2000) in its study on the regional competitiveness factors saying “the level of economic activity should not cause an unsustainable external balance of the economy nor should it

compromise the welfare of future generations.” European Commission (2003) understands competitiveness “to mean high and rising standards of living of a nation with the lowest possible level of involuntary unemployment, on a sustainable basis.” The IMF Executive Board stated when concluding the 2008 Article IV Consultation with the United States that “... the decline in the dollar’s real effective exchange rate has moved U.S. competitiveness relatively close to medium-term fundamentals.” Suárez (2010) testifies that measures encouraging competitiveness are “active employment policies and continuous apprenticeship”. Christoph Zott (2010), a professor in IESE’s Department of Entrepreneurship thinks that competitiveness of a country can be viewed as the sum of competitiveness of its businesses, which is in part determined by the impact of government policies. Finally, Lalinský (2010) explains it is rather difficult to define quantitative indicators enabling to assess short-term trends in the development of competitiveness. Such indicators “are not always internationally comparable and available in the necessary industrial division and for a sufficiently long period of time.” He concludes that “the most significant indicator of business competitiveness is export performance.”

3 Impact of the euro on foreign trade

3.1 Theoretical background

For most of the last hundred years, economists and policymakers thought that exchange rate volatility and multiple currencies depressed trade. For instance, the older economists of the nineteenth century generally favored a world currency. As John Stuart Mill (1894) puts it, there is so much of barbarism “in the transactions of most civilized nations that almost all independent countries choose to assert their nationality by having, to their own inconvenience and that of their neighbors, a peculiar currency of their own.” French dramatist Victor Hugo envisioned a common unit of money that would comprise of European nations and the United States of America. These blocs should have extended their hands over the seas, “exchanging their products, their commerce, their industry, their arts, their genius, opening up the globe, colonizing the deserts, improving creation under the gaze of the Creator.” This stemmed from causal empiricism, most of it related to the period from 1880 to 1914, also known as the classical gold standard. During that time, the majority of countries in varying degrees adhered to gold. It was also a period of unprecedented economic growth with relatively free trade in goods, labor, and capital (Bordo, 2002). From this Mundell (1961) deduced that more trade would be the main microeconomic gain enjoyed when two nations form a currency union, claiming that if factors of production are mobile across national boundaries then a flexible exchange system becomes unnecessary, and may even be positively harmful. However, this cornerstone of Mundell’s famous ‘optimal currency area’ theory rested on a no econometric evidence. Until relatively recently, economists could not find robust empirical evidence for a negative impact of exchange-rates and volatility on trade flows despite the increasingly sophisticated empirical methods and larger datasets. Clear results were not identified even after the exchange rate turmoil accompanying the break-up of the Bretton Woods system in the 1970s and despite the best efforts of economists, a basic paradox as to the impact of exchange rate volatility on trade flows remained unresolved (McKenzie, 1999).

The situation changed dramatically at the turn of the 21st century. Rose (2000) published his finding that a currency union is a powerful stimulant to trade.

Furthermore, he found a small negative trade effect of exchange rate volatility, even after controlling for a host of features, including the endogenous nature of the exchange rate regime. The results withstood an initial barrage of cross checks and sensitivity analyses and the estimates seemed to be robust. The so called ‘Rose effects’ implied that two countries that share the same currency trade three times as much as they would with different currencies. Since the introduction of this revolutionary paper, a lot of research has been conducted either to confirm or disprove Rose’s results. The empirical literature on the boost to trade due to the formation of a monetary and currency union is, however, rather ambiguous. Estimates published by researchers range significantly. Berger and Nitsch (2005), taking a long-run view of European integration, found that the introduction of the euro had had almost no measurable effect on trade. More specifically, there is strong evidence for a gradual increase (rather than a one-time jump) in trade intensity between countries that later join the EMU over a period of more than fifty years. As soon as they controlled for this long-term trend, the introduction of the euro had no additional effect on trade. Pakko and Wall (2001) even reported a 40% negative effect of currency unions on trade. On the other side of the spectrum lies the paper by Alesina, Barro and Tenreyro (2002), estimating that currency union has a positive effect on bilateral trade of as much as 1,388%. According to McKinsey & Company (2012) the trade increase within the euro area is an important lever substantially benefiting EMU members. Nonetheless, the study states that the countries benefit to different degrees, with most of the profits accruing to Germany. Dědek (1996) reports of the negative trade effects after the breakup of the common currency area in case of the former Czech and Slovak Federal Republic and the subsequent creation of independent Czech and Slovak Republics on 1 January 1993. In the first two years after the split, exports to the other Republic declined by 22% and 19% respectively in the Czech Republic and by 18% and 8% respectively in Slovakia. At the same time, export to other countries rose markedly. Apparently, findings of the research workers are rather equivocal. Thus, in order to carefully analyze and assess the results, one should invest in understanding the main empirical tool in the field - the gravity equation.

3.2 Insight into the Gravity model

The gravity model has a long history as many authors have noted a relationship between, on the one hand, flows between different locations and on the other hand, the

‘weight’ of these locations and the inverse of distance. As van Bergeijk and Brakman (2010) state it in their extensive publication devoted to gravity model’s application, perhaps the first formulation of the gravity narrative is mentioned by Ravenstein (1885), who explains how ‘currents’ of migration are driven by the “absorption of centers of commerce and industry” but “grow less with the distance proportionately.” Later on, in 1954 Isard and Peck empirically demonstrated the negative impact of distance for different modes of both domestic and international transport and came close to formulating gravity equation. However, the first mathematical formulation and empirical application of the gravity model occurred a bit later in 1962, thanks to the group of Dutch economists headed by Tinbergen who were the first to actually publish a gravity model and an empirical application. Tinbergen supervised the Ph.D. thesis of Linnemann (1966) that has become the standard reference to the early version of the gravity equation. Leamer and Stern (1970) were the first to explicitly refer to these formulations as ‘gravity models’. At that time, a solid micro-foundation of the model was still missing and the authors conclude that the significance of such research must be found in the context of seeking a broader understanding of the empirical base of the pure theory of international trade. In his popular article, Anderson (1979) deemed the gravity equation to be “the most successful empirical trade device of the last twenty-five years”. On the other hand, “its use for policy is severely hampered by its ‘unidentified’ properties”, he admitted. According to Baldwin (2008) it is Anderson who provided the first clear micro-foundations that relied only on assumptions that would be considered as standard nowadays, with the cornerstone supposition being the theory that each nation produced a unique good that was only imperfectly substitutable with other nations’ goods. Nevertheless, due to having too few theoretical foundations the model had a rather bad reputation in the 1970’s.

This has changed with the introduction of the so called ‘new international trade theory’. The author of the theory is Paul Krugman (1979) who eventually won the Nobel Prize in Economic Sciences for his contribution in the field. The theory breathed fresh air into the gravity model. Indeed a trend emerged where the model went from having too few theoretical foundations to having too many. For example, in a 1995 paper on the gravity model Deardorff writes: “it is not all that difficult to justify even simple forms of the gravity equation from standard trade theories.” However, he also adds that because the gravity equation “appears to characterize a large class of models,

its use for empirical tests of any of them is suspect.” The most recent advances include for instance Anderson and Van Wincoop’s (2003) introduction of nation-dummies in the framework of theoretical gravity equations and thus efficiently and consistently estimating the impact of national borders on trade between US and Canadian provinces. As Baldwin (2008) concludes, recent years have seen a number of papers by empirical trade economists that take the theory seriously, but these are typically viewed as contributions to narrow empirical topics, such as the magnitude of the elasticity of substitution and thus “the methodological advances in these papers have been generally ignored in the wider literature.”

3.3 Descriptive data analysis

Panel data methods are used to analyze the influence of euro adoption on trade flows between euro area member states. Before discussing the methodology, it is helpful to understand the behavior of panel data in general terms. The word *panel* is derived from Dutch and originally describes a rectangular board. According to Kunst (2011), in econometrics, the term denotes data sets that have both a time dimension as well as a non-time dimension. A genuine panel has the form:

$$X_{it}, i = 1; \dots, N, \quad t = 1, \dots, T.$$

Here the dimension i is called the ‘individual dimension’, and t is the time dimension. X can be a scalar (real) variable or also a vector-valued variable. Often, data sets do not correspond exactly to this pattern, even though they have similar dimensions i and t . For example, t may denote an individual time dimension rather than a common time (Kunst, 2011).

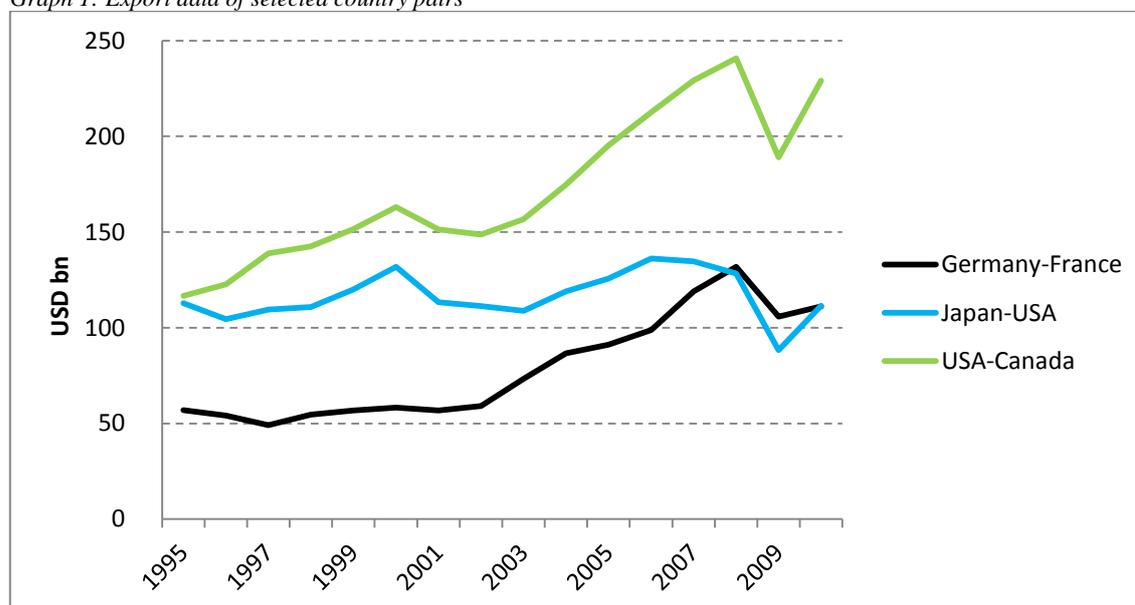
The methodology employed to estimate the euro trade effects draws upon the one used in Baldwin (2008) but with a few new variables and four years longer set of data. The country sample consists of 20 countries. Ten participate in the currency union and in the single market: Austria, Belgium-Luxembourg, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal and Spain. As in the paper written by Flam and Nordström (2007), Belgium and Luxembourg are treated as a single country since they were treated as such in trade statistics until 1999. Countries that entered euro area later, namely Greece, Slovenia, Cyprus, Malta, Slovakia and, most recently, Estonia are not included due to difficulties with controlling for their late entries and a too short time

period spent in the eurozone. Four more countries participate in the single market, but not in the currency union: Denmark, Norway, Sweden and the United Kingdom. Six OECD countries with similar levels of development and per capita income that are outside both the currency union and single market are also included: Australia, Canada, Japan, New Zealand, Switzerland and the United States. Altogether, this sums up to 380 country pairs with 16 observations (years) for each pair. There were trade data missing for Denmark in 1997, therefore the total number of observations in the sample is 6061 and the panel is partially unbalanced. The sample period is 1995-2010. The starting year was chosen because Austria, Finland and Sweden became members of the EU in 1995. By starting in 1995, neither we have to control for the change in their status, nor will there be problems with time series of trade data.

3.3.1 Export data

Export data quoted in current U.S. dollars were taken from the United Nations Comtrade database. They were deflated using a producer price index (PPI) from OECD. As an alternative, a consumer price index was used if the producer price index was unavailable. As mentioned earlier, trade data for Denmark in 1997 were not available. In the model, data are interpreted in a logarithmic form.

Graph 1: Export data of selected country pairs



Source: Own calculation based on UN Comtrade data

3.3.2 Real exchange rate

Current nominal exchange rates were obtained from Oanda webpage. Real exchange rates between countries i and j (an exporting country and an importing

country) are also known as the bilateral exchange rate. They have been constructed by dividing the exporting country's producer price index by the importing country's PPI. The PPIs for all countries are expressed in US dollars, i.e. the index values are multiplied by the current exchange rate of the dollar to the corresponding currency. Exports from country i to country j are expected to decrease with increasing bilateral exchange rate.

3.3.3 Other independent variables

Table 1 summarizes all the variables employed with the expected signs obtained from the regression. Real GDP data were taken from the OECD database. Trade costs should include geographical distance plus many other factors, such as border contiguity, shared language, common colonial relations etc. In other words, they are costs of exporting from i to j relative to the cost of exporting from i 's competitors to j (Anderson and van Wincoop, 2003). Language and geography-related variables were retrieved from the gravity database constructed by CEPII¹. More relevant to the estimation are the dummy variables for exports to, from, and within the eurozone as well as a set of dummy variables for exports to, from, and within the single market. The set of both dummies will show the difference in exports between eurozone/single market countries and outsiders.

Table 1: Variables and their expected signs

Variable	Description	Source	Exp. sign
$\ln Exports_{ij}$	dependent variable; natural logarithm of the export between countries i and j	Comtrade database	
$\ln GDP_i$	natural logarithm of the importing country's GDP	OECD	+
$\ln GDP_j$	natural logarithm of the exporting country's GDP	OECD	+
$\ln bilateral_{ij}$	natural logarithm of the exchange rate between the exporting and the importing country	Oanda; Eurostat	-
$adjacency$	dummy variable set to 1 if a country pair shares a common border	CEPII database	+

¹ Centre d'études prospectives et d'informations internationales

<i>common language</i>	dummy variable set to 1 if a country pair uses a common official language	CEPII database	+
<i>lndistance_{ij}</i>	natural logarithm of the distance between the exporter and the importer based on bilateral distances between the biggest cities of the two countries, weighted by the share of the city in the overall country's population	CEPII database	-
<i>landlocked_i</i>	dummy variable set to equal 1 if the importing country is landlocked	CEPII database	-
<i>landlocked_j</i>	dummy variable set to equal 1 if the exporting country is landlocked	CEPII database	-
<i>colony</i>	dummy variable set to equal 1 if a country pair has ever had a colonial link	CEPII database	+
<i>same country</i>	dummy variable set to equal 1 if a country pair has been the same country	CEPII database	+
<i>EZ_{ij}</i>	dummy variable for exports to, from or within the eurozone	Own calculation	+
<i>SM_{ij}</i>	dummy variable for exports to, from or within the single market	Own calculation	+

Source: Own elaboration

Table 2 reports the descriptive statistics. As the group in this setup is the country pair, the between-group variation is the variation of variables between country pairs for the considered period and the within-group variation is the variation of the country pair variable over analyzed period (Matei, 2007). Since the between variability is higher than the within variability in all cases, this is an indication of the possible heterogeneity across country pairs (Bellak *et al.*, 2007).

Table 2: Descriptive statistics

Variable		Mean	Std. Dev.	Min	Max	Observations
<i>lnExports_{ij}</i>	overall	21.51095	1.84401	15.2668	26.5920	N = 6061
	between		1.81043	16.0114	26.1874	n = 380
	within		0.35452	20.1042	23.1559	T-bar = 15.95
<i>common language</i>	overall	0.15311	0.36012	0	1	N = 6061
	between		0.36011	0	1	n = 380
	within		0	0.15311	0.15311	T-bar = 15.95
<i>colony</i>	overall	0.047517	0.21276	0	1	N = 6061
	between		0.21271	0	1	n = 380
	within		0	0.04752	0.04752	T-bar = 15.95
<i>same country</i>	overall	0.00528	0.07248	0	1	N = 6061

	between		0.07245	0	1	n = 380
	within		0	0.00528	0.00528	T-bar = 15.95
<i>Indistance_{ij}</i>	overall	8.008689	1.21491	5.08096	9.88019	N = 6061
	between		1.21655	5.08096	9.88019	n = 380
	within		0	8.00869	8.00869	T-bar = 15.95
<i>landlocked_i</i>	overall	0.100314	0.30044	0	1	N = 6061
	between		0.30040	0	1	n = 380
	within		0	0.10031	0.10031	T-bar = 15.95
<i>landlocked_j</i>	overall	0.099984	0.30000	0	1	N = 6061
	between		0.30040	0	1	n = 380
	within		0	0.09998	0.09998	T-bar = 15.95
<i>adjacency</i>	overall	0.105428	0.30713	0	1	N = 6061
	between		0.30730	0	1	n = 380
	within		0	0.10543	0.10543	T-bar = 15.95
<i>lnGDP_i</i>	overall	27.04428	1.27830	24.8903	30.3111	N = 6061
	between		1.25818	25.2545	30.0152	n = 380
	within		0.23334	26.3783	27.5335	T-bar = 15.95
<i>lnGDP_j</i>	overall	27.04049	1.27870	24.8903	30.3111	N = 6061
	between		1.25883	25.2545	30.0334	n = 380
	within		0.23311	26.3443	27.5297	T-bar = 15.95
<i>lnbilateral_{ij}</i>	overall	0.004575	1.67557	-4.95333	4.95333	N = 6061
	between		1.67723	-4.74043	4.74043	n = 380
	within		0.05815	-0.29812	0.30728	T-bar = 15.95

Source: Own elaboration

The *correlation matrix*² of the analyzed variables is illustrated in Table 3. At a glance, all the correlations are a matter of common sense. The correlation between exports and distance (0.506) is elevated. But, it is expected that the closer countries are the lower the costs of transportation and thus the higher the trade between them. Also, countries with higher GDP import more. Naturally, adjacency is negatively correlated with distance (-0.458) and positively correlated with common official language (0.379). Bilateral exchange rate does not display any high correlation, which is also quite reasonable.

