IDENTIFICATION AND CLASSIFICATION OF BENEFITS AND COSTS ASSOCIATED WITH INTRODUCTION OF EURO IN THE CZECH REPUBLIC

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Abstract
The paper aims at identification and classification of benefits and costs associated with introduction of a single currency and on providing proposals how to measure these impacts. Benefits and costs will be classified from their time-horizon perspective, on one-off impact and permanent impact, which may further be divided into immediate and medium/long-term impacts. Surveys on benefits and costs associated with introduction of a single currency in relevant EU Member States showed that there so far has not been done a comprehensive identification of all impacts and their precise time-horizon classification. Authors will also propose indicators quantifying magnitude of the identified impacts. Proposed methodology of time-horizon classification of benefits and costs associated with the introduction of euro together with proposal of indicators quantifying magnitude of the identified impacts will serve as a basis for further study of the authors, which will focus on precise quantification of the most important benefits and costs of euro introduction in the Czech Republic. Division of the impacts on one-off and permanent as well as immediate and medium/long-term will enable to provide more accurate estimate of the impact of euro introduction in the Czech Republic in different time-horizons. It will also allow the Czech authorities to define better the optimal time of entering eurozone and thus will significantly contribute to the discussion on timing of the Czech Republic membership in eurozone.

Keywords: euro, EMU, Czech Republic, costs, benefits

JEL codes: F15, F36

1 The results introduced in the article are outcomes of the research intent n. MSM 6215648904 with the title "The Czech Economy in the Process of Integration and Globalization, and the Development of Agricultural Sector and the Sector of Services under the New Conditions of the Integrated European Market", thematic area "Macroeconomic and microeconomic performance of the Czech economy, and the Czech government’s economical-political measures in the context of the integrated European market." The holder of the research intent is Mendel University of Agriculture and Forestry Brno, Faculty of Business and Economics.
1 Costs and benefits connected with the membership in the monetary union

Analysis of costs of membership in monetary union has its origin primarily in macroeconomic theory, while benefits have to be search rather at microeconomic level. Let’s first turn attention to the benefits of common currency. It is possible to identify two significant factors influencing the magnitude of potential benefits from introduction of common currency. First one is connected with the elimination (reduction) of transaction costs. The second is defined as the elimination of exchange rate volatility. It is obvious that the main beneficiaries from the introduction of common currency looking on two above defined factors are mainly businesses and citizens of eurozone member states. There exist also benefits at macroeconomic level like growth of mutual trade or increase in foreign direct investment inflow (FDI), which all finally stimulate higher dynamics of economic growth. Their quantification is however much more difficult as they are influenced by a lot of factors which have not direct connection with membership in monetary union.

The costs of membership in monetary union have primarily macroeconomic nature. The most important are the loss of autonomy in monetary and exchange-rate policy. Both instruments are effective tools to fight with asymmetric shocks, which are the results of unsynchronised business cycles. We will also pay attention to costs that have more direct impact on enterprises and citizens, namely reduction of commission incomes, increase of prices, impact on savings and pensions, software adaptation, administrative and technical adjustment expenses, lower income for state budget due to citizen-friendly tax rounding rule, reduction of seigniorage income.

Contemporary economic literature dealing with monetary integration offers many different methods of classification of benefits and costs of monetary integration. There are also different opinions on significance of individual costs and benefits from the point of view of their distribution in time, their impact on different target groups etc. All authors and studies admit that to complete unambiguous classification and quantification of costs and benefits from introduction of common currency is not an easy assignment (compare for example Lacina et al, 2007; European Commission, 1990; National Bank of Hungary, 2002; National Bank of Poland, 2004; National Bank of Slovakia, 2006). The reason is either non existence of appropriate data or difficulties with their quantification. Most of the costs and benefits have indirect effect and deriving the direct effect of common currency introduction is very complicated.
This paper aims to provide input into debate on identification, classification and quantification of different benefits and costs associated with membership in monetary union.

