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Potential Impact of the Euro Adoption in the Czech Republic on Relations with the Euro Area

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Abstract. The aim of the paper is to evaluate the impact of the euro introduction in the Czech Republic on the trade with euro area. The paper continue the present studies on expected impacts of euro introduction. Benefits associated with a monetary union integration for a newly acceding country are the larger, the higher (or the more growing, as appropriate) is the integration of the country's economy with the countries of the monetary union. These benefits are further subject to reducing the exchange rate volatility in respect of international trade relations. The stabilizing effect of the replacement of the Czech crown with the Euro will lead to the stimulation of mutual trade. The paper concludes that the integration of the Czech economy with the euro area is high (59% for foreign trade and 82% for foreign direct investment inflows) and increasing. For the assessment of the exchange rates volatility the weightet variation coefficient is used. In case the Czech crown is in fact replaced by the euro, the volatility would decrease to one-half. Furthermore, the risk of a monetary crisis would be eliminated. However the Rose Effect in the trade with euro area will be weak.

Keywords: monetary union, exchange rates volatility, trade effect, transaction costs

1 Introduction

According to the first European Central Bank's (ECB) President, W. Duisenberg, the euro is much more than a currency. "It is a symbol of the European integration" (Rusek et al., p. XVIII). However, there are other ways to look at the euro. According to P. Bagus, it is a project of the European socialists aimed at achieving a centralized European state, a project of intrigues, and power hungry politicians (Bagus, p. XVI).

The existing debt crisis of certain euro area member states leads to scepticism in respect of the common European currency. This results in a cautious position of the euro area non-member states with regard to the replacement of their respective national currencies with the euro. Marsh (2011) indicates the causes of distrust are "the pressures on EMU's existing membership") (p. 4) and concludes that „the enlargement of the euro area has more or less ground to a halt" (p. 288). The euro area enlargement is not very likely in the near future.

The commitment to adopt the euro still persists. By joining the European Union in 2004, the new Member States automatically undertook to take part in the third stage of the formation of Economic and Monetary Union as well – i.e. to accept a single European currency. The new Member States were, prior to their accession to the EU, also reminded their obligation to adopt the euro by the European Central Bank in the *Policy position of the Governing Council*: "[...] while not yet adopting the euro, they will be committed to striving towards the eventual adopting to euro. [...] The Treaty foresees that: i) at some point following accession, new Member States will join the Exchange Rate Mechanism II; and ii) when they are deemed to have fulfilled the Maastricht convergence criteria, they will adopt the euro" (European Central Bank, 2003, p. 1).

The Czech Republic is one of the "Members States with a derogation". The pressures on the Czech Government to specify its plans concerning the accession to the euro area already started to emerge in

2001. However, they were not coming from the European Union, but rather from international investors, such as investment fund and banks, as well as from international organizations, such as the OECD, World Bank, and IMF (Dyson, 2006, pp. 171 – 172).

Negative standpoints of the Czech Government concerning the euro adoption are namely explained by the impacts of the fading financial crisis and economic recession, specifically by (Government and CNB, 2010, pp. 4 – 6; 2011, pp. 5 – 6):

- Domestic economic problems, such as the deterioration of the public finance, interruption in the convergence of the domestic price level to the prices in the euro area, stagnating structural characteristics of the labour markets;
- Fiscal problems of many Member States of the euro area: this leads to uncertainty on international financial markets, concerns of investors, potential twists in the short-term capital flows, and threats to the Czech crown stability in case of its inclusion in the Exchange Rate Mechanism II (ERM II).

However, the public finance sustainability criterion has been moving to its fulfilment. In compliance with the *Programme Announcement*, the objective of the Government is to achieve a public finance deficit below 3% in 2013 (Government, 2010, p. 4). According to the *Convergence Programme* of April 2012, the public finance deficit amounted to 3.1% in 2011 – namely due to expenditure savings. The new prognosis for 2012 even expects a public sector deficit to be lower in comparison with the prognosis from the end of 2011 – i.e. -3.0% in respect of GDP (Ministry, 2012, p. 12). Therefore, this Maastricht criterion should be fulfilled one year prior to the deadline originally foreseen by the Government.