Table 3: Correlation matrix of main variables

Adjacency	Com_lang_off	Samecountry	Ln_Distw	Landlock_ex	
1.0000	0.3792	0.2122	-0.4583	0.0857	Adjacency
	1.0000	0.1713	-0.0447	0.0776	Com_lang_off
		1.0000	-0.1756	-0.0243	Samecountry
			1.0000	-0.1309	Ln_Distw
				1.0000	Landlock_ex
Landlock_im	Ln_Exports	Ln_GDP_ex	Ln_GDP_im	Ln_Bilateral	
0.0862	0.3973	0.0399	0.0398	-0.0003	Adjacency
0.0782	0.1584	0.0316	0.0328	-0.0012	Com_lang_off

² Correlation matrix is a matrix giving the correlations between all pairs of data sets, 5% critical value (two-tailed) = 0.0252 for n = 6061

-0.0243	0.1059	-0.0170	-0.0168	-0.0002	Samecountry
-0.1301	-0.5044	0.1033	0.1040	-0.0015	Ln_Distw
-0.0527	-0.0576	-0.2046	0.0105	0.1092	Landlock_ex
1.0000	-0.0959	0.0108	-0.2030	-0.1099	Landlock_im
	1.0000	0.4547	0.5064	-0.0477	Ln_Exports
		1.0000	-0.0203	-0.0494	Ln_GDP_ex
			1.0000	0.0456	Ln_GDP_im
				1.0000	Ln_Bilateral

Source: Own elaboration

3.4 Methodology

The traditional gravity model is derived from Newton’s Law of Gravitation. In physics, the trade gravity model’s namesake describes the force of gravity between two objects as proportional to the product of the masses of the two objects divided by the square of the mutual distance between them. “A mass of goods or labor or other factors of production supplied at origin i , Y_i , is attracted to a mass of demand for goods or labor at destination j , E_j , but the potential flow is reduced by the distance between them, d_{ij} ” (Anderson, 2011). Strict application of the analogy leads to the following:

$$\text{force of gravity} = G \frac{Y_i E_j}{(\text{distance}_{ij})^2} ;$$

where the E and Y are the two masses. G is the gravitational constant (equal to $6.67300 \times 10^{-11} \text{ m}^3 \text{ kg}^{-1} \text{ s}^{-2}$, where m, kg and s stand for meters, kilos and seconds).

The naïve form of the gravity model implies that exports from country i to country j depend directly on the two countries’ exports and inversely on the trade costs between them. Physical mass (M) is replaced by economic mass (GDP) and the power function on distance is removed. The basic function therefore takes the following form:

$$\text{Exports}_{ij} = \frac{GDP_i \times GDP_j}{\text{Trade costs}_{ij}}$$

If we depart from this strict analogy Anderson (2011) explains that “traditional gravity allowed the exponents of 1 applied to the mass variables and of -2 applied to bilateral distance to be generated by data to fit a statistically inferred log-linear relationship between data on flows and the mass variables and distance.” Hence, the gravity model is estimated in log-linearized form:

$$\ln \text{Exports}_{ij} = \beta_1 \ln GDP_i + \beta_2 \ln GDP_j - \ln \text{Trade Costs}_{ij}$$

Anderson (2011) suggests to supplement the traditional gravity “with other proxies for trade frictions, such as the effect of political borders and common language” in order to improve the fit. Taking it into consideration, the complete model takes the following form:

$$\begin{aligned} \ln Exports_{ij} = & \beta_{ij} + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_3 \ln bilateral_{ij} + \beta_4 adjacency \\ & + \beta_5 common\ language + \beta_6 colony + \beta_7 same\ country \\ & + \beta_8 \ln distance_{ij} + \beta_9 landlocked_i + \beta_{10} landlocked_j \\ & + \beta_{11} fromEZ + \beta_{12} toEZ + \beta_{13} withinEZ + \beta_{14} fromSM + \beta_{15} toSM \\ & + \beta_{16} withinSM \end{aligned}$$

Concerning the methodology, two different techniques are employed. The first is Ordinary Least Squared method with time trend. In this case, we do not assume any particular structure of the within-panel error term, except for the presence of the unobserved effect. Standard errors are estimated by using the cluster option and thus calculating standard errors that are robust to within panel serial correlation and heteroscedasticity. The second method is a two-way fixed effects approach, known as the Least Square Dummy Variable (LSDV) regression model, in which the unobserved effect is brought explicitly into the model by a set of dummy variables. STATA and Gretl software are used to execute the tasks.

3.5 Results interpretation

Table 4 summarizes the results of the regressions. For sake of comparison, columns A-F show the original results obtained by Baldwin (2008), using various techniques.³ Columns G and H represent the findings of the present author. All the variables carry the expected signs. They suggest the aggregate intra-eurozone trade was stimulated only slightly, i.e. up to 5%. Astonishingly, the trade flows to eurozone proved negative. This might indicate that the eurozone crisis negatively influenced trade with outsiders but the trading activity among the countries of the control group remained stable. Another explanation for the negative results is a general proclivity to

³ Notes: A = OLS in real terms using log-gravity and time dummies ; B = OLS in nominal terms using log-gravity and time dummies; C = Importer, Exporter and time dummy (i.e. Anderson-Van Wincoop + time dummy) using log-gravity in nominal terms; D = Time-varying importer and exporter using log-gravity in nominal terms; E = Time and pair dummies using log-gravity in nominal terms; F = Time-varying importer and exporter and time invariant pair using log-gravity in nominal terms.

display positive effects. Recently, in a meta-analysis of 61 studies, Havránek (2010) reports of the striking degree of publication bias present in the Rosean literature applied on the eurozone, e.g. “if there is a top economist among co-authors, the study reports significantly higher (trade) effects.” As Baldwin (2008) explains it would be a “vast oversimplification to talk about ‘the’ impact of the euro on trade” and it is rather difficult to come up with unambiguous results.

Regarding the remaining variables, the impact of the euro on the eurozone’s exports to non-euro users is also negative, but insignificant and very, very small. GDP size is positive and significant in the case of origin as well as destination. As expected, the impact of distance on trade is negative with the value of $\beta_8 \ln distance_{ij}$ around -1. Border contiguity and shared official language both have positive impact on mutual trade. Landlocked countries seem to trade less, which is also natural given that they are typically of smaller size. $\beta_3 \ln bilateral_{ij}$ variable is negative, proving that the bilateral real exchange rate time series expressed by way of national producer price indices was constructed correctly. The overall goodness-of-fit of the model is satisfactory ($R^2 = 0.92$; adjusted $R^2 = 0.91$).

Table 4: Overview of the results

	A	B	C	D	E	F	G	H
EZ11	0.04 ***	-0	0.01	-0	0.01 ***	0.02 ***	0.0	0.05 **
EZ01	0.06 ***	-0 ***	0	0	0	-0 **	-0.16 *	-0.16 ***
EZ10	-0 ***	-0 *	0	-0	0.01 ***	0.03 ***	-0.06	-0.02
ly_o	0.69 ***	0.2 ***					0.75 ***	0.72 ***
ly_d	0.76 ***	0.68 ***					0.77 ***	0.76 ***
ldistw	-1.2 ***	-1.1 ***	-1.2 ***	-1.3 ***			-1.02 ***	-0.99 ***
adjacency	0.13 **	0.1 **	0.15 ***	0.22 ***			0.35 ***	0.4 ***
comlang_off	0.38 ***	0.42 ***	0.18 ***	0.09			0.2 *	0.15 ***
lremot_o	-1.6 ***	-1.7 ***	0					
lremot_d	3.49 ***	2.35 ***	0					
landlock_o	-0.8 ***	-0.7 ***	1.49 ***				-0.33 ***	-0.4 ***

landlock_d	-0.7 ***	-0.7 ***	0.63 ***				-0.73 ***	-0.69 ***
lrber	-0.1	0.18 ***	-0	0.39			-0.09 ***	-0.08 ***
smp_o	0.04 ***	0.01 ***	-0 **	-0	-0 ***	-0 ***		
smp_d	-0.1 ***	0.01 **	0	-0.1 *	0.01 *	0.02 *		
_cons	-65 **	-29	31 ***	33.3 ***	-1.8	21.5 ***	-10.3 ***	-9.6 ***

Source: Baldwin (2008) and own calculations

Several tests have been performed to verify the reliability of the results. The *multicollinearity* is checked by applying the variance inflation factors (VIF) test (Bellak *et al.*, 2006). VIF are a scaled version of the multiple correlation coefficient between variable j and the rest of the independent variables and is calculated as: $VIF_j = 1 / (1 - R_j^2)$, where the R_j is the multiple correlation coefficient (Matei, 2007).

Table 5: Variance inflation factors test

Variable	VIF	1/VIF			
adjacency				1.61	0.622654
withinsm	10.82	0.092396	com_lang_off	1.42	0.705015
ln_distw	4.34	0.230498	landlock_ex	1.35	0.743362
tosm	4.09	0.244413	landlock_im	1.34	0.74402
fromsm	4.08	0.244941	ln_bilateral	1.29	0.775741
withinez	2.26	0.443356	ln_gdp_im	1.24	0.805967
toez	2.09	0.478869	ln_gdp_ex	1.24	0.807237
fromez	2.09	0.479318	samecountry	1.1	0.911903
timetrend	1.69	0.591923	Mean VIF	2.63	

Standardly, VIF values are acceptable when lower than 10. The 1/VIF column tells us what proportion of an independent variable's variance is independent of all the other x variables. A low proportion (e.g., 0.10) indicates potential trouble. The results described in table 4 reveal that some work still might be done to improve the single market dummies. In general, there are no problems due to multicollinearity among the independent variables as all the values of 1/VIF are above 0.10 (Matei, 2007).

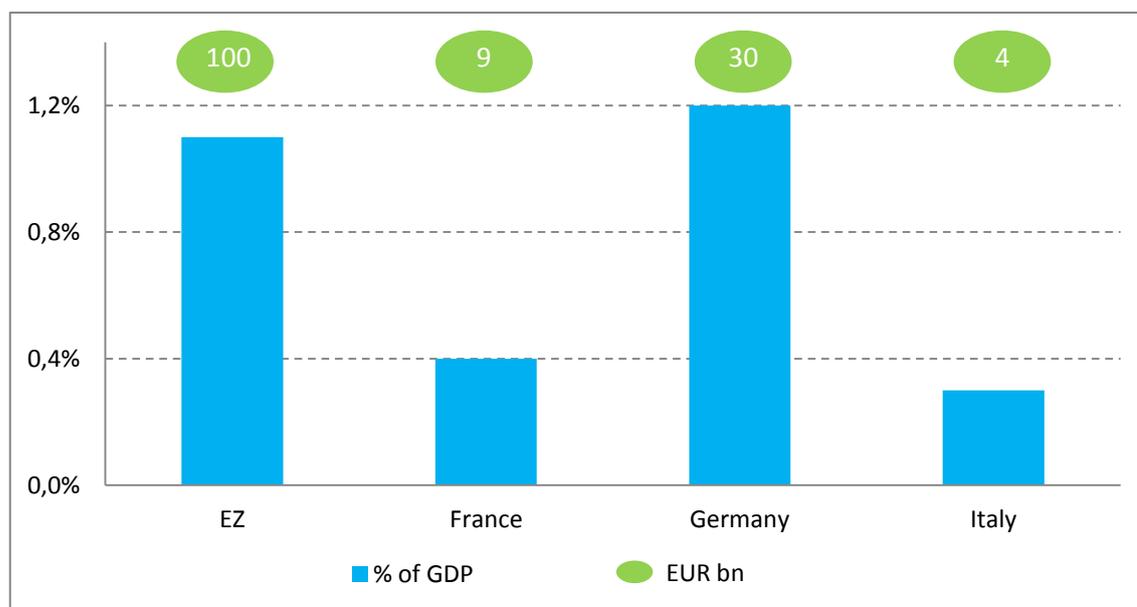
Regarding the heteroscedasticity problem, country data are often collected using clustering and so some country groups may be oversampled. Viewing each country's data period as a cluster should yield more realistic standard errors. The heteroscedasticity problem is solved because the estimation method used is clustered Ordinary Least Square that calculates standard errors robust to within panel serial

correlation and heteroscedasticity. More specifically, the `cluster(id)` option is added to the regression command, where `id` is the identification number of a particular country pair.

3.6 Further evidence on the euro trade impacts

A recent study conducted by McKinsey & Company (2012), a leading global management consulting firm, reveals the euro-implied benefits are distributed unequally among members. While Germany's accumulated growth of trade exceeds EUR 30 billion, Italy has felt the effect only to the limited extent, with 0.3% increase in its trade volume over the same period. Overall profits from the increased trade for the whole euro zone add up to some EUR 100 billion.

Graph 2: Positive trade effects brought by euro adoption, 1999-2010



Source: Eurostat, European Commission, McKinsey & Company

In spite of the misbalances in the distribution of positive trade effects, the report deems false the widespread view that some eurozone nations had profited at the expense of others. Table 4 shows that with the euro every nation is better off, but to substantially different extent. McKinsey estimates point to 15 percent boost to within eurozone trade resulting from the launch of the euro. This accounts for half of the total increase in trade since 1999. "The rest is likely to have come from further development of the EU's single market, more intense globalization, and strong growth in the wake of the EU's enlargement to Eastern Europe," the report concludes.

Table 6: Benefits of eurozone membership in selected countries

Country	Contribution to GDP growth	
	% of GDP	EUR bn
Austria	7.8	22
Finland	6.7	12
Germany	6.4	165
Netherlands	6.2	37
Italy	2.7	44
Portugal	2.1	4
Spain	0.7	8
France	0.7	14
Greece	0.1	0.172
other eurozone countries		27
Overall	3.6	332

Source: Eurostat, McKinsey & Company

As one can see, the effect of the single currency varies across countries and thus the results are influenced by the sample used and should always be interpreted with caution. Marsh (2011) comments that because nations within a single currency area were not able to devalue their currency, some of the southern and western peripheral countries “such as Ireland, Portugal, Spain and Greece with higher inflation than the core group around Germany effectively had exchange rates that were far too high, pricing their goods and services out of business in international trade.” Lalinský (2010) observes differences between industries, claiming that those businesses using decreasing costs of scale profited the most from the launch of the euro. He says that, besides industry-related division and industry location, factors such as different access to production resources and market liberalization rate “could have played a decisive role” in the euro conversion being a benefit for a particular country and industry or not.” Havránek (2010) concludes “the trade effect of the euro (at least based on available empirical studies) is probably much lower than we believed, even if ‘what we believed’

was already twentyfold less than what Rose reported in his famous article.” Baldwin (2008) believes that while it is impossible to fully understand the euro’s trade impact without another decade or so of data, the effect seems to be diminishing, i.e. “the aggregate trade effect of the euro – the Rose effect - is positive but small.” He also mentions the differences across sectors and member states, but he adds that “there is really not enough data to firmly establish such differences in a credible fashion.” Therefore, in order to sufficiently verify the first hypothesis, further analysis is required. The next section deals with the question of possible euro-induced trade effects on a qualitative basis, with a special accent on the performance of the Czech Republic and Slovakia during the period surrounding euro changeover in Slovakia.