In its first section, the paper identifies benefits of introducing common currency and how they influence national economy and presents estimates of size of their impact as they were calculated in studies on euro-introduction impacts. The second part similarly deals with the costs of introducing single currency.

Subsequently, a summary table presents evaluation of each benefit and cost from the point of view of their time-horizon, main target group, sources of data for quantification and size of estimated impact. The analysis comes to conclusion on which benefits and costs should be decisive in making decision on under which conditions to enter the euro-area.

1.1 Benefits of euro introduction

The following text identifies expected benefits associated with euro introduction. It provides brief explanation of the relevant impact and identifies benefit-takers groups, suggestion of how to measure magnitude of the relevant impact and also estimate of its timing.

1.1.1 Elimination of exchange-rate volatility

Exchange rate volatility has impact on all actors participating in financial transactions with euro-area: foreign trade operations of Czech enterprises, public sector institutions receiving payments and paying liabilities in euro and citizens travelling to euro-area countries. This benefit will be further increased by adoption of euro in other new Member States, mainly Slovakia, Hungary and Poland. This will have positive impact on enterprises doing business in these countries and citizens travelling there. Among benefits associated with eliminations of exchange-rate volatility belongs also reduction of hedging costs connected with foreign trade operations in euro currency.

For citizens, exchange-rate volatility is represented by change of value of their assets denominated in foreign currency, e.g. euro notes and coins which they keep after they return from their journey abroad for the next time.

For enterprises, exchange-rate volatility is represented by change of value of their contracts between the date, when contract is signed and date when it is realized. Enterprises may protect themselves against such a risk by using hedging instruments such as currency option or foreign exchange forward. However, enterprises have to pay for this security.
For public sector institutions, exchange-rate volatility is represented by change of value of their incomes or liabilities denominated in euro. Example may be drawing of Structural Funds, which is for all EU Member States provided in euro. During the period 2004–2006 the Czech Republic was allocated 1 584,4 million euro from Structural Funds, which was 50 336,4 million Czech crowns with the June 2004 exchange rate of 31,77 CZK/EUR. With the August 2007 exchange rate of 28,025 CZK/EUR, the same allocation in euro represented 44 402,8 million Czech crowns. Three-year fluctuation of the CZK/EUR exchange rate resulted in loss of nearly 6 billion Czech crowns from the Structural Funds.

For the 2007–2013 programming period, the Czech Republic was allocated 26,69 billion euro. With 28,025 CZK/EUR July 2007 exchange rate, the allocation represented 748 billion Czech crowns. If we had adopted euro in 2007 just like Slovenia did, and if we assume that by 2010 we would have successfully drawn half of this allocation, we would still have 13,345 billions of euro for 2011–2013. Under a hypothetical fixed conversion rate of 28,025 CZK/EUR it would be 374 billion Czech crowns in prices of 2007. However, since we haven’t adopted euro yet and we obviously will not have it by 2010, CZK/EUR exchange rate will certainly change by that time. Under assumption that the exchange rate will be 25 CZK/EUR in 2010, we would have only 333,6 billion Czech crowns left for 2011–2013. Due to exchange-rate volatility, adoption of euro in 2007 would make us 40,4 billion Czech crowns (1,17 % of estimated 2007 GDP) better-off as compared to scenario when we still don’t have euro in 2010 and under rather conservative assumption that the Czech currency will appreciate by only some 3 crowns vis-à-vis euro. Of course, further loss would come in the subsequent years 2011–2013 depending on when we adopt euro and how the CZK/EUR exchange rate would develop.

Quantification of gains resulting from elimination of exchange-rate volatility of CZK/EUR can be done by calculating loss of enterprises profits from foreign trade exposed to CZK/EUR exchange rate volatility, volume of assets/liabilities denominated in euro and the amount of volatility and also the price and volume of hedging.

Elimination of exchange-rate volatility will be an immediate and permanent benefit for the Czech economy.

1.1.2 Reduction of transaction costs

Transaction costs derive from the commissions, which all economic agents have to pay for changing Czech crowns or from less favourable exchange rate conditions when they
don’t pay commission fees but change money at street exchange offices. Among transaction costs can be included also administrative expenses related to keeping double-currency accounting systems, making additional financial reporting, paying higher fees for bank account transfers to euro area countries and paying additional employees who deal with foreign exchange operations.