Comparing to the selected potential members of the euro area, namely Poland and Hungary, the Czech Republic shows significantly better results in the area of real convergence (see Table 1).

Table 1 Comparison of real convergence of potential members of euro area (2010, in % to euro area 17)

	Economic level	**Price level**
Czech Republic	74.1	72.2
Poland	58.3	59.4
Hungry	60.2	62.3

Source: http://epp.eurostat.ec.europa.eu – Statistics – Economy and Finance (National accounts – GDP per Capita; Purchasing Power Parities – Comparative Price Levels). Own calculation.

The Czech Republic fulfills unofficially proposed criterion of GDP per capita in the value of 70% of average in euro area (Dabrowski, Rostowski, 2006, p. 6).

This essay deals with the potential impacts of the Czech Republic's euro area accession. The objective of the essay is to assess the stimulating effect of the euro adoption on the economic relations of the Czech Republic with the euro area countries. The development of the Czech economy's integration with the euro area countries is assessed first. Furthermore, the exchange rate volatility is quantified for the existing development as well as for the hypothetical development in case the Czech crown is replaced with the euro. This is followed by the explanation of the expected expansion of mutual trade and foreign direct investment (FDI) inflows after the euro adoption.

2 Methodics and Literature

Our observations employ the following steps:

- Replacing the national currency with the euro is beneficial for high (or increasing, as appropriate) integration of the acceding economy with the monetary union economies;

- Benefits are the larger, the higher (or the more growing, as appropriate) is the volatility of the present exchange rate for the given national currency;
- If the replacement of the national currency reduces the exchange rate volatility, it will stimulate mutual trade and even the foreign direct investment inflows.

The process is shown through the diagram in Figure 1.

In case of trade, it concerns the endogenization of the McKinnon's optimum currency area criterion (McKinnon, 1963). According to this criterion, highly open economies (and namely small economies) have a limited potential to affect the competitiveness of their goods by changing their exchange rate. This is caused by domestic prices evening out with foreign prices. Therefore, the loss of an exchange rate (i.e. replacement of a national currency with a common union currency) will not affect them. The endogenization of the criterion means that the common currency adoption will result in further increases of mutual trade.

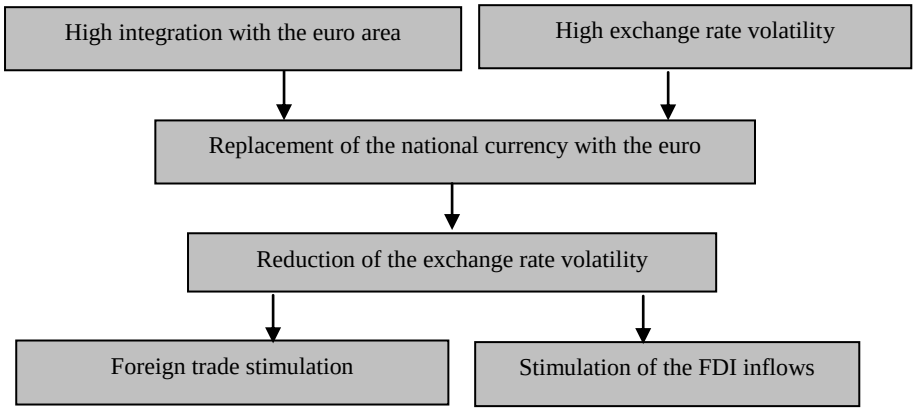


Figure 1 Potential benefits of the euro adoption
Source: Own elaboration

Economic integration can be expressed through statistical data on shares of foreign trade with the euro area and on the share of foreign direct investments with the euro area states. The quantification of the exchange rate volatility will be carried out using the calculations of standard deviations and variation coefficients. The data originate from the Czech National Bank and Eurostat. General bases of monetary integration's theory namely rely on Baldwin, Wyplosz (2006), De Grauwe (2005) and Marsh (2011).