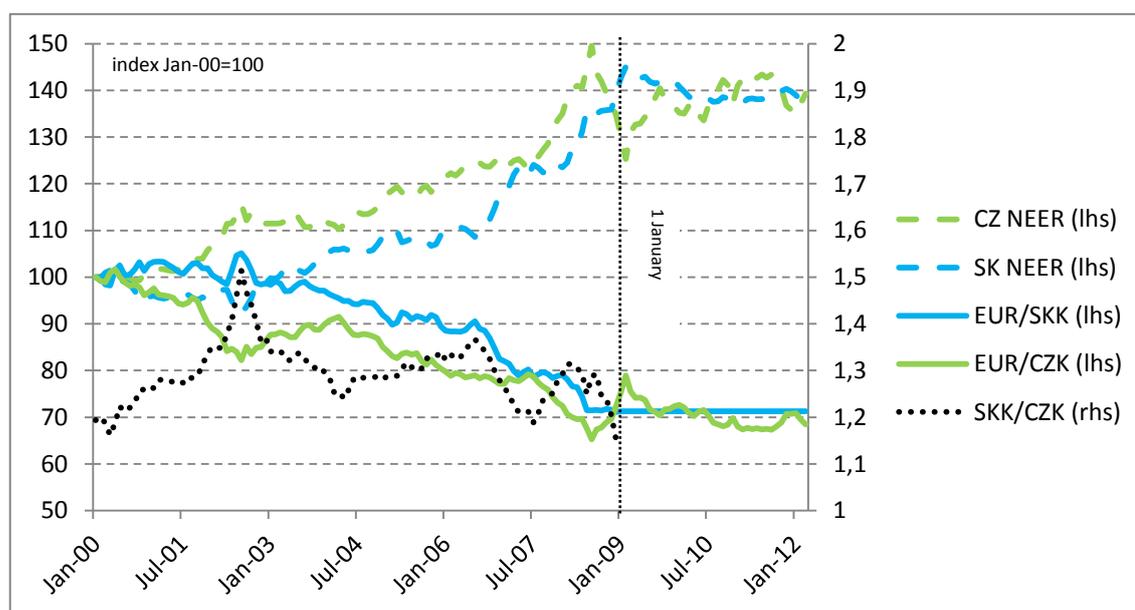
3.7 Export performance of the Czech Republic and Slovakia

Too little time has passed since the introduction of the euro to make a serious econometric analysis examining its impact on Slovak economy, especially if we consider that the euro is generally expected to be beneficial mainly from the long-term. The task becomes even harder bearing in mind the fact that the currency changeover coincided with emergence of the economic recession which severely harmed country’s small and export-oriented economy. In addition to that, negative effects of the economic downturn were exacerbated by a fortnight-long interruption of industrial production caused by the gas crisis that occurred at the turn of 2008-2009.

After more than two and a half years spent in the Exchange Rate Mechanism II (ERM II), Council of the EU decided that Slovakia would join the euro area as its 16th member as of 1 January 2009. The Slovak koruna entered ERM II with an initial central parity at 38.455 SKK/EUR, and a standard fluctuation band of $\pm 15\%$. In order to reflect improvements in underlying fundamentals the central parity of the koruna was revalued to 35.4424 SKK/EUR, with effect from March 2007 and to 30.1260 SKK/EUR, with effect from May 2008. The central parity level has been set as the ultimate SKK/EUR conversion rate in July 2008. The nominal exchange rate against the euro was thus fixed.

Before analyzing the export performance, a closer look at the development of the exchange rate is desirable. The nominal effective exchange rate (NEER)⁴ is computed as a weighted average of a currency's exchange rates versus several most important foreign currencies⁵, and thus measures the global appreciation/depreciation of a currency (European Commission, 2012). Graph 2 illustrates the CZK and SKK had evolved broadly in parallel since 2004 until mid-2008. Especially in the second half of the period, both currencies recorded substantial nominal-effective appreciation. The exchange rate between the two currencies had remained broadly stable, oscillating around 1.25 SKK/CZK. Fixation of the EUR/SKK⁶ exchange rate was confirmed by market development, with trades close to the conversion rate until the end of 2008 in spite of the considerable market instability. Meantime, the Czech koruna, while enjoying full exchange rate flexibility, depreciated sharply against the euro between mid-2008 and early 2009 and, despite a subsequent strong rebound, it has not fully recovered yet.

Graph 3: NEER and the bilateral SKK/CZK exchange rate



Source: National central banks; Oanda

⁴ An increase of the indices represents effective exchange rate appreciation.

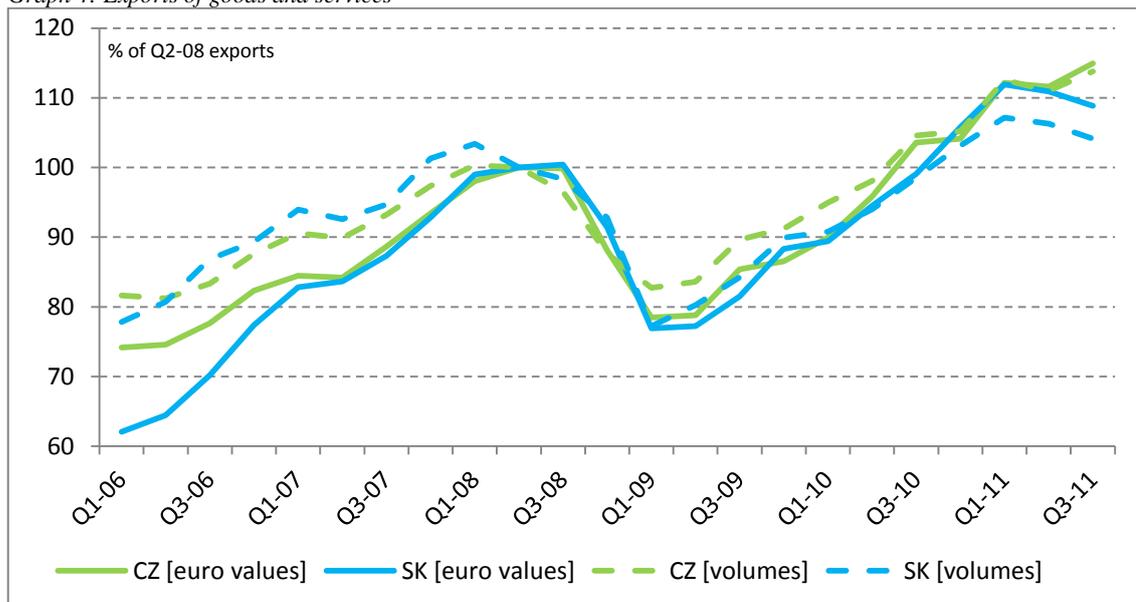
⁵ For Slovakia, 15 trading partners were included: Germany, Czech Republic, Italy, France, Austria, Poland, Hungary, United Kingdom, United States, Netherlands, Belgium, Spain, Russian Federation, China and Korea. For the Czech Republic: eurozone, Russia, Poland, United Kingdom, USA, Japan, Hungary, Switzerland, Sweden, Denmark, China, Korea and Romania.

⁶ If this rate goes up, more foreign currency can be obtained for EUR. It therefore becomes more expensive for those who want to exchange foreign currency for euro. In other words, an upward movement of EUR/SKK line means EUR is appreciating and SKK is depreciating.

Taking into account all the above mentioned, export earnings in euro terms evolved largely in parallel in both countries, showing no substantial difference in performance of the two neighbors. As of 2007, exports in terms of euros experienced very similar development, with the correlation of 0.98. The euro value of both Czech and Slovak exports dropped sharply by more than 20% during Q4-2008 and Q2-2009, and then gradually recovered back to its original level by mid-2010, i.e. exports reached the pre-crisis levels over the period of five quarters.

On the other hand, in terms of volume, a different trend can be observed. While Czech exports fared better, losing around 17% of their Q2-2008 level and then climbing above 100% by Q3-2010, Slovakia's export volume dropped by 23% between the onset of the crisis and its peak in 2009, and only regained its pre-crisis values by Q4-2010, yet lagging behind the Czech Republic. Nominal exchange rate depreciation against the euro witnessed at the beginning of the economic slowdown may have enabled Czech exporters to lower their prices and thus to somewhat mitigate the negative impact of the external demand shock on their sales abroad at the peak of the crisis. However, as Jevčák (2011) explains, "the initial competitiveness boost from the sudden weakening of the Czech koruna at the onset of the crisis might have been partly offset by the fact that a large part of export revenues was at the time hedged" at lower exchange rate levels at which the koruna had traded before the crisis. This is evidenced by the fact that the export performance in nominal euro terms (i.e. export earnings) was almost identical for both economies, i.e. relatively higher real exports compensated for lower export prices.

Graph 4: Exports of goods and services

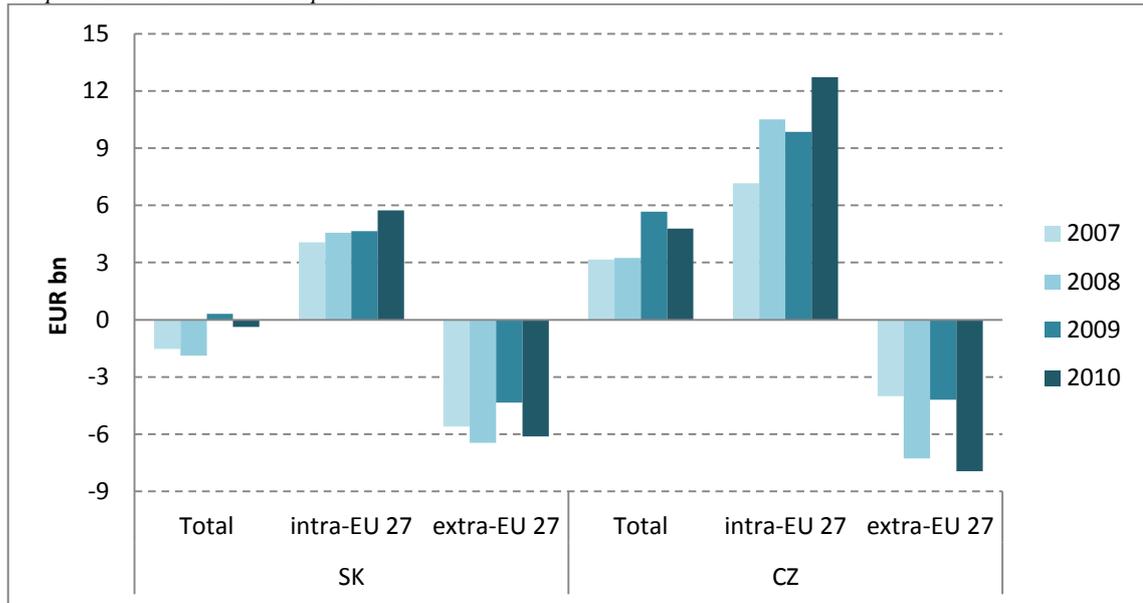


Source: Author's calculations based on Eurostat data

Lalinský (2010) suggests the high level of openness of the Slovak economy played a major role in a steeper decline of its exports. Another factor is that value added is created mainly cyclically sensitive industries. “These factors made the impact of external negative developments on the Slovak economy quicker and stronger,” he concludes.

Graph 5 shows the evolution of trade balance in nominal terms. Overall, the trade balance of both countries has been gradually improving over the 2007-2010 period, as the crisis-related decline in domestic demand resulted into contraction of the spread between exports and imports. The Czech Republic maintains a positive balance, whereas Slovakia oscillates around zero. Negative trade balance with extra-EU 27 partners partially offsets the positive intra-EU statistics. This indicator shows a considerable distinction between the two countries. Most likely it is caused by different structure of their respective economies, with more value added being created in the Czech Republic.

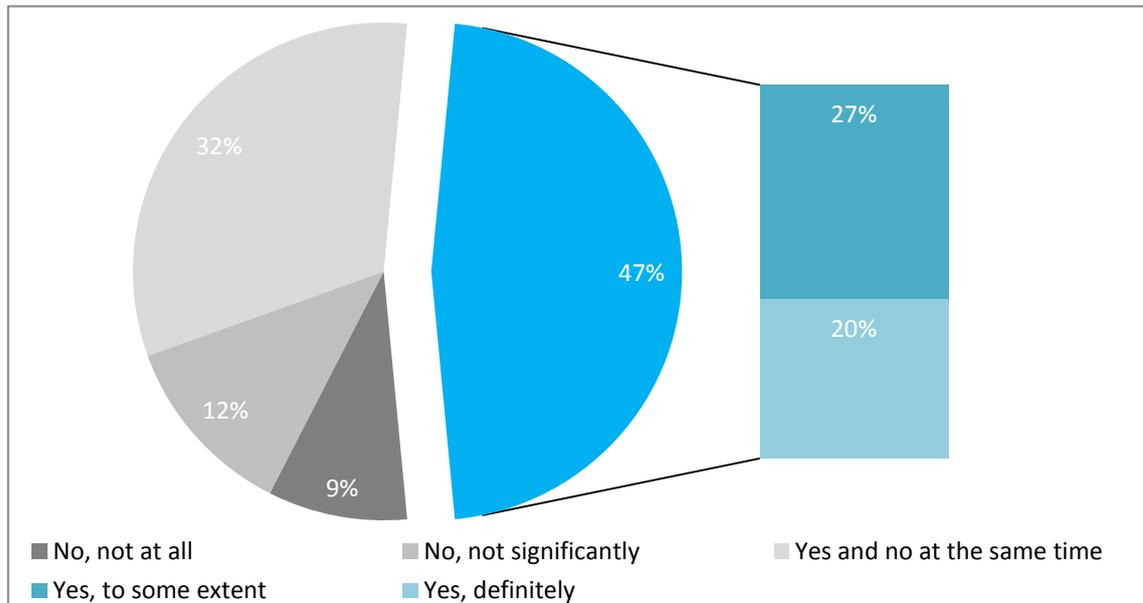
Graph 5: Trade balance development



Source: Eurostat

Business Alliance of Slovakia in its late 2011 survey asked whether the introduction of euro in Slovakia created potential for rise of foreign trade in their companies. According to the results, almost 50% of enterprises felt the positive impulses brought by euro, whereas only 9% felt no effect at all. Figure 1 summarizes the findings:

Figure 1: Has the Slovak euro adoption created potential for the increase of foreign trade?



Source: Business Alliance of Slovakia (PAS)

All in all, the currency changeover in Slovakia was very specific since it coincided with the outbreak of the great global recession. Taking this into consideration,

Slovakia saw a sharp decline in its export production in the period of transition to euro. Czech exports also slid, but to a much lower extent. At the first glance, and in accordance with the common belief, the difference could be explained by too strong exchange rate caused by the devaluation of neighboring currencies. However, Lalinský (2010) believes the extremely high level of openness of Slovak economy played a major role. Yet another factor he mentions is that “added value is largely created in industries which are sensitive to cyclical variations, i. e. industrial production and trade. These factors made the impact of external negative developments on the Slovak economy quicker and stronger.” In addition to that, as to the loss of independent monetary policy, National Bank of Slovakia (2006) explains that Slovak monetary policy had had a limited scope to respond to the development within core sectors of the economy even before it introduced the new currency. Pillars of the economy, such as automotive and electrotechnical industries are strongly oriented towards exports, their import intensity is also very high and finances are acquired on international markets. NBS reports that since the monetary policy is not able to influence this sector, its loss does not mean higher exposure of the Slovak economy to the shocks in the industry. Lalinský (2010) points out that comparing the development in Slovakia with other countries allows admitting a possible, though hard to quantify, negative impact which the strengthening of the effective exchange rate could have had on selected services. On the other hand, considering the hypothesis that fixing of the koruna exchange rate and the euro transition had a significant negative impact on the competitiveness of Slovakia, exports would have recovered more slowly in 2009 (or would even have fallen) in comparison with the Czech Republic or other countries with floating exchange rates. To sum up, our empirical evidence suggests that the positive trade effects brought about by the introduction of the common European currency are rather moderate – around 5%. Since the impact of the euro on Slovak economy is unlikely to be much different in the long run, we can accept the first hypothesis and conclude that the euro adoption typically implies more trade between member states.

4 Major competitiveness indicators

In order to face challenges of the financial crisis, the EU institutions adopted several legislative proposals to enhance the economic governance in the EU. IMF (2012) report stresses the importance of proper assessment of external competitiveness as a key analytical and policy challenge. “Detecting a lack or loss of competitiveness is essential to identifying a build-up of unsustainable imbalances and guiding a smooth adjustment.” European Commission⁷ presented a new surveillance procedure for the prevention and correction of macroeconomic imbalances, aiming to detect the imbalances in advance:

The Macroeconomic Imbalance Procedure (MIP) is a surveillance mechanism that aims to prevent and correct macroeconomic imbalances within the EU. It relies on an alert system that uses a scoreboard of indicators and in-depth country studies, strict rules in the form of a new Excessive Imbalance Procedure (EIP) and enforcement in the form of financial sanctions for euro area Member States which do not follow up on.