Quantification of reduction of financial transaction costs can be done by calculating the volume of inter-bank spot and forward euro transactions, volume of euro-currency operations of citizens and enterprises and cost of these transactions represented by half of the spread between buy price and sell price of the currency. Administrative transaction costs can be calculated on the basis of survey among enterprises and other institutions dealing with CZK/EUR foreign exchange operations.

In Hungary, overall transaction costs were estimated between 0.18–0.30 % GDP (National Bank of Hungary, p. 111), in Poland it was 0.21 % GDP (National Bank of Poland, 2004, p. 45) and in Slovakia 0.36 % GDP (National Bank of Slovakia, 2006, p. 5–6). Singer (in Pecinkova (ed.), 2007, p. 58) estimates their size at about 0.5 % of Czech GDP.

Reduction of transaction costs will be an immediate and permanent benefit for the Czech economy.

1.1.3 Better price transparency

Better price transparency should be achieved when all economic agents are able to compare prices all over euro-area countries. This is supposed to increase competitiveness and reduce prices. Citizens as well as enterprises can benefit most from price transparency when buying goods and services or buying inputs for their production. However, empirical findings after euro introduction in 2002 show no signs of price convergence in euro-area so far.

Therefore, if price transparency improves, it would occur rather in medium/long-term and would be a permanent benefit for the Czech economy.

1.1.4 Decline in interest rates due to elimination of risk premium, increase of investment

Risk premium is the cost that national economy has to pay for attracting foreign investors and eliminating their fears of loss due to future exchange rate uncertainty. Hence, after adoption of euro in the Czech Republic, investors from euro-area would not need to protect themselves against foreign exchange development and the overall level of interest rates should decline by the size of risk premium. However, interest rates in the Czech republic
are already now at comparable level with euro-area – or even lower: since August 2007 the deposit facility is at 2.25% in Czech Republic while it is at 3% in euro area (CNB, 2007; ECB, 2007). As noted Singer (in Pecinkova (ed.), 2007, p. 57), spreads of the Czech bonds didn’t change even after the Czech Republic announced it would not meet its previous target of joining euro-area in 2009–2010.

Therefore, in case of Czech Republic we cannot expect lowering of key interest rates due to elimination of risk premium. Still, joining the euro-area may help the Czech Republic in the eyes of foreign investors since it is probable that international rating agencies will increase our rating to euro-area level of AAA. Currently, Czech Republic is rated at A level (MFCR, 2007). Increased inflow of FDI should lead to increase in GDP. Several studies estimated that increase of FDI by a unit produces a 1.5–2.3 higher total investment in the economy (Borensztein at al, 1995) and that increase of FDI by 1 percentage point relative to GDP in developing country, ceteris paribus, leads to increase in GDP per capita by 0.8 percentage point (Blomstrom et al, 1994).

However, precise measurement of impact of euro introduction on FDI inflows is very difficult since there are many other factors influencing FDI than just joining single currency area. Such a calculation is missing also in reports on costs and benefits of euro introduction in other new Member States (National Bank of Hungary; National Bank of Poland, 2004; National Bank of Slovakia, 2006). Still, impact of euro introduction can be identified by measuring flows of FDI before and after euro introduction on the sample of several countries so that we can see if there is any similar pattern of FDI flows after euro adoption even in different years and try to eliminate other factors that can be identified.

Increased investment would occur in medium/long-term and would be a permanent benefit for the Czech economy.

1.1.5 Integration of financial markets

Domestic enterprises as well as other economic agents including citizens will have easier access to financial products of financial service providers in other euro-area countries. However, due to difficulties associated with searching the best available services, it can be expected that only large enterprises and public sector institutions will be able to use benefits of better services, more financial products, lower fees and therefore more effective utilisation of their resources. Thanks to increased competition and more effective financial supervision of the euro-area financial market, quality of the Czech financial market should also improve.
Decrease in interests on credits for companies would mean reduction of the cost of external capital, which could boost also domestic investment, in addition to FDI discussed above.