The paper is further based on the literature dedicated to the enlargement of the euro area, namely Rusek, Lacina, Fidrmuc (eds.) (2009), Dyson (ed.) (2006), Dabrowski, Rostowski (eds.) (2006).

Empirical analyses concerning the existing development of the conditions for the euro adoption (i.e. the nominal and real convergence of the Czech economy with the economy of the euro area) are namely included in the annual *Assessment of the Fulfillment of the Maastricht Convergence Criteria and the Degree of Economic Alignment of the Czech Republic with the Euro Area* that are prepared by the Ministry of Finance and the Czech National Bank.

The effects of a common currency on the mutual trade of the monetary union members are discussed by a number of papers. The primary one is the study entitled *One Market, One Money* (1990). Furthermore, it namely concerns the working papers of the European Central Bank (e.g. Mongelli, Vega, 2006 or Baldwin, 2006). Especially Central Europe and expected effects of the euro adoption are addressed in the study of Schadler et al. (2005). The consequences of the ten years of the euro existence are summed up in the European Commission study *EMU@10* (2008).

3 Economic Relations of the Czech Republic and the Euro Area

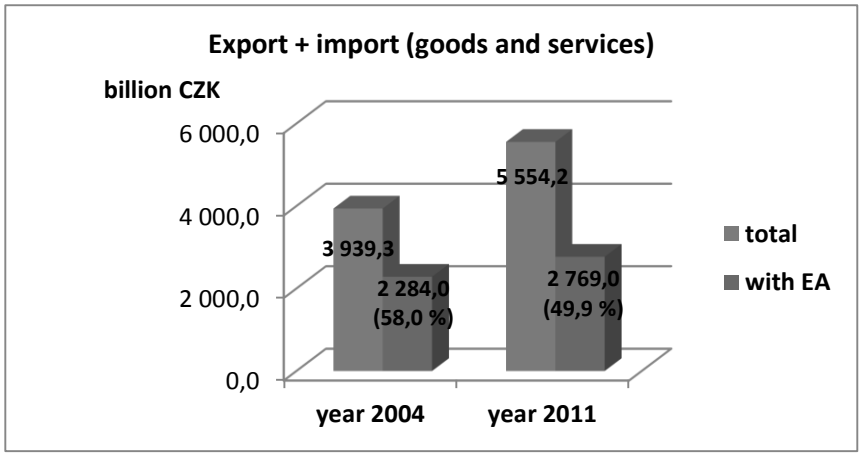
The expected benefit of the euro adoption is high in case of high economic links between the acceding States and the current euro area Member States. The development of the integration of the Czech and the euro area economy is characterized by Table 2.

The data from Table 2 demonstrate that the economic integration of the Czech Republic with the euro area is slightly increasing. The increasing integration is mainly promoted by the euro area enlargement, namely by the Slovak Republic[1]. This is corroborated by the comparison of the integration development of the Czech Republic with the original 12 euro area states[2] in 2004 and in 2011. Even though the absolute data (in CZK bn.) on the integration with the 12 euro area states are on the rise, the relative data (in %) are declining – see Figure 2.

Table 2 Integration of the Czech Republic with the euro area

Export + import (goods and services)			
	2004 (EA 12)	**2008 (EA 15)**	**2011 (EA 17)**
Total (billions CZK)*	3 939.3	5 519.4	5 554.2
With EA (billions CZK)	2 284.0	3 071.1	3 261.7
% with EA	58.0	55.6	58.7
FDI in the Czech Republic (stock at the end of year)			
	2004 (EA 12)	2008 (EA 15)	2011 (EA 17)
Total (billions CZK)	1 280.6	2 189.5	2 505.2
From EA (billions CZK)	1 017.6	1 809.4	2 039.9
% from EA	79.5	82.6	81.4

Source: CA: http://www.cnb.cz/cs/statistika/platebni_bilance_stat/publikace_pb/bezny_ucet_pb_tc/index.html
FDI: http://www.cnb.cz/cs/statistika/platebni_bilance_stat/pzi/index.html
Own calculations.
*Notes: * community principle. EA = euro area in composition according to the current situation in these years.*
FDI in 2011: to the stock 2010 were added flows for 2011.