In case of existing serious imbalances, it is required that the member state puts in place a detailed policy plan to achieve necessary corrections. An effective means of enforcement are provided. Concerning the competitiveness, three main measures have been identified by the Commission⁸:

Table 7: Indicators with indicative thresholds

Indicator	Thresholds	
	non-eurozone	eurozone
Real Effective Exchange Rates with HICP deflators (3 years change)	±11%	±5%
Export Market Shares (5 years change)	<-6	<-6

⁷ http://ec.europa.eu/economy_finance/economic_governance/macroeconomic_imbalance_procedure/index_en.htm

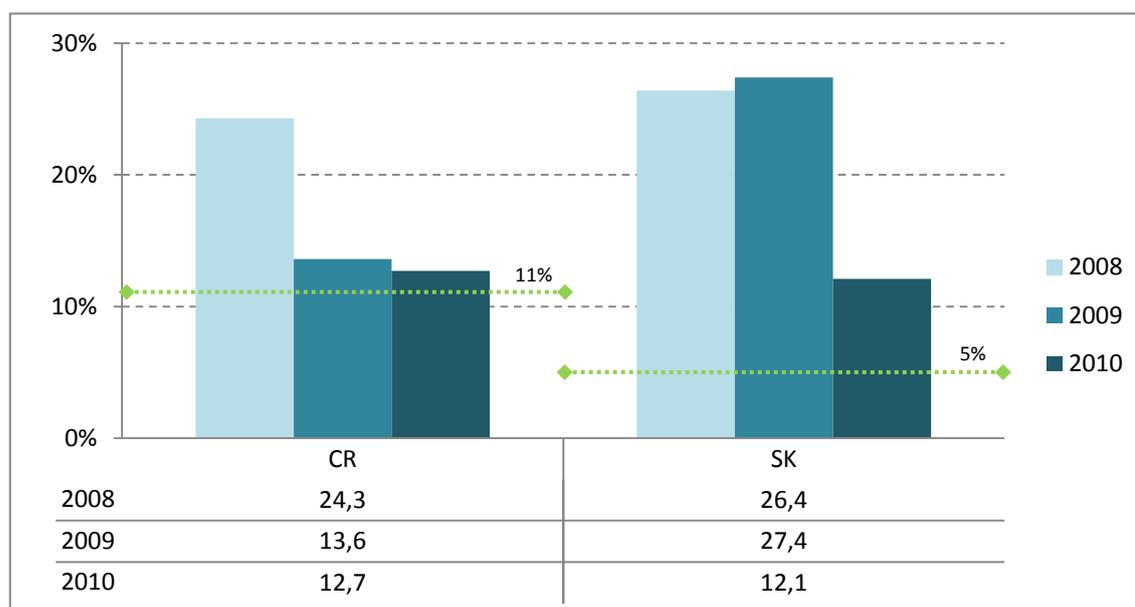
⁸ An overview of formulas used in the computation of the transformations for each indicator is presented in Annex 3.

Source: European Commission

4.1 Real effective exchange rate

The real effective exchange rate based on consumer prices is a measure that captures the drivers of changes in price and cost competitiveness of each state relative to its major trading partners⁹. This indicator exemplifies the attractiveness of imports over domestic production and, since it accounts for broader price developments it casts a more comprehensive picture of global ‘price’ pressures on domestic producers in a medium-term perspective (European Commission, 2012). Another reason for inclusion of the real effective exchange rate indicator is that it has frequently been found to be a statistically significant forerunner of economic problems (Reinhart *et al.*, 1998). In particular, Frankel and Saravelos (2010) recognize the REER as an important indicator of crises occurring before 2008.

Graph 6: 3-year % change of real effective exchange rate



Source: DG ECFIN

Both economies under observation experienced losses in price competitiveness through strong effective exchange rate appreciation. The growth can most likely be attributed to the nominal exchange rate appreciation in 2008. In 2009, the difference in the exchange rate regimes made a major dissimilarity and, while Slovak REER further

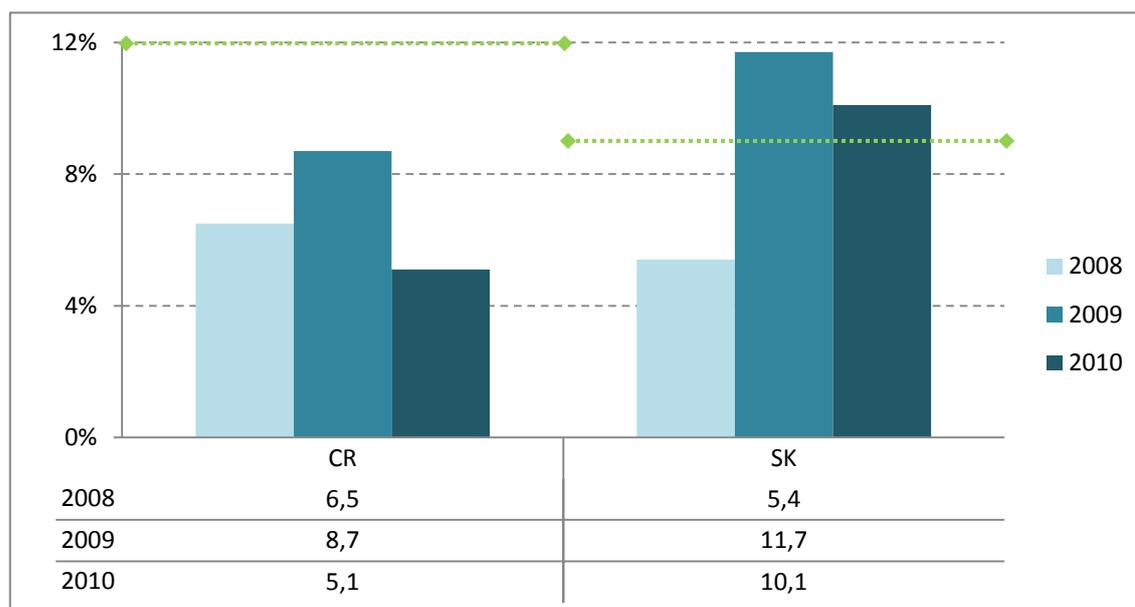
⁹ 36 industrialized countries: EU-27 plus Australia, Canada, United States, Japan, Norway, New Zealand, Mexico, Switzerland, and Turkey.

increased, CZK with its exchange rate elasticity depreciated. The 2010 data are practically the same for the two economies, with the Czech Republic clearly approaching the indicative level and Slovakia being some 7% above the lower threshold.

4.2 Unit labor costs

The nominal unit labor costs indicator measures the average cost of labor per unit of output. Hence, incorporation of this indicator aims to monitor developments in cost and price competitiveness across EU members. A rise in an economy's nominal unit labor costs corresponds to a rise in labor costs that exceeds the increase in labor productivity. This can potentially represent a threat to an economy's cost competitiveness, if other costs (e.g. cost of capital) are not adjusted in compensation (European Commission, 2012).

Graph 7: 3-year % change of nominal unit labor costs



Source: European Commission

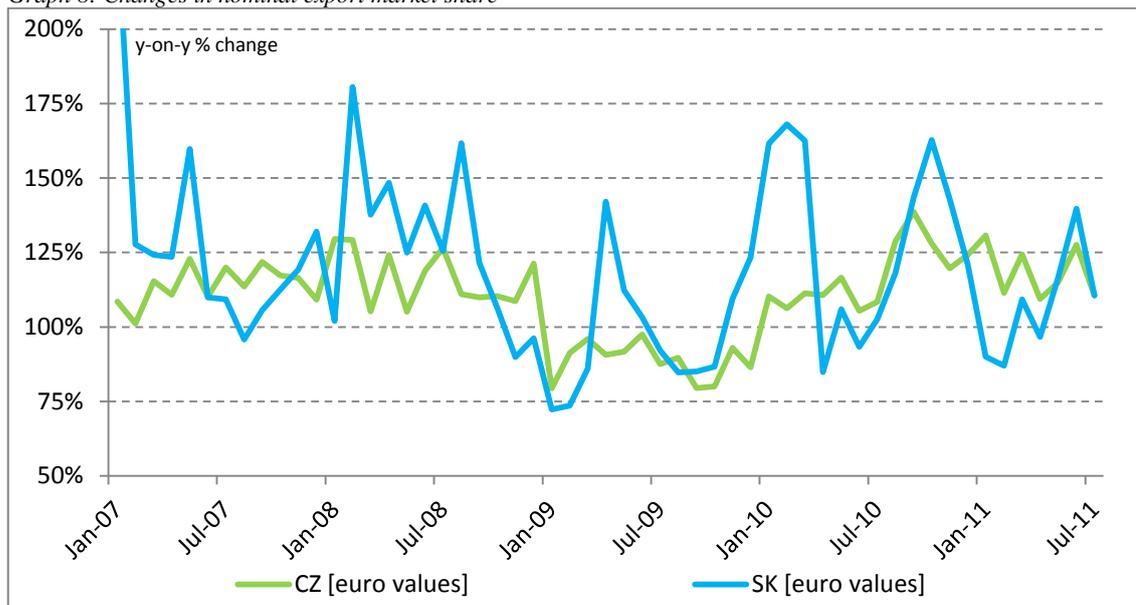
Graph 7 displays that while the Czech Republic is safely below its threshold value, Slovakia was struggling to meet the criterion and, though marginally, during the last two years remained above the indicative border. Slovak nominal unit labor costs sharply climbed in 2009. Indeed, it most likely is an evidence of too strong SKK/EUR conversion rate.

4.3 Export market shares

Another meaningful indicator of export performance is export market share. This measure captures structural losses in competitiveness. The logics behind is that countries lose shares of export market not only if exports decline but also if their exports do not rise at the same pace as world exports and their relative position at the global level deteriorates (European Commission, 2012). Export market share indicators differ with respect to the way they are constructed. According to the ECB (2005) methodology, they may be computed as a total indicator (i.e. the share of a country's exports in the total market for exports), or as an indicator that weights the geographical export markets according to their importance in the exports of the country under analysis. Export market share indicators differ also with respect to whether they are presented in terms of volumes or values. More specifically, the market share in volume terms is defined in this thesis as an index of the ratio of a country's export volumes to its foreign demand, where the latter is estimated as a weighted average of the import volumes of major trading partners, with the weights being equal to the share of each destination in total exports of the country under analysis. The market share in value terms takes euro values instead of volumes. Due to a lack of consistent data, only EU trading partners were taken into consideration when computing the respective market shares.

Looking at the trend of the export market share, no clear influence of euro can be inferred. Slovakia seems to have witnessed a smaller loss during the peak of the crisis. Relative to the nominal imports of its major trading partners (weighted by their average share in Czech/Slovak exports), the evolution of Slovak exports was relatively favorable throughout 2008 and 2009, apart from a sharp drop in January 2009. Meanwhile, the Czech Republic experienced a decline in its nominal export market share in the course of 2009 and the indicator held relatively steady. Generally, the Czech Republic witnessed more temperate jumps in the indicator over the monitored period. After a strong performance around the turn of the years, both countries' market shares basically converged in mid-2011.

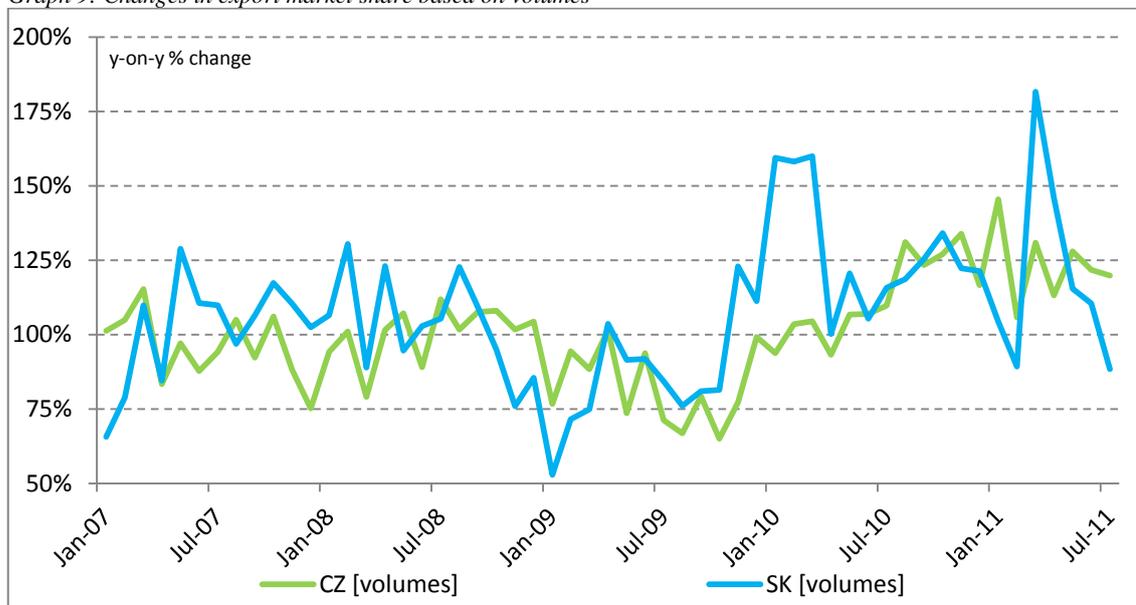
Graph 8: Changes in nominal export market share



Source: Author's calculations based on Eurostat data

Nevertheless, according to Jevčák (2011), the Czech Republic fared relatively better if the assessment of export performance is based on volumes, which is in line with the more positive trend of its real exports mentioned in the previous chapter. But all in all, we can see only minor differences in the evolution of the indicator based on annual changes.

Graph 9: Changes in export market share based on volumes

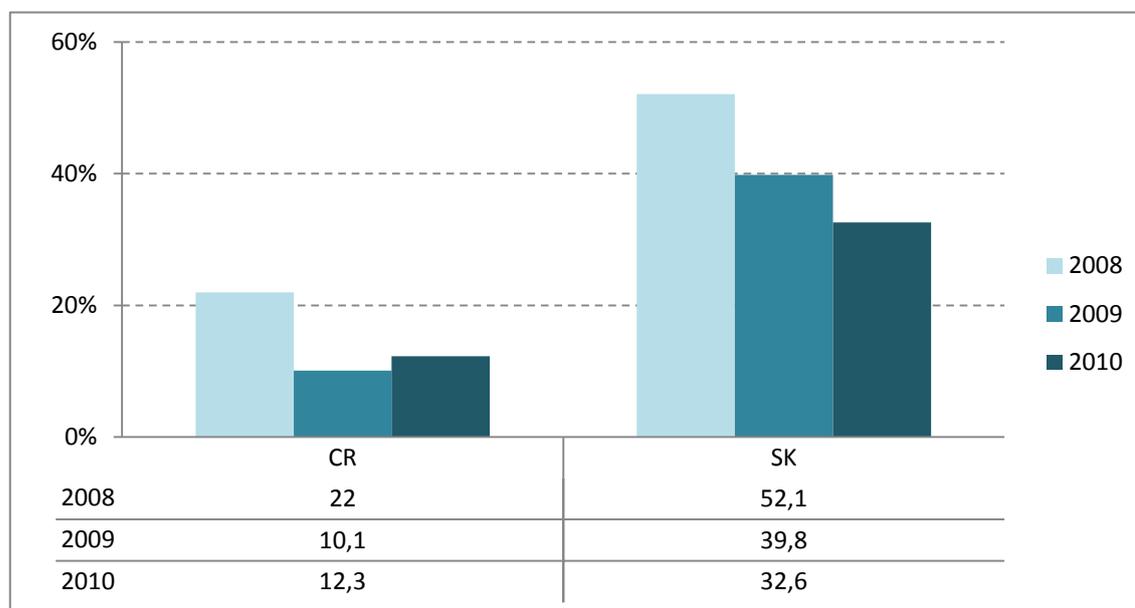


Source: Author's calculations based on Eurostat data

Export market share based on 5-year change has the same threshold value for both eurozone and non-eurozone countries. Despite losses in price competitiveness through REER appreciation and growth in unit labor costs, Graph 9 shows there are

gains in export market shares in the Czech Republic as well as in Slovakia over the 2003-2010 period. In Slovakia, the 5-year % change was more than double the Czech growth, but with a gradually decreasing trend surrounding the euro adoption. Therefore, neither positive nor negative effect of the euro can be deduced from this indicator.