Quantification of improved situation on financial market can be done by comparing financial products of the Czech market and markets in other euro-area countries. However, this wouldn’t answer the question of by how much did the Czech economic agents improved their position since it depends mainly on their degree of utilization of integrated financial markets. This can be measured by regularly repeated survey among economic agents after euro introduction. Surveys should also monitor development of the Czech interest rates on credits for companies and volume of these new credits. Heinemann and Jopp (2002) estimate that further integration in the EU countries might amount to 0.5 % of the EU annual GDP. For the Czech Republic alone, the benefit would thus be rather in per mill of our GDP.

Benefits of increased integration of financial markets would occur in medium/long-term and would be permanent benefits for the Czech economy.

1.1.6 Stimulation of foreign trade

Using the same currency with the main trading partners eliminates an obstacle associated with the risk of exchange-rate volatility and therefore provides more favourable environment for foreign trade. In 2006, the Czech Republic exported 85.6 % of its total exports to other EU26 countries and imported 80.5 % of its total imports from other EU26 countries (Eurostat, 2007). Easier trade is beneficial mainly for enterprises that can further expand their foreign trade operation but also for those that so far haven’t participated in foreign trade because transaction costs and exposure to exchange rate volatility discourage them from doing business with foreign currency countries. Indirectly, increased trade is beneficial for citizens since they may consume greater variety of goods and services, possibly also for lower price. Also, stimulation of foreign trade may drive up demand for additional employees and thus improve conditions on labour market.

As regards quantification of effects of single currency adoption on foreign trade, gravity model of trade is used. This model is based on the assumption that bilateral trade between countries is positively related to their GDP and negatively related to the distance between them. Moreover, factors such as common language, historical background, nationality, trade agreements etc. are also being included in the model (National Bank of Poland, 2004, p. 50). It is important to stress out that measuring change in volume of trade just between monetary union members does not tell the whole truth since we should also keep
an eye on development of trade with non-members of monetary union. The reason is that trade between members can be created at the expense of trade with non members and therefore forming/joining monetary union may result in a zero-sum game.

Report of the National Bank of Poland (2004, p. 51) provides an overview of dozens of research results on trade effect of a currency union. These results vary between 11 % to 550 % increase of foreign trade depending mainly on selected methodology and countries included. There are many factors influencing foreign trade other than just currency (e.g. prices of inputs, international conflicts etc.) and none of these results has so far been considered as the best one since there is not an overall agreement on the methodology used. Slovak National Bank estimated 50% increase of total Slovak foreign trade after euro introduction and increase of foreign trade with euro-area would be about 60 % since the share of Slovak export to EU24 countries is around 85 % of total Slovak exports (National Bank of Slovakia, 2006, p. 17). This is similar to the share of the EU countries in the Czech exports. National Bank of Hungary estimated 107% increase of Hungarian openness due to euro introduction. Based on the work of Frankel and Rose (2000) which suggests that increase of foreign trade ration to GDP by 1 percentage point leads to an increase of GDP per capita by 0,33 % over 20 years, 107% increase of Hungarian openness would add 35 % to GDP per capita over 20-year horizon (0,55–0,76 percentage points increase in annual GDP). Latvia Bank (2004, p. 12) estimates that increased foreign trade will add 6–19 % to Latvia GDP over 20 years. Singer (in Pecinkova (ed.), 2007, p. 58) derives from estimate of increased foreign trade by 5–10 % in the long-run and suggests that its contribution to the Czech annual GDP growth would be within interval 0,1–0,2 %. Benefits of increased trade would occur in medium/long-term and would be a permanent benefit for the Czech economy.
### Table 1: Overview of benefits of euro introduction