[1] In 2008, i.e. one year prior to the Slovakia's accession to the euro area, the share of Slovakia in the Czech trade amounted to 8.1%; in 2011, this share amounted to 8.2%.
[2] Germany, France, Italy, Belgium, the Netherlands, Luxembourg, Ireland, Austria, Spain, Portugal, Finland, and Greece.

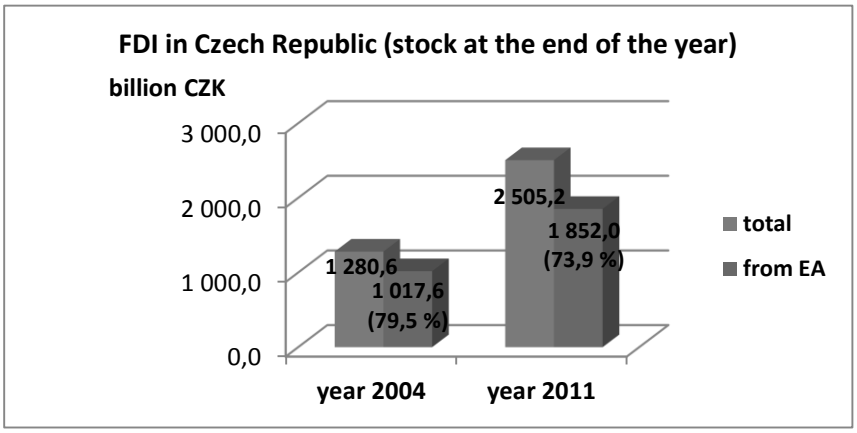


Figure 2 Integration of the Czech Republic with the initial euro area (12)
Source: same as Tab. 2. Own calculations.
Note.: FDI in 2011: to the stock 2010 were added flows for 2011. EA = euro area 12.

Volatility of Exchange Rates

The benefit of a single currency depends on the development of the exchange rate of the existing national currency in relation to the euro. The more this existing (or expected) exchange rate development shows instability, the higher will be expected benefits of the euro adoption. The development of the CZK/EUR exchange rate is shown in Figure 3. In respect of the development, it is necessary to pay attention to:

- one year prior to the onset of the financial crisis,
- subsequent period of the crisis (from September 2008 till the end of 2009)
- and the following one year.

Overall, it concerns the period from September 2007 till the end of 2010.

Figure 3 Exchange rate CZK/EUR developments
Source: http://www.cnb.cz/cs/financni_trhy/devizovy_trh/kurzy_devizoveho_trhu/prumerne_form.jsp
Own preparation.

Furthermore, we will examine the average monthly exchange rates volatility – USD/EUR and CZK/USD exchange rates, in addition to the CZK/EUR exchange rate. The volatility will be expressed in two ways:

- Standard deviation – i.e. the dispersion of the average monthly exchange rate value (quadratic average of deviations of individual values from their arithmetic mean) – in currency units;
- Variation coefficient, i.e. the proportion of the standard deviation to the arithmetic mean of the exchange rate during the same monthly period – in %.

The results of the measuring are shown in Table 3.

Table 3 Volatility of exchange rates

Exchange rate	Standard deviation	Variation coefficient
CZK/EUR	1.120	4.34
USD/EUR	0.102	7.24
CZK/USD	1.588	8.61

Source: CZK/EUR and CZK/USD: http://www.cnb.cz/cs/financni_trhy/devizovy_trh/kurzy_devizoveho_trhu/index.html
USD/EUR: http://epp.eurostat.ec.europa.eu/portal/page/portal/exchange_rates/data/database
Own calculations.

Let us assume, for the sake of simplification that trade transactions with the euro area countries are only carried out in EUR and the remaining transactions (outside of the euro area) are only carried out in USD. We will use the shares of international trade in 2011 (Table 2) as weights. The share of the first group of transactions amounted to 58.7%, while the share of the remaining transactions amounted to 41.3%.