Graph 10: 5-year % change in export market shares



Source: European Commission

4.4 Additional performance measures

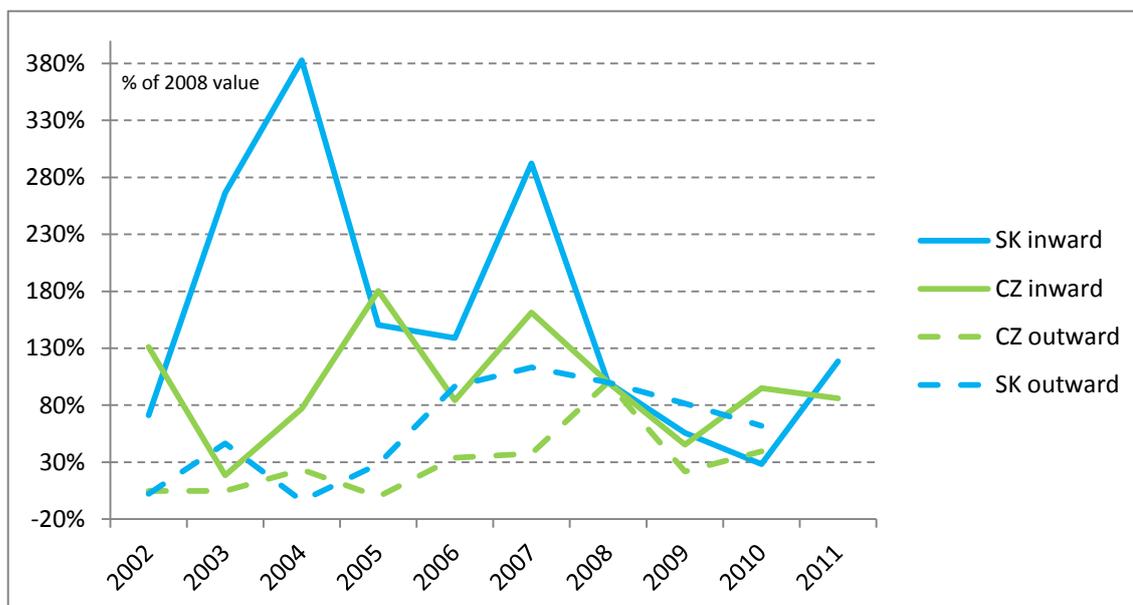
Usually, there are several favorable impacts of the adoption of European single currency expected to manifest immediately. Lalinský (2010) specifies that they are especially such positives that permanently decrease the level of costs or increase GDP. The savings on transaction costs when charges and margins for currency exchanges are eliminated are among the most outright ones. Businesses should also be able to slightly reduce their administrative expenses since they do not have to deal with accounting of euro exchange transactions anymore. Full elimination of exchange risk against euro and slight decrease of such risk against other currencies should be felt by enterprises that have not hedged against them. In particular smaller enterprises, which have not had simple access to foreign financial markets, should enjoy a simpler and cheaper access to credits and stock capital. Consumers should profit from increased transparency of prices on the European market and from expected more intense competition. New direct investments should, in the long run, lead to faster economic growth and higher efficiency and competitiveness of the whole economy.

4.4.1 Foreign Direct Investment

This section addresses an interrelated issue, namely whether EMU has had any effects on foreign direct investment flows. FDI flows can be considered to be interrelated with trade since, as Petroulas (2006) explains, such flows are “often viewed either as a substitute for trade (horizontal FDI) or as a complement to trade (vertical FDI).” In addition, it also gives an indication of whether euro area creates better conditions for firms making long-term investment decisions. Flam and Nordstrom (2007) explain that there are not clear distinctions between horizontal and vertical FDI, but “the former usually refers to the establishment of local production for local sales, while the latter refers to the establishment of production of inputs in low-cost locations to be exported for final assembly at another location.” Adoption of the euro reduces the exchange rate uncertainty that, in theory, discourages international investment. Fixing the exchange rate eliminates the risk, hence encouraging international investment, as well as making cost calculations and pricing decisions easier. Adopting a single currency is thus expected to promote international investment, i.e. FDI flows.

Due to a lack of complete and consistent foreign direct investment data, a significant part of the panel is unbalanced and an alternative approach had to be adopted to evaluate the impact of the euro on the FDI development in the Czech Republic and Slovakia. Unlike for previous indicators, we can see a slightly negative, but very small correlation between the observed countries. This may indicate that investors often choose between the Czech Republic and Slovakia when considering the best place to locate their investment. At a glance, foreign direct investment in the Czech Republic evolved in a less volatile manner. While the Czech values more than halved in 2009, they started to recover already in the consecutive year. Slovakia experienced a decline in the 2009-2010 period, but revived sharply in 2011, getting well over the 2008 level. FDI outflows developed largely in parallel in both economies.

Graph 11: Foreign direct investment inflows and outflows

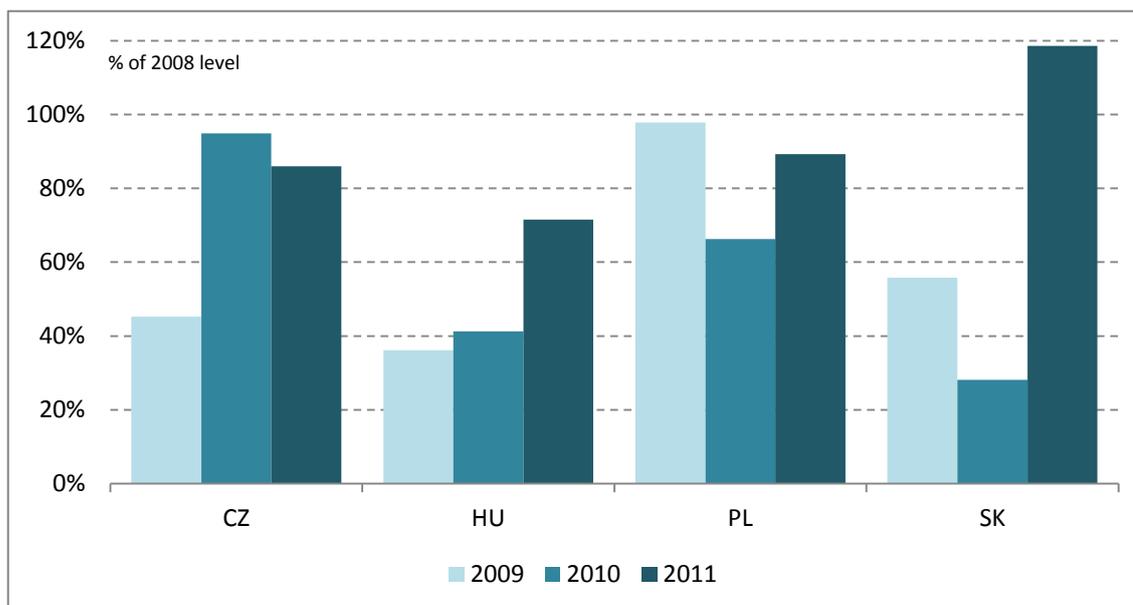


Source: Czech National Bank, SARIO, UNCTAD

Looking at the inflow of foreign investments to nations of the Visegrad Four group¹⁰, one can observe substantial differences in the development, with Poland outperforming the others at the onset of the crisis. With this exception, all other countries' FDIs plummeted in 2009. Slovakia as the only euro-using country experienced a strong recovery in 2011, being also the only one to get closer to the pre-crisis levels. This fact means that it has become attractive to investors and the introduction of the euro might have had a beneficial, though hard to quantify, effect on the investment climate.

¹⁰ Czech Republic, Hungary, Poland and Slovakia

Graph 12: Development of foreign direct investment inflows



Source: National central banks

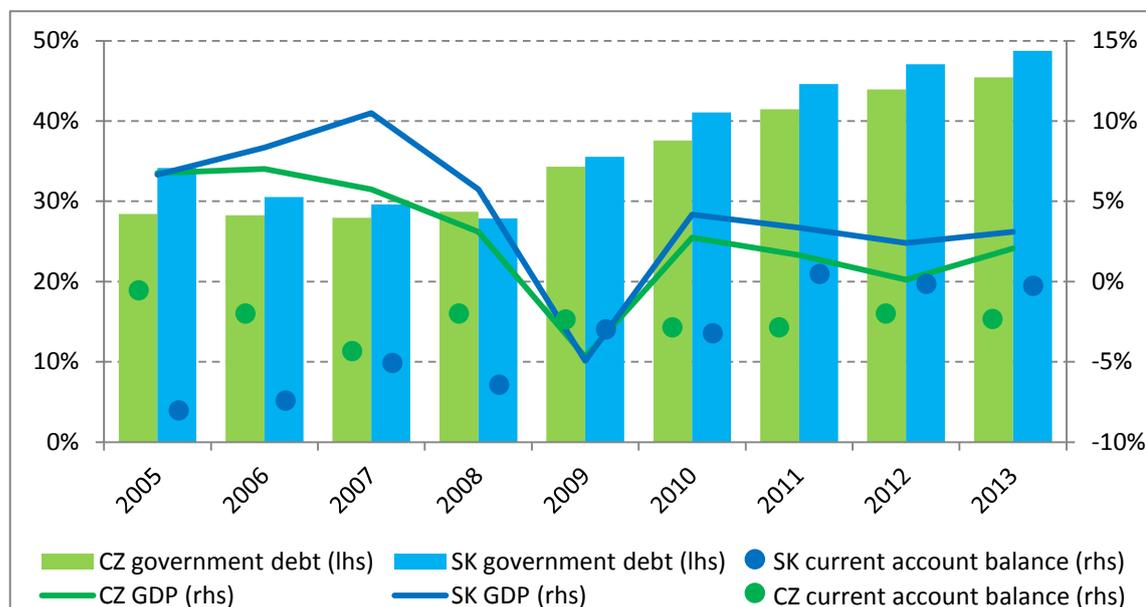
4.4.2 Current account balance

Loss of independent exchange rate and monetary policies eliminated the capability to correct macroeconomic imbalances. According to De Broeck *et al.* (2012), this resulted in severe financial turbulences in some earlier euro adopters that saw appreciating real exchange rates and widening current account deficits. European Commission (2012) considers the current account balance to be the major driver of net lending/borrowing of the economy as a whole. Thereby, this indicator “provides important information about the economic relations of the country with the rest of the world. A high current account deficit indicates that the economy is borrowing and typically it is importing in excess of its exports.” Frankel and Saravelos (2010) point out that the current account balance is one of the most frequent statistically significant indicators in explaining the occurrence of crises in case that the deficits/surpluses are not just natural responses to changes in underlying structural characteristics of the economy. Countries in a catching-up phase often temporarily run current account deficits as investing in productive activities increases the prospects of future income.

European Commission (2012) comments that in Slovakia, the current account recorded large and sustained deficits during the last years, partially financed through capital transfers from abroad. Nevertheless, the indicator improved in 2011. Some narrowing can be observed in recent years also in the Czech Republic, driven largely by an improving trade balance. De Broeck *et al.* (2012) conclude that neither REER nor

export share developments nor the evolution of the current account deficit does suggest exchange rate misalignment in Slovakia.

Graph 13: Current account balances as % of GDP, general government debt as % of GDP and annual GDP growth



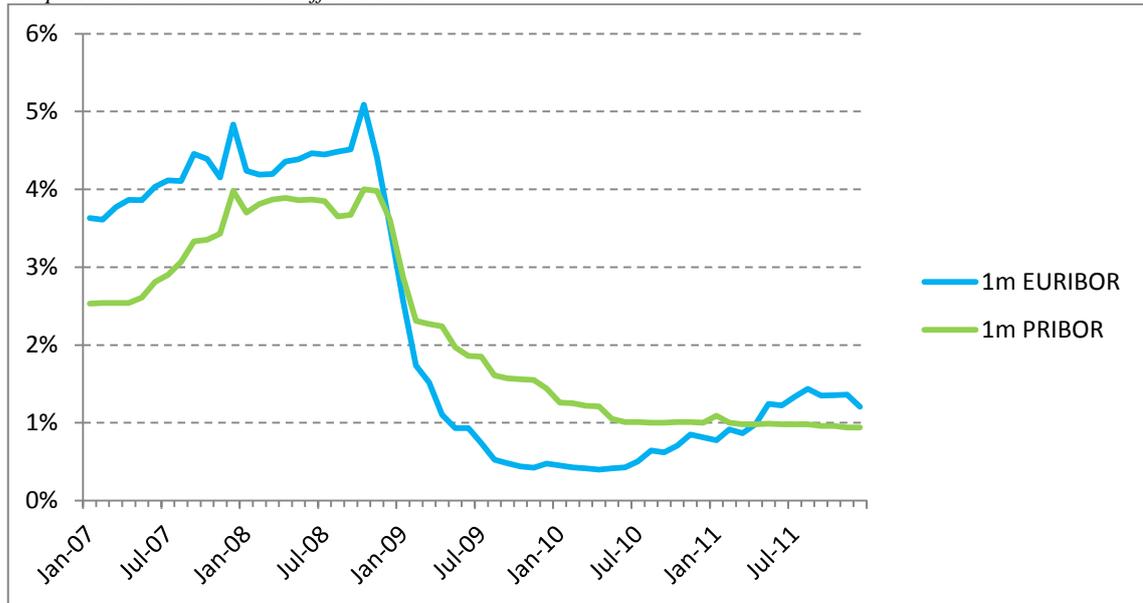
Source: IMF

4.4.3 Financial markets performance

One of the proclaimed benefits of entering the euro area is a cheaper and facilitated access to capital compared to non-eurozone countries and a consequent reduction in the debt service costs. Moreover, during the crisis, the European Central Bank made available a special currency swap for eurozone banks which has improved the safety of the banking sector in Slovakia (Daborovsky, 2010).

If we look at the graph depicting the evolution of the interbank offered rates in eurozone and in the Czech Republic, we can see the money market rates were lower in the euro area since the end of 2008, with the 3-month interbank rate below 100 basis points from May 2009 until October 2010. Czech 3-month rates only declined to 120 basis points by mid-2010. This might indicate that the CNB, as a monetary authority of a small open economy, was more constrained in its capacity to loosen monetary policy than the ECB (Jevčák, 2011).

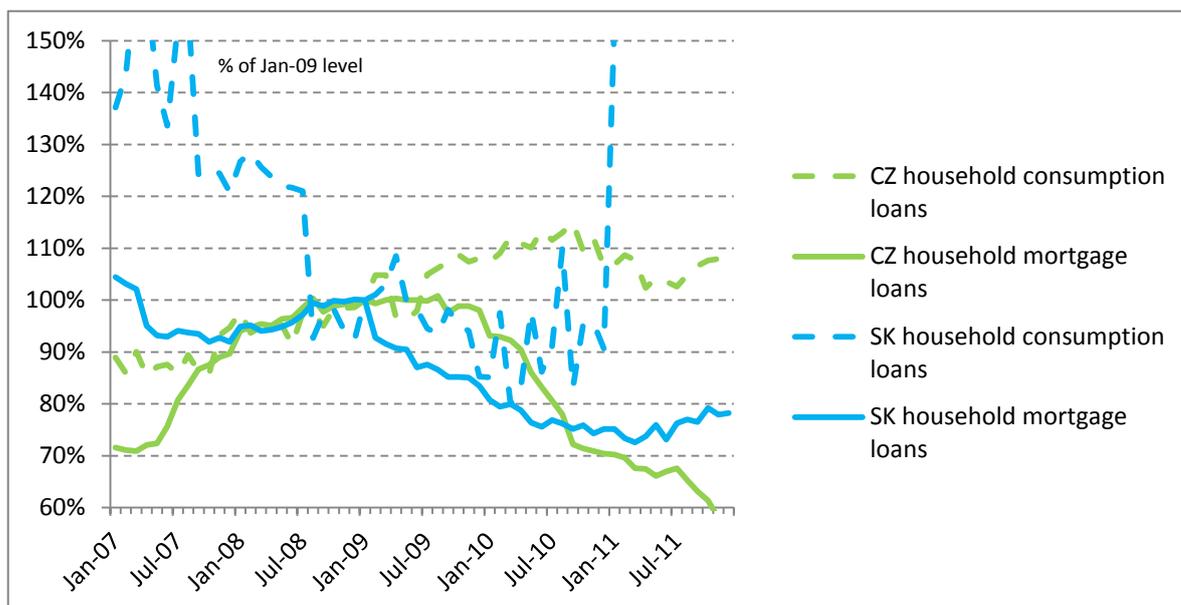
Graph 14: 3-month interbank offered rates



Source: ČNB, ECB

Jevčák (2011) believes the looser monetary policy was transmitted into more favorable bank lending rates in Slovakia. Short-term interest rates on new consumption loans increased by some 20% in the Czech Republic between mid-2008 and end-2009, before stabilizing in 2010, while in Slovakia they dropped by some 20% in the summer of 2008 and then oscillated around the same level until end-2010 and witnessed a sharp increase in 2011. Czech mortgage rates remained broadly steady in 2009 before experiencing a strong decline in 2010-2011. Meanwhile, Slovak mortgage rates started to decrease gradually already in early 2009.

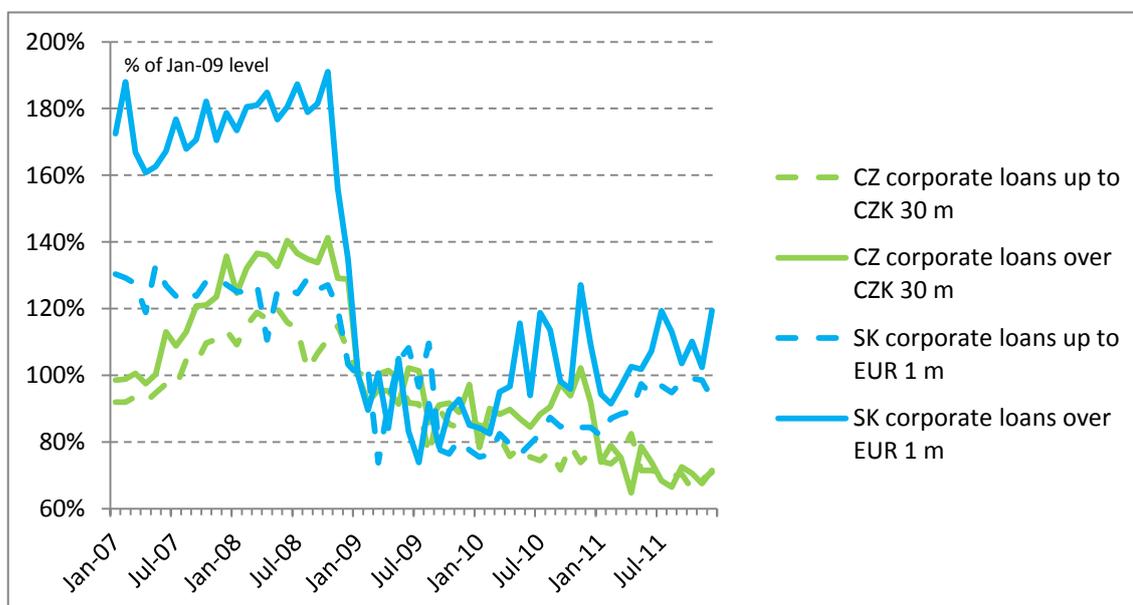
Graph 15: Interest rate (floating and fixed up to one year) on new bank lending to households



Source: ČNB, NBS

Similarly, the decline in the short-term corporate lending rates materialized faster in Slovakia, while the Czech rates decreased more gradually. Both households and corporate lending rates reversed at the turn of 2011. Low interest rates and the availability of capital have made loans to both firms and citizens more accessible.