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Time horizon</th>
<th>Main target group</th>
<th>Sources of data for quantification</th>
<th>Estimated impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elimination of exchange-rate volatility</td>
<td>immediate</td>
<td>enterprises, public sector institutions, citizens</td>
<td>foreign trade exposed to CZK/EUR exchange rate volatility, volume of assets/liabilities denominated in euro, size of volatility, price and volume of hedging</td>
<td>4</td>
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<tr>
<td></td>
<td>permanent</td>
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<tr>
<td>Reduction of transaction costs</td>
<td>immediate</td>
<td>enterprises, public sector institutions, citizens</td>
<td>volume of inter-bank spot and forward euro transactions, volume of euro-currency operations of citizens and enterprises, cost of these transactions (half of the spread), survey on administrative transaction costs</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>permanent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Better price transparency</td>
<td>medium/long-term</td>
<td>enterprises, citizens</td>
<td>survey on price convergence among countries after euro-adoption</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>permanent</td>
<td></td>
<td></td>
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<tr>
<td>Decline in interest rates due to elimination of risk premium, increase of investment</td>
<td>medium/long-term</td>
<td>economy as a whole</td>
<td>comparison of interest rates, measuring flows of FDI before and after euro introduction with elimination of external factors</td>
<td>2</td>
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<tr>
<td></td>
<td>permanent</td>
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<td></td>
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<tr>
<td>Integration of financial markets</td>
<td>medium/long-term</td>
<td>large enterprises, public sector institutions</td>
<td>survey on utilization of new financial products and on development of interest rates on credits</td>
<td>1</td>
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<td></td>
<td>permanent</td>
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<tr>
<td>Stimulation of foreign trade</td>
<td>medium/long-term</td>
<td>enterprises, citizens</td>
<td>gravity model of trade</td>
<td>3</td>
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<td>permanent</td>
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</table>

1 Estimated impact of benefits on the Czech economy: scale 1 (negligible), 2 (small), 3 (medium), 4 (important), 5 (substantial).

### 1.2 Costs

Section describing costs of introducing common currency provides brief explanation of the relevant impacts and identifies cost-bearers groups, suggestion of how to measure magnitude of the relevant impact and also estimate of its timing.
1.2.1 Loss of sovereign monetary policy and loss of exchange-rate policy

National central banks can use instruments of monetary policy or exchange rate policy to help the economy cope with internal and external events that influence economic environment and performance of the national economy. Reduction of interest rates stimulates economic growth through increased investment due to lower cost of capital and through higher demand resulting from lower savings and higher use of credits by households. Depreciation of currency helps in the short run increase competitiveness of domestic exporters on foreign markets. Monetary and exchange rate policies are therefore important tools for maintaining or re-creating macroeconomic stability.

However, in small and open economies, such as the Czech Republic, monetary authority is not the only actor that influences amount of money in economy and exchange rate development. Swings in inflows and outflows of international capital may have much deeper impact on economy than operations of a central bank. This reduces the cost associated with loss of sovereign monetary policy and loss of exchange-rate policy – the Czech National Bank cannot perform really sovereign monetary policy and exchange-rate policy even now when we still keep our own currency. It is just one of the actors on the capital and foreign currency stage.

When we adopt euro, we will lose exchange-rate policy completely, since there will no longer be Czech crown and we will have to accept exchange rate and monetary policy conducted by the European Central Bank (ECB), with the Czech National Bank being just one actor in the decision-making process within the European System of Central Banks. This shouldn’t constitute a problem in a period of stability. Things may alter dramatically in case of profound internal or external shocks hitting the Czech economy, when the cost of abandoned monetary and exchange-rate policies may be large. If it is just the Czech economy that is facing economic difficulties, we cannot expect the ECB to change its monetary policy for the whole eurozone. Therefore, if there is for example sharp decline in demand for cars, the Czech economy will be hit relatively more than economies of most other eurozone countries since automobile and related industries constitute great part of the Czech GDP. In 2006, share of automotive industry on total Czech industrial production was at 19,81 % while the average figure for the EU is around 10 % (Automotive Industry Association, 2007). In case of such an asymmetric shock with deep consequences for economy, national banks would usually try to help the economy by either devaluating national currency to improve position of domestic car producers on international markets or lower interest rates to make it
easier for the companies to borrow so that they can faster buy new technology that would make car production cheaper or to support expansion of production also in other sectors that would absorb the dismissed workforce from the automotive industry. With single European currency we cannot expect the ECB to behave in such a way – it would have to devaluate euro which, as long as the problem is isolated in just one or few Member States (asymmetric shock), will not happen. Similarly, lowering the key interest rates only because of local problems in euro-area cannot be expected. Only instruments of fiscal policy remain available, yet limited by the Stability and Growth Pact, together with legal instrument that could change economic environment in the country. However, these instruments take usually longer time to impact the economy.