The exchange rate volatility for foreign trade transactions then was as follows:

- With regard to the actual development using the CZK/EUR exchange rate (variation coefficient of 4.34% with the weight of 0.59) and CZK/USD exchange rate (variation coefficient of 8.61% with the weight of 0.41), the weighted variation coefficient amounted to 6.09%;
- Following the hypothetical replacement of the Czech crown with the euro and the EUR/EUR exchange rate (ariation coefficient of 0.00% with the weight of 0.59) and EUR/USD exchange rate (variation coefficient 7.24% with the weight of 0.41), the weighted variation coefficient amounted to 2.97%.

This implies the conclusion that in case of the existence of the independent Czech crown, with the CZK/EUR and CZK/USD exchange rates, the weighted variation coefficient of exchange rates is 2.1 times higher than in case of the hypothetical replacement of CZK with the euro.

With regard to the 40-month period in question, we pay more attention to the effects of the financial crisis on the exchange rate volatility.[3] Table 4 shows the development of variation coefficients for three separate periods (prior to, during, and after the crisis). The average volatility of all exchange rates did not show extreme values during the crisis – i.e. the financial crisis did not have a significant impact on the foreign exchange market.

Table 4 Variation coefficients of exchange rates in three separate periods

Period	CZK/EUR	USD/EUR	CZK/USD
Prior to the crisis	5.48	4.89	8.50

[3] As the "milestone" of the transition of the mortgage crisis into the financial crisis, the failure of the American investment bank Lehman Brothers on September 17, 2008 is usually considered.

During the crisis	3.73	5.11	7.69
After the crisis	2.20	8.52	4.88
Whole period	**4.34**	**7.24**	**8.61**

It is possible to draw two another conclusions with regard to the development of the CZK/EUR exchange rate:

1. CZK/EUR exchange rate shows an explicit appreciation trend, which undermines the competitiveness of Czech exporters on a long-term basis. Equation of linear trend function in Figure 3

   $$y = -0.0689x + 29.663$$

   shows that in the period 2005 – 2011 there was average monthly appreciation by 0.07 CZK/EUR. In other words it means that 100 CZK rose in price from 3.37 EUR to 4.16 EUR in the trend in the monitored period.

2. During the period of July 2008 – February 2009, a significant depreciation of the exchange rate took place, specifically by 28.3%. It is a sign of a looming currency crisis associated with an national currency of a small open economy. In case of a single currency (euro) that has a substantial share in the turnover of the global foreign exchange market, such currency crisis would be very unlikely.

4 Stimulation of Economic Relations with the Euro Area

The expected benefit of a single currency adoption will be the stimulation effect:

- on the international trade (so-called trade effect): „We review recent empirical research and endorse two conclusions: monetary unions *do* promote trade between their members but *do not* reduce bilateral trade between their member states and countries outside such unions“ (Begg et al., 2003, p. 5);
- on the inflow of foreign direct investments.

Utilization of the euro instead of the existing national currency brings about two changes in foreign trade within trade with the euro area (see De Grauwe, 2005, p. 80):

1) Certain transaction costs are eliminated, especially those associated with the foreign currency management – e.g. conversion of foreign currencies, increased payment system costs associated with the use of foreign currencies, costs associated with the administration of other accounts (i.e. foreign exchange accounts), costs arising from more complex bookkeeping of foreign currencies, etc. The disappearance of the aforementioned costs promotes competitiveness and stimulates exports.

What is the quantification of transaction costs? In case of large economies, the currencies of which are widely used internationally, the savings of these costs amount to 0.1 – 0.2% of their GDP; in case of small open economies and less developed economies, these savings amount to around 1% of their GDP. In terms of the entire group of the European Communities states (in 1990), the estimates amounted to 0.4% of GDP of the former EC states (Commission, 1990, p. 63). The central banks of Poland and Hungary estimate these costs at 0.2% of their GDP (Schadler et al., 2005, p. 16.), while the Slovak central bank anticipates these costs at 0.36% (National Bank of Slovakia, 2006, p. 93.). In the Czech Republic, these costs are estimated at 0.28% of GDP (Lacina et al., 2007, p. 81).