Graph 16: Interest rate (floating and fixed up to one year) on new bank lending to non-fin. corporations

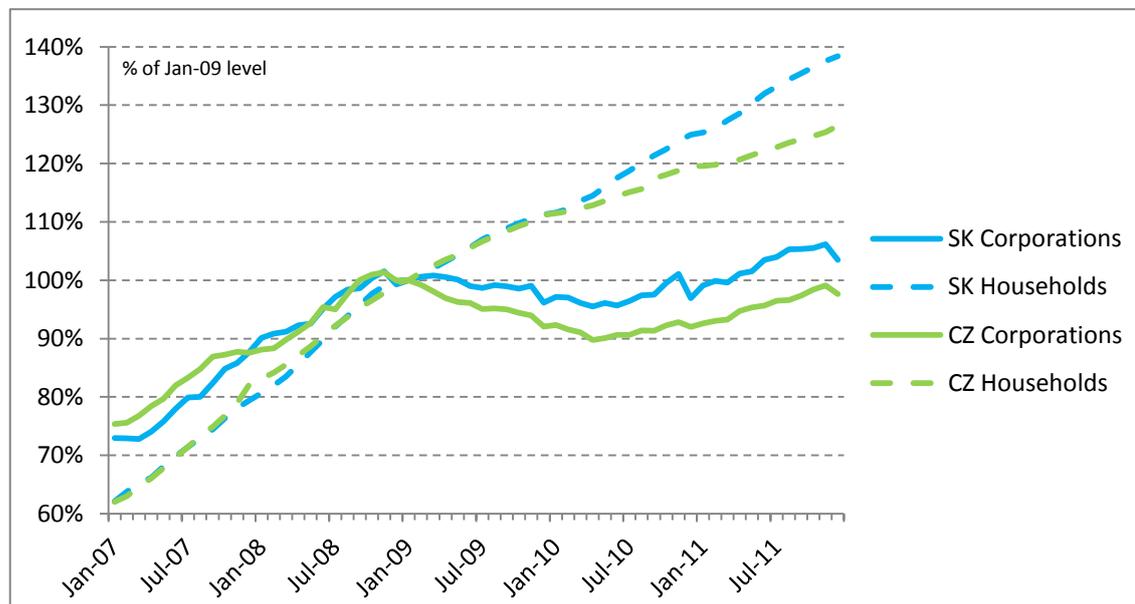


Source: ČNB, NBS

As Jevčák (2011) concludes, the more attractive short-term lending rates seem to have contributed to more favorable credit developments in Slovakia. Credit to non-financial corporations and to households expanded largely in parallel until the end of

2008 in both countries. While credit to households continued growing even during the crisis, credit to corporate sector saw a contraction of more than 10% in the Czech Republic. In Slovakia, corporate credit remained rather stable, maintaining the values above the 2008 level all the time. Altogether, overall credit to the Slovak private sector increased marginally even in 2009, before accelerating again in Q2-2010. However, Marsh (2011) warns that in some countries the fall in interest rates associated with the start of the euro was used to “fuel wasteful consumption and speculative purchases of financial assets and real estate whose value subsequently plummeted” instead of building up productive capacities and thus preparing themselves for the foreign competition. Too low interest rates in these countries triggered a credit boom “leading to above-average growth rates and also higher inflation and thus a loss of competitiveness”, Marsh summarizes. Empirically, high credit growth was also found to be associated with higher crisis incidence as rapid credit expansion is a sign of a decline in lending standards. (Frankel and Saravelos, 2010; Sachs *et al.*, 1996). Moreover, credit booms may heighten external vulnerability if states experience significant rises in credit flows denominated in foreign currencies (European Commission, 2012).

Graph 17: Credit to households and non-financial corporations

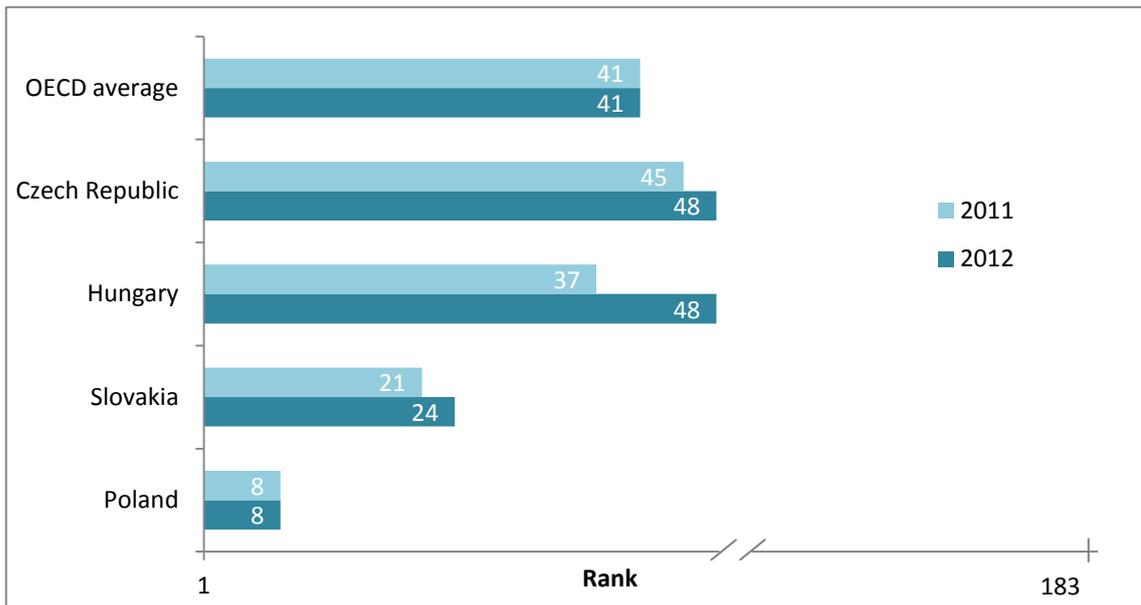


Source: ČNB, NBS

The Doing Business Project, launched in 2002, looks at domestic small and medium-size companies and measures the regulations applying to them through their life cycle. The ease of getting credit indicator reflects how difficult it is for companies to obtain credit from financial institutions. As Graph 18 shows, out of 183 countries

under observation, Poland scored the 8th place. Slovakia ranked 24th, falling from the 21st place in 2011. The Czech Republic and Hungary both occupy the 48th position.

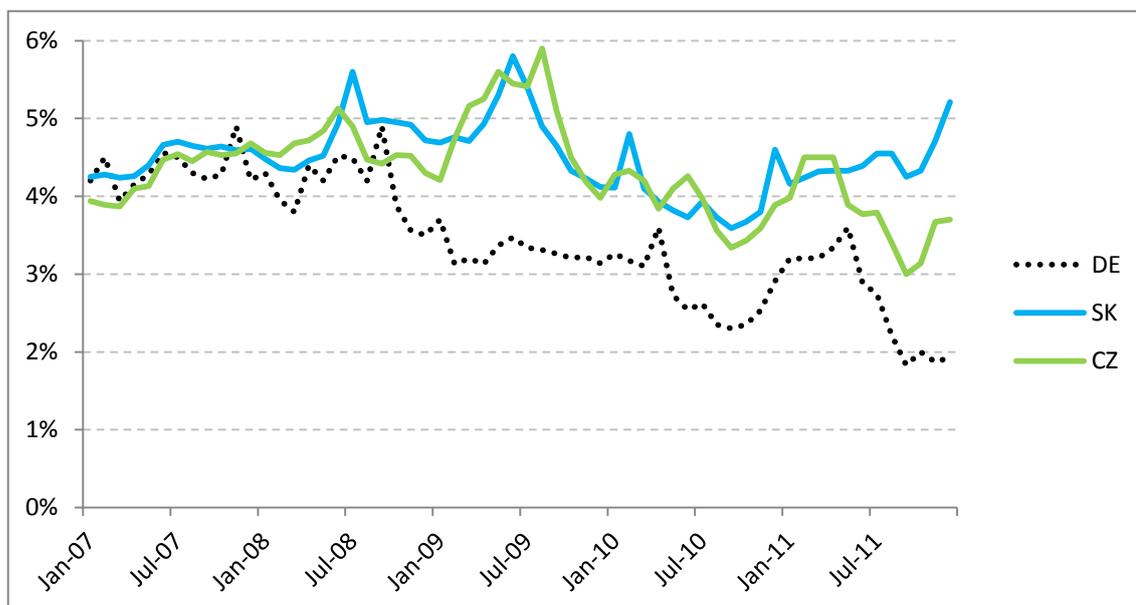
Graph 18: The ease of getting credit ranking



Source: *Doing Business*

Graph 19 shows the historical development of government bond yields. As in previous cases, the long-term government bond markets appear to have drawn a very similar pattern in both countries. Czech yields experienced a slightly more irregular decline and broadly stabilized below Slovak yields again by mid-2010. Unsurprisingly, German yields considered as ‘risk-free’ were the lowest of the three practically all the time.

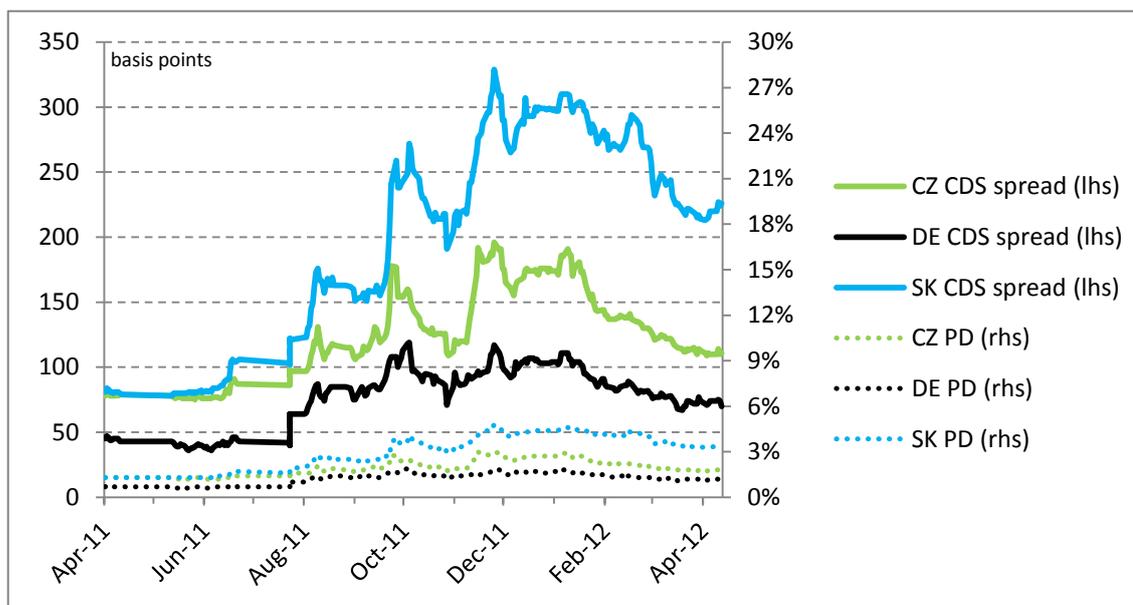
Graph 19: 10-year government bond yields



Source: European Commission and Eurostat

Graph 20 shows the credit default swap (CDS) spreads and default probabilities over the course of 2011. Credit default swaps are used to “give an idea of investors’ perception of the riskiness of an institution, but the probabilities of default derived from those instruments are risk-neutral probabilities, i.e., they incorporate investors’ attitude toward risk (Nelson and Perly, 2005).” The difference between Czech and Slovak spreads increased in mid-2011, with Czech spreads remaining lower, probably thanks to somewhat stronger fiscal fundamentals (lower government debt and deficit). The spreads basically stabilized in November 2011 with Slovak values being higher by 100 basis points. Probability of default, assuming the 40% recovery rate, is low in both countries with the Czech values getting very close to Germany. The split in the credit default swap spreads proves that investors are starting to distinguish between countries even within one regional basket. This suggests that the euro area membership by itself is no panacea and higher investors’ confidence must inevitably be supported by sound fiscal policy.

Graph 20: CDS spreads and probability of default (at 40% recovery rate)



Source: Deutsche Bank, Bloomberg

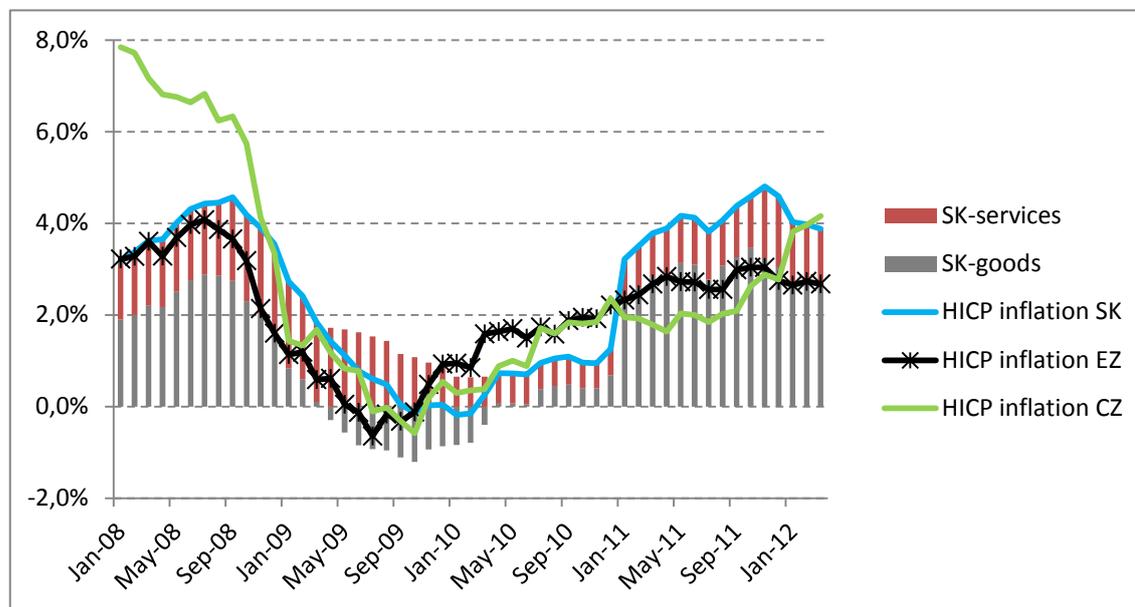
4.4.4 Price stability

Since Slovakia adopted the single currency with a very strong exchange rate based on the assumption of further rapid growth, there were expectations that the lower price level and the Balassa-Samuelson effect would lead to higher inflation once the adjustment of the real effective exchange rate through nominal appreciation is exhausted. The Balassa-Samuelson effect stands for higher increases in the non-tradable sector. It accounted only incrementally towards price appreciation around the euro changeover in the observed subsets of services (Beblavy, 2010). National Bank of Slovakia anticipated the effect to contribute a 0.7 percentage point to the headline inflation in the medium term with the return to normal estimates later on (Nowotny *et al.*, 2010).

Both countries witnessed a decrease in the HICP index since the offset of the crisis. Slovakia recorded a rise in the services price index, which took place between mid-2008 and late 2009. This was probably related to euro-changeover effects (Jevčák, 2011). According to Eurostat (2009) the price rise associated with euro adoption was seen in particular in the non-tradable segments, such as transport services, household and domestic services, restaurants and some services related to the dwelling. The overall impact of the changeover on HICP inflation during the period of December 2008 to February 2009 is considered to range up to 0.3 percentage points. This conclusion is in line with NBS (2009) estimations of the euro introduction effect to overall inflation to

reach the level of under 0.2 percentage points. Generally, Slovak inflation continued to decline after euro introduction, falling below the euro zone average, unlike what was observed in early euro adopters.