Therefore, it is not recommended to join the monetary union before substantial synchronisation of economic cycles between applicant country and single currency area is achieved. Business cycle synchronisation is usually measured by evaluating how the economies in question react to supply and demand shocks. Growth of GDP and index of industrial production are usually taken into account in the calculation. Long-term trends are eliminated from the data as well as other factors that would influence the results obtained, such as impacts of one-off fiscal policy measures introduced by government.

The Slovak National Bank (2006, p. 46) mentions analysis of the International Monetary Fund comparing differences in impacts of independent monetary policy and of common monetary policy of ECB on development of the Czech GDP – production gap and on inflation fluctuation against long-term average. With independent monetary policy, standard deviation of the production gap is 1,7 %, with ECB monetary policy it would be 1,9 %. Standard deviation of inflation is 1,7 % with independent monetary policy while 1,8 % with ECB monetary policy. Loss of sovereign monetary policy thus does not seem to be dramatic.

Moreover, the Slovak National Bank (2006, p. 41) stresses out that Spanish, Greek or Portuguese economies had not been synchronised before euro introduction as well but they are synchronised now. Growing intra-industry trade between applicant country and monetary union should lead to synchronisation of economies and therefore reduce cost of loss of sovereign monetary policy and loss of exchange-rate policy.

On the other hand, Singer (in Pecinkova (ed.), 2007, p. 60) shows that the Czech and euro-area economic cycles are rather diverging since 2003 and structure of our economy is also diverging due to rather surprising rise of share of industry on GDP.
Loss of sovereign monetary policy and loss of exchange-rate policy will be an immediate and permanent, though probably diminishing cost for the Czech economy.

1.2.2 Reduction of commission incomes

Banks receive incomes on foreign exchange operations in the form of inter-bank spot and forward foreign exchange transactions and foreign exchange operations of citizens and enterprises. After euro introduction, commission incomes will be reduced since euro transaction commission incomes will be lost completely.

The Slovak National Bank (2006, p. 5–6) estimated that inter-bank spot and forward euro transaction costs amount to some 0,15 % GDP and euro-currency operations of citizens and enterprises represent another 0,15 % GDP. From the point of view of income lost, we cannot include incomes from inter-bank spot and forward euro transactions, since this is a zero-sum game between banks. Therefore, if we assume that similar figures would apply also for the Czech Republic, bank sector would face loss of income in magnitude of 0,15 % GDP. This loss would be somehow larger when also other new Member States (notably Slovakia, Poland, Hungary) join euro-area.

Loss of commission incomes from euro transactions will be an immediate and permanent cost for the Czech economy.

1.2.3 Increase of inflation

Inflation can be raised due to euro introduction through two channels. The first means rounding prices up when expressed in euro and misuse of new prices environment by enterprises leading to setting-up prices in euro at even higher level than would correspond just to prices rounded up. The second channel is represented by real convergence process when economic development, standard of living, wages as well as prices in the Czech Republic will gradually converge to the euro-area level.

Eurostat (2003) calculated that out of the total inflation in euro-area of 2,3 %, impact of euro introduction in 2002 represented only 0,12–0,29 %. Similarly, study of the European Commission identifies total impact of the changeover on consumer price inflation in Slovenia after euro introduction in 2007 at 0,3 percentage points (European Commission, 2007). These impacts seem to be negligible.