2) The exchange rate risk and the costs associated with the mitigation thereof disappear.[4] This leads to the stimulation of mutual exports and imports. This fact is addressed in detail in the European Commission study *One Market, One Money* (1990). „The main theoretical argument as to why exchange rate variability should adversely affect trade is that risk-adverse agents will reduce their activity in an area, such as trade or investment for export, if the risk, i.e. the variability of the return they can obtain from this activity, increases. [...] The most direct channel for nominal exchange rate variability to affect international trade arises because most international trade contracts involve a time lag between the time the contract is made, and when the exporter obtains his payment." (Commission, 1990, p. 72).

While it is possible to mitigate this risk through hedging, it leads to higher costs for companies. Increased costs are clearly the reason why "only a small part of intra-EC trade is hedged in reality" (Commission, 1990, p. 75).

Detailed elaboration of the "trade effect" mechanism consists in explaining the relatively strong increase in trade with zero exchange rate risk. The explanation consists in distinguishing two effects on exports of companies: (Mongelli, Vega, 2006, p. 15 – 16):

- Existing export companies increase their exports;
- The number of export companies increases; new exporters emerge, namely from among small businesses.

In case the exchange rate risk elimination leads to the significant predominance of the second effect, the so-called Rose Effect occurs. This effect is show in Figure 4. The trade-off line for exchange rate volatility and trade ceases to be liner, becoming convex, thus showing strong increase in trade.

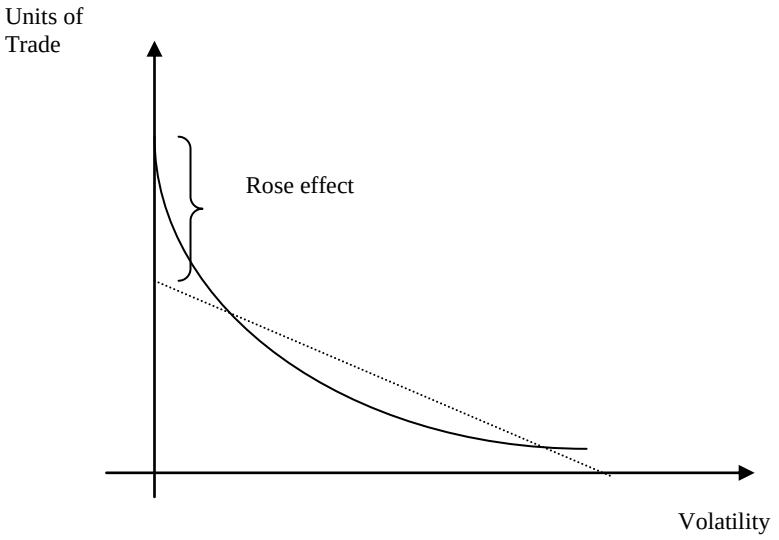


Figure 4 The Rose effect: a trade-off between volatility and trade
Source: Mongelli, Vega., 2006, p. 16.

[4] „However, business surveys provide strong evidence that [...] foreign exchange risk is still considered a major obstacle to trade." (Commission, 1990, p. 63).

In case of the Czech Republic, it is necessary to assess the expected benefits of the euro adoption in respect of export of small and medium-sized enterprises (SME)[5] under the influence of two factors (data according to the Ministry of Industry, 2011, pp. 12, 14, 48):

1) SMEs in the Czech Republic show only a slightly lower share in exports (51.3% in 2010) in comparison with their share in the total output of the national economy, i.e. in the added value (53.9%).
2) According to the survey of the European Commission among small and medium-sized enterprises (survey of 2010), 25% of SMEs exported in the EU on an average, compared to 35% in the Czech Republic.

Therefore, we cannot expect a significant increase of exports on the part of the SMEs, stimulated by the single currency adoption.