Graph 21: HICP index and its main components

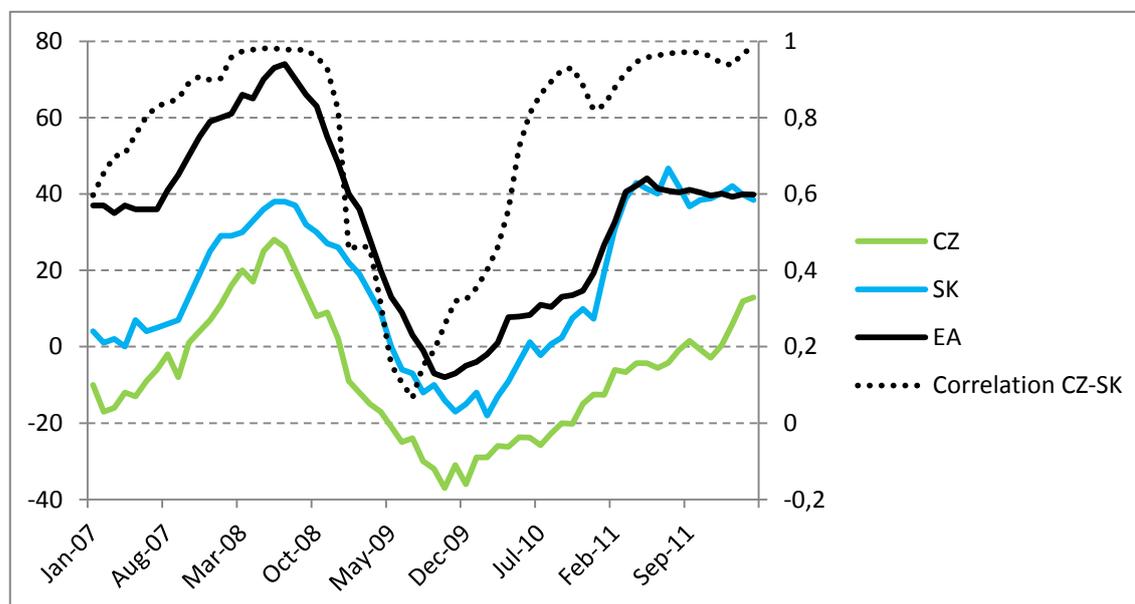


Source: Eurostat

Regarding the inflation perceptions, Graph 17 shows that during the last five years, level of perceived inflation has been higher in the eurozone compared with either the Czech Republic or Slovakia. Beblavý (2010) points out that the Czech and Slovak populations use a different benchmark when assessing inflation in comparison with eurozone consumers, as the actual inflation in both the Czech Republic and Slovakia was higher than euro area inflation during nearly the entire period analyzed despite perceptions indicating the opposite. In other words, Slovaks and Czechs “held a fairly benign view of inflation even prior to euro adoption, and in the absence of major and visible price shocks, people’s perceptions tracked the actual price developments quite well and tended to converge on price stability.” Since June 2010, perceived Slovak inflation has moved in parallel with Czech series with the correlation above 0.7. Beblavý observes higher inflation for non-tradables, linked to the Slovakia’s strategy of nominal currency appreciation prior to eurozone entry but also to the changeover itself. Nevertheless, he concludes that euro adoption in Slovakia came at a time of disinflation

related to adverse global economic situation, which consumers actually experienced, so there is not any overall ‘teuro’¹¹ perception.

Graph 22: Perceived inflation in the eurozone, the Czech Republic and Slovakia and correlation of the 12-month moving sample of the Slovak HICP with Czech HICP



Source: European Commission, Eurostat

When examining the inflation development close to the time of actual entry into the eurozone, actual HICP inflation can be compared to perceived inflation. Similar to Beblavy (2010), five episodes are analyzed – 2002, when the eurozone switched to euro bank notes and coins; 2007, when Slovenia adopted the euro; 2008, when Cyprus did; 2009, when Slovakia joined; and 2011, after the euro changeover in Estonia. Table 10 shows that there is a major difference between the eurozone (2002) and the remaining four countries in the correlations between actual and perceived inflation. While Cyprus, Estonia, Slovakia and Slovenia all exhibit high and positive correlations between actual and perceived inflation, the period around the launch of euro bank notes and coins demonstrates no correlation. The values are considerably high especially in the case of Slovakia and Slovenia.

Table 8: Perceived and actual HICP inflation during the 18 months around the euro adoption

Month	Eurozone		Slovakia		Cyprus		Slovenia		Estonia	
	Per.	Act.	Per.	Act.	Per.	Act.	Per.	Act.	Per.	Act.
t-6	36.4	2.55	33.7	4.43	34.4	2.34	13.8	1.93	13.5	2.75
t-5	35.7	2.35	33.3	4.44	42.1	2.24	23.1	3.12	22.5	2.81
t-4	33.3	2.16	30.9	4.55	36.0	2.34	19.2	2.47	26.3	3.80

¹¹ From *teuer*, meaning ‘expensive’ in German

t-3	29.7	2.25	27.3	4.18	47.0	2.70	23.0	1.54	46.3	4.46
t-2	28.9	1.97	27.6	3.90	51.6	3.20	13.8	2.43	57.5	5.04
t-1	27.3	2.05	24.5	3.54	44.0	3.74	16.2	2.98	59.6	5.42
t	32.1	2.61	16.7	2.71	38.9	4.07	26.6	2.79	63.6	5.10
t+1	40.2	2.52	15.9	2.39	45.2	4.74	29.0	2.28	60.3	5.53
t+2	42.4	2.50	11.6	1.80	49.4	4.44	22.6	2.63	66.3	5.09
t+3	47.9	2.30	4.5	1.38	41.2	4.35	24.7	2.86	76.0	5.40
t+4	50.2	2.02	-4.6	1.07	60.7	4.64	29.9	3.10	83.4	5.51
t+5	54.6	1.92	-8.6	0.72	67.5	5.21	34.5	3.77	80.2	4.94
t+6	55.7	2.02	-10.1	0.61	68.5	5.34	33.5	3.97	74.3	5.26
t+7	59.0	2.12	-13.0	0.49	70.4	5.07	54.5	3.43	79.5	5.59
t+8	59.9	2.10	-7.7	0.05	67.1	4.99	60.8	3.57	80.6	5.36
t+9	58.0	2.30	-12.3	-0.13	67.0	4.84	72.1	5.11	81.6	4.69
t+10	56.5	2.29	-10.7	0.04	62.6	3.13	74.9	5.74	82.8	4.45
t+11	57.6	2.28	-9.6	0.04	56.5	1.82	77.4	5.70	78.5	4.09
corr.		-0.24		0.98		0.60		0.88		0.77

Source: Beblavy (2010) and own elaboration

Table 11 briefly summarizes the findings regarding the inflation perceptions versus reality in the run-up to the euro adoption.

Table 9: Actual and perceived inflation in the period of euro adoption: Cyprus, Estonia, the eurozone, Slovakia and Slovenia

Actual/Perceived	Low	High
Low	Slovakia	Eurozone
High	-	Cyprus, Estonia, Slovenia

Source: Beblavy (2010) and own elaboration

Beblavy (2010) concludes that Slovakia's inhabitants exhibited an extremely high correlation between their perceptions of declining inflation and the actual disinflation during that period. "This sets them apart from other countries adopting the single currency, which all experienced an increase in perceived inflation during the same period, regardless of whether actual inflation conformed to the same trend." Concerns about a pick-up in inflation following the euro adoption and related real exchange rate appreciation proved unfounded. Regarding the impact of the euro on price stability, Hurnik, Tuma and Vavra (2009) claim that "ten years after the euro area's establishment only the achievement of price stability is beyond any doubt." On

the other hand, regarding the inflation volatility, the authors argue that “monetary policy based on a flexible exchange rate and a credible inflation-targeting regime” has managed to provide a sound stabilization mechanism for the Czech Republic’s economy. They add that this is a country-specific conclusion and the advantage of euro area membership itself is hardly (if at all) verifiable by economic analysis.

4.4.5 Transaction costs

In exchanging domestic currency into foreign currency both households and enterprises have to bear the transaction costs and hedging costs. According to McKinsey (2012), these costs “effectively operate like tax on trade, reducing the profitability of exports and imports.” The company evaluates the aggregate savings for eurozone countries to reach 0.4% of GDP – around EUR 40 billion. In its well-known report *One Market, One Money*, evaluating the potential benefits and costs of forming an economic and monetary union, the European Commission (1990) calculates that costs of conversion of currencies and costs of cover for exchange risk “can be conservatively estimated to amount to around 0.5% of GDP” for the then European Community as a whole. Even though this may seem to be a small amount, the report points out that the combination of risk factors and transaction costs has a damaging impact on efficient resource allocation. It concludes the costs are “particularly high (1 % of GDP) for some of the member states which have small and very open economies or weak currencies that are little used internationally,” which undoubtedly was the case of Slovakia.

Table 10: Estimated cost savings on intra-EU settlements by single currency (% of European Community GDP)

		estimated range	
Financial transaction costs	Bank transfers	0.17%	0.28%
	Banknotes, eurocheques, traveler's cheques, credit cards	0.05%	0.07%
In-house costs		0.09%	0.13%
Reduction of cross-border payments cost		0.03%	0.03%
Total savings of transaction costs		0.34%	0.5%

Source: European Commission

As the 2006 study conducted by the National Bank of Slovakia reveals, the highest transaction costs occur in cash exchange traveling abroad and relatively high transaction costs are incurred also in payments by bank cards. The volume of such transactions is, however, rather small. Most of the transactions are performed on inter-bank market and they occur in connection with international trade and speculations on the exchange market. These transactions can be divided into financial and administrative costs, the former mostly representing a difference between purchase and

selling price (spread) and various charges for exchange. There are not exact figures showing the savings from eliminated transaction fees brought about by the euro adoption. NBS (2006) estimated that “total savings of transaction costs due to euro adoption in Slovakia can be quantified to minimum 0.36 % GDP.” In nominal terms, this represents more than 230 million euros. Since the total savings of transaction costs depend on the amount of exchange transactions, the importance of these savings may further intensify with future increase in the volumes. On the other hand, Gonda (2007) asserts that they are partially offset by the loss of transaction revenues of banks.

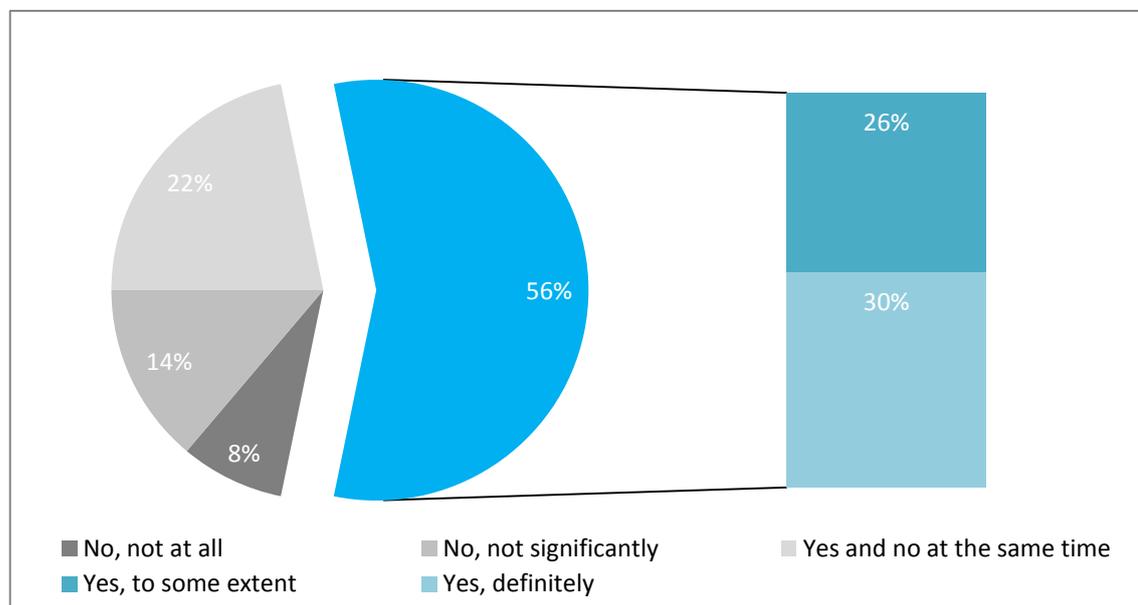
Table 11 Savings of transaction costs due to euro adoption in Slovakia (in %GDP)

Savings of financial transaction costs	Inter-bank spot and forward transactions	0.15%
	Foreign currency transactions with corporations and households	0.15%
Savings of administrative transactions costs		0.06%
Total savings of transaction costs		0.36%

Source: NBS

An interesting survey among entrepreneurs has been conducted by the Business Alliance of Slovakia (PAS). Figure 2 shows that regarding the transaction costs, more than 55% of respondents indicated that they felt the decrease. On the other hand, only 8% noticed no savings at all.

Figure 2: Has your company experienced a decrease in transaction and administrative costs?



Source: Business Alliance of Slovakia (PAS)

4.4.6 European stabilization actions

In May 2010, the European Union and euro-area member states established the European Stabilisation Mechanism consisting of the European Financial Stabilisation

Mechanism (EFSM) and the European Financial Stability Facility (EFSF). According to the European Commission, the aim of these institutions is to safeguard EU financial stability amid severe tensions in euro-area sovereign debt markets. Altogether with funding from the International Monetary Fund (IMF) and possible ECB purchases of sovereign debt, a safety-net of up to EUR 750 billion has been formed, addressing the current exceptional circumstances. This safety-net is financed primarily from the contributions of the euro-area member states. Apart from ESM a fiscal agreement – known as the Euro Fiscal Pact – has been signed by 25 European leaders (except the UK and the Czech Republic) to introduce more stringent budgetary rules. While the Czech Republic guarantees costs associated with the debt crisis only up to the value of the country’s share in the IMF and the share of European Commission, Slovakia and other eurozone countries directly cover a fundamental part of the euro bulwark. Table 10 shows the structure of contribution in the European Stabilisation Mechanism.

Table 12: Guarantees and contributions to the European Stabilisation Mechanism

Bond buys, guarantees, loans (March 2012)	EMU total [EUR bn]	Slovakia total [EUR m]	Per capita share [EUR]
Total	1 352	10 094	1 869
ECB bond buys	213.5	1 480	274
EFSF guarantees	779.78	7 728	1 431
EFSM guarantees	60	349	65
IMF guarantees	250	450	83
Share of IMF on Greece loan	48.3	87	16

Source: INESS

Juraj Karpiš (2011) explains that shortly after Slovakia entered eurozone the philosophy of the monetary union has changed dramatically. The debts of one nation become explicitly the debts of the whole union. Apart from implicit support of irresponsible fiscal policies, this precedent will cause that some economically weaker members may have to endow wealthier countries and their banking systems. Karpiš concludes it is not unlikely that this unanticipated transfer of wealth arising from euro area membership will decrease economic growth of Slovakia in comparison to the situation had it stayed outside the currency zone. Martin Šuster (2011), the NBS economist who supported the rapid adoption of the euro was astonished how the notion of solidarity was interpreted. “The principle that each country is responsible for itself was abandoned. This goes completely against the spirit of the treaties that the EU was

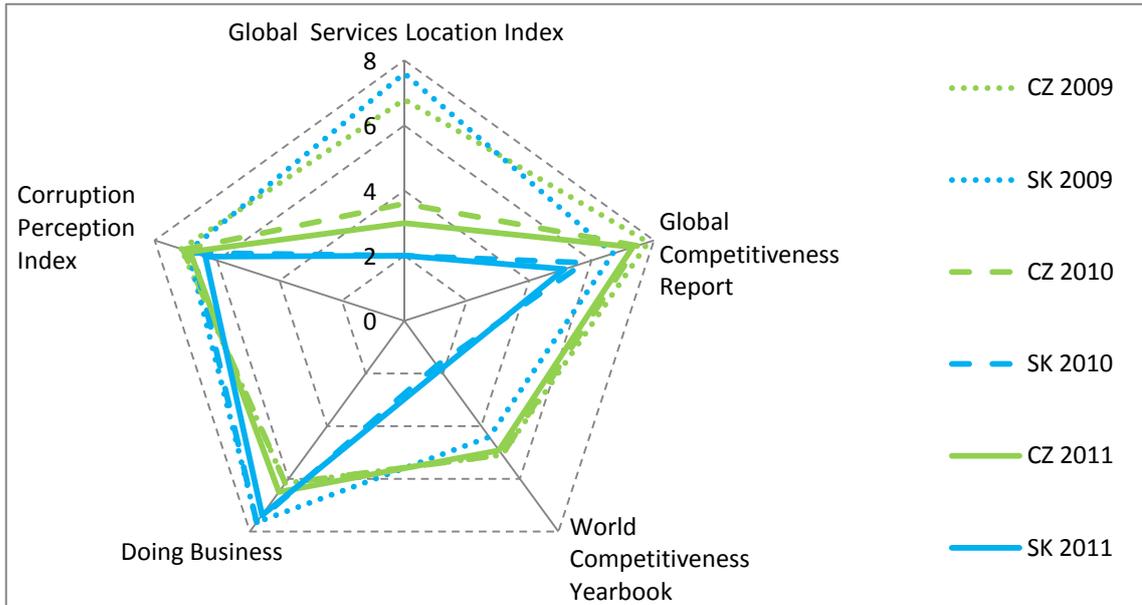
grounded in.” On the other hand, Šuster adds that the current problems show that Slovakia is better aligned with the cycle of the eurozone than the countries of southern Europe are. He suggests that the positive effects of being in the eurozone, such as increase in foreign trade, will occur in the much longer time span.