The studies quantifying the overall trade effect for various monetary unions give conflicting results.[6] Rose (2000) discovered that the pairs of states, which are members of a monetary union, have a 100% higher bilateral trade on an average (in certain cases even by 300%) compared to the trade of pairs of states that are not members of a monetary union. However, other studies concluded that this effect is small in case of the euro area. The explanation consists in the fact that most monetary unions included in the Rose's research covered very small states, e.g. the Eastern Caribbean Currency Union (see, for example, De Grauwe, 2005; Baldwin, 2006; Quah, 2004).

Rose (2002, p. 10) performed a meta-analysis of 24 studies comprising 443 findings, concluding "that currency union approximately doubles trade." Trade increases mainly apply to small open economies.

Also Rose and Stanley (2005) performed a meta-analysis of 34 studies in total, comprising 754 findings. They claim "a robust, economically important, positive trade effect from monetary union" (p. 348). They analyzed different results of individual studies using various econometric methods, coming to a conclusion about the stimulation of mutual trade of monetary union members (expressed as a share of the sum of export and import in GDP) as a result of using a common currency by 30 – 90% (p. 359).

Baldwin (2006, p. 48) comes to a conclusion about a more modest increase in the mutual trade of the euro area states, „say the number is between 5% and 10% to date. Most of the evidence suggests that this number may grow as time passes, maybe even doubling."

Baldwin and Wyplosz (2006, p. 368) also conclude that the mutual trade of the euro area member states increased more than the trade of states outside of the euro area.

It is also safe to expect the positive impact of the reduction of costs associated with the conversion of foreign currencies to domestic currency on the FDI inflows. However, the exchange rate risk elimination will clearly be more important, specifically in the following ways:

- In part, the above mentioned trade (export) stimulation promotes competitiveness – FDIs thus become more attractive in a state that is a member of the euro area;
- It partly affects (through exchange rate conversion) the proceeds, i.e. profits or dividends, transferred to parent foreign country – this is eliminated in case of a single currency;
- Moreover, this promotes FDI inflows from economies other than the euro area states, provided the monetary union membership increases the acceding state's rating.

According to the study of the European Commission *EMU@10* (European Commission, 2008, p. 4), the euro had the following benefits:

[5] A small enterprise (according to the Commission Regulation no. 800/2008) is an enterprise, which employs less than 50 employees and the assets or turnover of which do not exceed EUR 10 million. A medium-sized enterprise must meet similar indicators – up to 250 employees, EUR 43 mil. in assets, and EUR 50 mil. in turnover.

[6] Transparent interpretation of results for a number of research projects is included in De Grauwe, 2005, pp. 80 – 82.

- Mutual trade of the euro area Member States increased from one fourth to one third of GDP in the past 10 years; one half of this increase is attributed to the effect of exchange rate risk elimination and lower costs;
- FDI within the euro area increased from one fifth to one third of GDP; two thirds of the FDI increase are attributed to the effect of the euro adoption.

5 Conclusions

The replacement of the Czech crown with the euro is objectively postponed, especially because of the current problems of the euro area. However, Czech economy is strongly linked to the economies of the euro area countries, regarding to both international trade and foreign direct investments inflow. Moreover, this integration is growing, especially under the euro area enlargement influence (particularly the impact of Slovakia's entry into the euro area).

The CZK/EUR exchange rate is not stable. In case of the existence of the independent Czech crown, with the CZK/EUR and CZK/USD exchange rates, the weighted volatility of exchange rates is 2.1 times higher than in case of the hypothetical replacement of CZK with the euro. The exchange rate volatility reduction should contribute to further expansion of trade between the Czech Republic and the euro area. However, it is not possible to envisage an overly significant impact of the Rose Effect. The reason for this is the currently high export of Czech SMEs (compared to the EU average); its further increase is unlikely.

The CZK/EUR exchange rate has been showing appreciation trend on a long-term basis, thereby undermining the competitiveness of Czech businesses. The recent developments have also shown that there is still an imminent risk of currency crisis in respect of the Czech crown. Both problems would be eliminated by the euro adoption.

6 Acknowledgment

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