4.4.7 Government Efficiency and Business Climate

Cross-country surveys dealing with competitiveness consistently assess various aspects of competitiveness. Figure 2 depicts a relative score of the Czech Republic and Slovakia in the World Bank Doing Business Index, Global Competitiveness Report, World Competitiveness Yearbook and A.T. Kearney Global Services Location Index and a widely used Corruption Perceptions Index. All indices were normalized into standardized value of zero to ten points.

Based on the indices, both countries have experienced a slow deterioration in competitiveness and their positions in cross-country rankings have slipped in recent years. The sharpest decline has been recorded in the A.T. Kearney’s index evaluating the most appropriate off-shore locations for services. The results show that the Czech Republic as well as Slovakia lost a significant portion of its cost competitiveness, most likely due to wage increases. Yet, the business climate in Slovakia is fairly attractive by the standards of comparable countries. According to the World Bank Doing Business 2011 indicators, Slovakia scored 8 points in terms of the overall ease of doing business. Other competitiveness surveys (e.g. World Economic Forum, 2010, and IMD, 2010) consistently identify inefficiencies in the provision of public goods and services, weak independence of law enforcement and the court system and a lack of transparency of government operations as major growth and productivity impediments. Concerning transparency, the Corruptions Perceptions Index compiled by Transparency International, 2010) reports stagnation in Czech and Slovak score and a slide in the countries’ ranking. “A range of procurement scandals and weaknesses in a number of oversight institutions stood in the way of improvement (De Broeck *et al.*, 2012).” Reducing corruption thus remains an important challenge in both the Czech Republic and Slovakia.

Figure 2: Cross-country competitiveness surveys



Source: Own elaboration based on the World Bank, IMD, WEO, A.T. Kearney and Amnesty International

5 Conclusion

To sum up, the literature review described how complex the whole problem of competitiveness is. While applied extensively to countries, the term is not uniformly measured or defined and it apparently means different things to different researchers. Some emphasize a country's low costs or the level of its exchange rate, others a country's technological leadership, its growth rate or productivity. Yet, the literature review seems to confirm that the most frequently mentioned macroeconomic indicator of country competitiveness is the export performance.

In the main part of the thesis, we analyzed the trade effects associated with creation of the eurozone. The so called 'Rose effects' implies that two countries that share the same currency trade more than they would otherwise. The empirical literature on the boost to trade due to the formation of a monetary union is, however, rather ambiguous. Estimates published by researchers range from negative or marginal effect to more than decuple increase in bilateral trade. Our empirical evidence suggests that positive trade effects brought about by the introduction of the common European currency are rather moderate – around 5%. This result is in line with some of the earlier estimates showing that the euro changeover typically stimulates foreign trade between member states but to a much lower extent than previously believed. Even though the effect varies across countries, it can be concluded that the euro adoption has a positive, though hard to quantify, impact on trade. Addressing the Czech Republic and Slovakia, the evolution of exports during the observed period was rather specific due to the global market turmoil that coincided with the euro introduction in Slovakia. Taking this into consideration, Czech exports fared relatively better at the onset of the crisis. Nominal exchange rate depreciation against the euro witnessed at the beginning of the economic slowdown may have enabled Czech exporters to lower their prices and thus to somewhat mitigate the negative impact of the external demand shock on their sales abroad at the peak of the crisis. On the other hand, the export earnings evolved largely in parallel, confirming the hypothesis that higher real exports were offset by lower prices. Hence, the currency depreciation did not prove to be a measurable advantage.

The last chapter looked at the development of other major competitiveness indicators, in particular: real effective exchange rates, unit labor costs and export market shares. At a glance, vast majority of indicators exhibited a very similar pattern in the Czech Republic and Slovakia. Both economies under observation experienced losses in price competitiveness through strong effective exchange rate appreciation. Major difference could be observed in 2009, when Czech indicator declined dramatically, while Slovakia's rose. In addition, Slovak nominal unit labor costs sharply climbed in 2009, most probably as a result of too strong SKK/EUR conversion rate. No clear influence of the euro could be inferred from the trend exhibited by export market shares.

Other benefits expected to manifest after the euro changeover were *inter alia* permanent savings on transaction costs, facilitated and cheaper access to capital, increased price transparency and new direct investments. All these should, in the long run, lead to faster economic growth and higher efficiency and competitiveness of the whole economy. Regarding the foreign investments, Slovakia experienced the strongest recovery among the Visegrad Four countries, being also the only one to exceed the pre-crisis level. This fact indicates that it has become attractive to investors and the introduction of the euro might have had a beneficial effect on the investment climate. Lower short-term lending rates contributed to more favorable credit developments in Slovakia, compared to the Czech Republic. More attractive interest rates have made loans to both firms and citizens accessible amid the crisis.

However, the split in the CDS spreads proves that the euro area membership by itself is no panacea. Investors carefully distinguish between countries even within one region and their confidence must inevitably be supported by sound fiscal policy and economic reforms. Competitiveness surveys repeatedly identify inefficiencies in public procurement, weak law enforcement and an overall lack of transparency of government operations as major growth and productivity hindrances. Shortly after Slovakia joined, the philosophy of the monetary union has changed considerably. The debts of one nation have become explicitly the debts of the whole union. This interpretation of solidarity caused that some economically weaker members have to support wealthier countries. It is not unlikely that this unanticipated burden arising from euro area membership will hamper Slovak economic growth in comparison to the situation had it stayed outside the eurozone. Time will tell whether the rapid introduction of the euro has really been worthwhile.

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Appendix A:

Studies dealing with the effect of currency unions on trade

Author	Year	Euro	Point est.				
				Faruqee	2004	Y	0,0820
				Taglioni	2004	Y	0,5300
Rose	2000	N	1,2100	Baldwin & Taglioni	2004	Y	0,0340
Pakko & Wall	2001	N	-0,3780	Flandreau & Maurel	2005	N	1,1600
Rose & van Wincoop	2001	N	0,9100	Klein	2005	N	0,5000
Rose	2001	N	0,7400	Yamarik & Ghosh	2005	N	1,8285
Persson	2001	N	0,5060	Aristotelous	2006	Y	0,0550
HoNhan	2001	N	0,9210	Flam & Nrdstrbm	2006a	Y	0,2320
Méltiz	2001	N	0,7000	Baldwin & Taglioni	2006	Y	-0,0200
Tenreyro	2001	N	0,4710	Baldwin & di Nino	2006	Y	0,0350
Nitsch	2002b	N	0,8200	Flam & Nordstrom	2006b	Y	0,1390
Frankel & Rose	2002	N	1,3600	Gomes et al.	2006	Y	0,0690
Thom & Walsh	2002	Y	0,0980	Tsangarides et al.	2006	N	0,5400
Glick & Rose	2002	N	0,6500	Baxter & Kouparitsas	2006	N	0,4700
Rose & Engel	2002	N	1,2100	Barro & Tenreyro	2007	N	1,8990
Bun & Klaassen	2002	Y	0,3300	Subramanian & Wei	2007	N	0,6370
de Souza	2002	Y	0,1700	Adam & Cobham	2007	N	0,8750
Nitsch	2002a	N	0,6200	Shin & Serlenga	2007	Y	-0,0003
Smith	2002	N	0,3800	Bun & Klaassen	2007	Y	0,0320
Bomberger	2002	N	0,0800	de Sousa & Lochard	2007	Y	0,1500
Saiki	2002	N	0,5600	Shirono	2008	N	0,9100
Kenen	2002	N	1,2219	Méltiz	2008	N	1,3800
Levi Yeyati	2003	N	0,5000	Berger & Nitsch	2008	Y	-0,0010
Estevadeordal et al.	2003	N	0,2930	Brouwer et al.	2008	Y	0,0120
Barr et al.	2003	Y	0,2500	Baldwin et al.	2008	Y	0,0200
Lopéz-Córdova & Meissner	2003	N	0,7160	Caso	2008	Y	0,1630
Micco et al.	2003	Y	0,0890	de Nardis et al.	2008	Y	0,0400
de Nardis & Vicarelli	2003	Y	0,0610	Frankel	2008b	Y	0,0970
Cabasson	2003	Y	0,6300				
Alesina et al.	2003	N	1,5600				
de Sousa & Lochard	2003	N	1,2100				
Rose	2004	N	1,1200				
de Nardis	2004	Y	0,0930				
Sadikov et al.	2004	Y	0,2200				

Source: Havránek (2010)

Appendix B:

Formulas for the indicators' transformations

Indicators	Formulas for data transformation
3 year backward moving average of CURRENT ACCOUNT BALANCE as % of GDP	$\frac{\left(\frac{CA}{GDP}\right)_t + \left(\frac{CA}{GDP}\right)_{t-1} + \left(\frac{CA}{GDP}\right)_{t-2}}{3} * 100$
NET INTERNATIONAL INVESTMENT POSITION as % of GDP	$\frac{NIIP_t}{GDP_t} * 100$
% change (3 years) of REAL EFFECTIVE EXCHANGE RATE with HICP deflators relative to 35 other industrial countries ^(a)	$\frac{(REER_HICP_35)_t - (REER_HICP_35)_{t-3}}{(REER_HICP_35)_{t-3}} * 100$
% change (5 years) in EXPORT MARKET SHARES	$\frac{\left(\frac{EXP_c}{EXP_{world}}\right)_t - \left(\frac{EXP_c}{EXP_{world}}\right)_{t-5}}{\left(\frac{EXP_c}{EXP_{world}}\right)_{t-5}} * 100$
% change (3 years) in NOMINAL UNIT LABOUR COST ^(b)	$\frac{(ULC)_t - (ULC)_{t-3}}{(ULC)_{t-3}} * 100$
y-o-y % change in DEFLATED HOUSE PRICES ^(c)	$\left(\frac{\frac{HPI_t}{DEFL_t} - \frac{HPI_{t-1}}{DEFL_{t-1}}}{\frac{HPI_{t-1}}{DEFL_{t-1}}} \right) * 100$
PRIVATE SECTOR CREDIT FLOW as % of GDP ^{(d) (e)}	$\frac{PSCF_t}{GDP_t} * 100$
PRIVATE SECTOR DEBT as % of GDP ^{(d) (e)}	$\frac{PSD_t}{GDP_t} * 100$
GENERAL GOVERNMENT DEBT as % of GDP	$\frac{GGD_t}{GDP_t} * 100$
3 year backward moving average of UNEMPLOYMENT RATE	$\frac{(UR)_t + (UR)_{t-1} + (UR)_{t-2}}{3}$

Source: European Commission (2012)

Appendix C:

Indicators and indicative thresholds

	External imbalances and competitiveness					Internal imbalances				
Headline Indicators	3-year average of current account balance as a % of GDP	Net International Investment Position as a % of GDP	3-year % change of Real Effective Exchange Rate, HICP deflators relative to 35 industrial countries	5-year % change of export market shares	3-year % change of nominal unit labour cost	y-o-y % change in deflated house prices	private sector credit flow as % of GDP	private sector debt as % of GDP	general government debt as % of GDP	3-year average of unemployment rate
Data source	Balance of Payments statistics, EUROSTAT.	Balance of Payments Statistics, EUROSTAT.	DG ECFIN indicator data base on Price and Cost competitiveness.	Balance of Payments statistics, EUROSTAT, IMF.	EUROSTAT.	Harmonised house price index by EUROSTAT, completed with ECB, OECD and BIS data.	Transactions AFA, EUROSTAT for annual data and QSA, ECB for quarterly data.	Balance Sheet AFA, EUROSTAT for annual data and QSA, ECB for quarterly data.	EUROSTAT (EDP – treaty definition).	EUROSTAT LFS data.
Indicative thresholds	+6/-4%	-35% Lower quartile	+/-5% for EA +/-11% non-EA Lower and Upper Quartiles of EA - /+ s.d. of EA	-6% Lower quartile	+9% EA +12% non-EA Upper Quartile EA3 p.p	+6% Upper quartile	+15% Upper Quartile	160% Upper Quartile	+60%	+10%
Period for calculating thresholds	1970-2007	First available year (mid-1990s)-2007	1995-2007	1995-2007	1995-2007	1995-2007	1995-2007	1995-2007		1995-2007
Additional indicators	Current Account balance as % of GDP, BoP data; Net lending/borrowing vs ROW as % of GDP; Net Trade Balance of energy products as % GDP	Net External Debt as % GDP; FDI inflows as % GDP	3-year % change REER vs rest of the euro area	% y-o-y change in export market shares based on volumes of goods; % y-o-y growth Labour productivity;	10-year % change in Nominal ULC; % Change (10 years) in Effective ULC vs. EA (17)	3-year % change in Nominal house Prices; Residential Construction as % GDP	% change in financial liabilities of the non-consolidated financial sector	Private sector debt based on consolidated data; y-o-y growth of financial Liabilities of financial sector, non-consolidated		% y-o-y growth of Employment

Source: European Commission (2012)

Appendix D:

The Macroeconomic Imbalance Procedure scoreboard for 2010

Year 2010	External imbalances and competitiveness					Internal imbalances				
	3 year average of Current Account Balance as % of GDP	Net International Investment Position as % of GDP	% Change (3 years) of Real Effective Exchange Rate with HIPC deflators	% Change (5 years) in Export Market Shares	% Change (3 years) in Nominal ULC	% y-o-y change in deflated House Prices	Private Sector Credit Flow as % of GDP	Private Sector Debt as % of GDP	Public Sector Debt as % of GDP	3 year average of Unemployment
Thresholds	-4/+6%	-35%	±5% & ±11%	-6%	+9% & +12%	+6%	15%	160%	60%	10%
BE	-0.6	77.8	1.3	-15.4	8.5	0.4	13.1	233	96	7.7
BG	-11.1	-97.7	10.4	15.8	27.8	-11.1	-0.2	169	16	7.5
CZ	-2.5	-49.0	12.7	12.3	5.1	-3.4	1.7	77	38	6.1
DK	3.9	10.3	0.9	-15.3	11.0	0.5	5.8	244	43	5.6
DE	5.9	38.4	-2.9	-8.3	6.6	-1.0	3.1	128	83	7.5
EE	-0.8	-72.8	5.9	-0.9	9.3	-2.1	-8.6	176	7	12.0
IE	-2.7	-90.9	-5.0	-12.8	-2.3	-10.5	-4.5	341	93	10.6
EL	-12.1	-92.5	3.9	-20.0	12.8	-6.8	-0.7	124	145	9.9
ES	-6.5	-89.5	0.6	-11.6	3.3	-3.8	1.4	227	61	16.5
FR	-1.7	-10.0	-1.4	-19.4	7.2	5.1	2.4	160	82	9.0
IT	-2.8	-23.9	-1.0	-19.0	7.8	-1.4	3.6	126	118	7.6
CY	-12.1	-43.4	0.8	-19.4	7.2	-6.6	30.5	289	62	5.1
LV	-0.5	-80.2	8.5	14.0	-0.1	-3.9	-8.8	141	45	14.3
LT	-2.3	-55.9	9.1	13.9	0.8	-8.7	-5.3	81	38	12.5
LU	6.4	96.5	1.9	3.2	17.3	3.0	-41.8	254	19	4.9
HU	-2.1	-112.5	-0.5	1.4	3.9	-6.7	-18.7	155	81	9.7
MT	-5.4	9.2	-0.6	6.9	7.7	-1.6	6.9	212	69	6.6
NL	5.0	28.0	-1.0	-8.1	7.4	-3.0	-0.7	223	63	3.8
AT	3.5	-9.8	-1.3	-14.8	8.9	-1.5	6.4	166	72	4.3
PL	-5.0	-64.0	-0.5	20.1	12.3	-6.1	3.8	74	55	8.3
PT	-11.2	-107.5	-2.4	-8.6	5.1	0.1	3.3	249	93	10.4
RO	-6.6	-64.2	-10.4	21.4	22.1	-12.1	1.7	78	31	6.6
SI	-3.0	-35.7	2.3	-5.9	15.7	0.7	1.8	129	39	5.9
SK	-4.1	-66.2	12.1	32.6	10.1	-4.9	3.3	69	41	12.0
FI	2.1	9.9	0.3	-18.7	12.3	6.8	6.8	178	48	7.7
SE	7.5	-6.7	-2.5	-11.1	6.0	6.3	2.6	237	40	7.6
UK	-2.1	-23.8	-19.7	-24.3	11.3	3.4	3.3	212	80	7.0

Source: European Commission (2012)