Nevertheless, there is more important aspect in relation between euro introduction and prices: perceived level of inflation. Majority of citizens in all countries that introduced euro in 2002 as well as citizens in Slovenia perceived that prices went up more than was indicated by
statistical office through HICP indicator. In 2002, people estimated inflation at up to 4.5% while actually it was at 2.3% and price increase of the most regularly purchased items moved around 3%. It seems that the higher perceived than actual inflation is caused by more substantial increase of prices of frequently purchased goods/services that result rather from misuse of the new prices environment by retailers and providers of services (accommodation, travelling, restaurants, hairdressers etc.) than from merely rounding-up during changeover. Since perception of inflation is the most important thing as regards public opinion about the success of euro changeover, government should focus on providing people with information in advance of the changeover date about the way prices will be quoted, how development of prices will be monitored, how prices of most commonly purchased items will look like when expressed in euro etc.

Increase of prices achieved through the real convergence channel will be of a long-term nature, it will not happen just shortly after euro-introduction. When we still have national currency, real convergence is conducted rather through appreciation of the Czech crown, which is floating, while inflation is targeted and monitored by the Czech National Bank. When national currency is abandoned, real convergence will be reflected in higher than euro-area inflation rate. The Slovak National Bank estimates that inflation rate in Slovakia will exceed inflation rate of euro-area by 1–2 percentage points. Development in the Czech Republic should not be much different.

Increase of price level due to rounding-up or misuse by retailers will be an immediate and one-off cost for the Czech economy, increase of prices due to real convergence will occur in a medium-term and will be permanent though probably diminishing.

1.2.4 Impact on savings and pensions

Savings of all economic agents will be converted into euro through the same conversion rate as any other assets, wages and prices. Therefore there is no danger of losing savings just due to their conversion to euro. However, during the process of real convergence after introduction of euro can be expected, that savings (but also debts and liabilities) will depreciate due to higher inflation than we have now, which will further reduce real interest rates on savings (as well as on debts and liabilities). The Slovak National Bank (2006, p. 62) also points to the fact that postponing the date of euro introduction will increase purchasing power of incomes and savings because it is expected that the Slovak crown will continue to appreciate. This effect will, however, be relevant only for purchases abroad since the purchasing power of Slovak crowns in Slovakia will be still the same. On the other hand,
savings denominated in euro will have relatively lower value later on than they have now since later on they will be converted with worse conversion rate.

Pensions will be, similarly to savings, incomes and prices, converted into euro with the same conversion rate. Later on, pensions will be adjusted to development of prices and inflation, as long as there is no change in the law on pensions. Pensioners will be worse-off only between two valorisations in case of high inflation representing more dramatic reduction of their welfare. However, it is not probable that the Czech Republic will face rapid inflation around or above 10%. Moreover, pensions are adjusted also according to development of wages which are expected to rise faster than before euro introduction so overall impact on pensions will be very small.

Quantification of euro-introduction effect on savings is extremely difficult, since we would have to calculate income from savings after euro introduction with hypothetical income without deterioration of real interest rate due to higher inflation. Moreover, thanks to integration of financial markets and increased competition, people as well as companies will get the chance to make use of other investment products that will be increasingly more available also in our country. Overall impact on savings as well as on pensions can therefore be considered as negligible.

Impact on savings and pensions will occur in a medium-term and will mean permanent, though probably diminishing cost for the Czech economy due to gradually decreasing inflation and increasing wages.

1.2.5 Software adaptation, administrative and technical adjustment expenses

Enterprises, financial institutions and public sector institutions will have to adjust their software programmes on financial operations (accounting, financial reporting etc.) so that these systems are able to work with two currencies during the period of about half a year before euro introduction and then for another roughly half a year after changeover. Invoices, bank account statements, statements on pension schemes, social security benefits etc. will have to present amounts in both currencies. All prices will have to be presented in both currencies as well, which will make additional costs for shops, restaurants, cinemas etc. Enterprises will have to accept and store two currencies during the period of dual circulation and will have to provide training to their employees on how to handle the new currency, new software application etc. The government will run information campaign on wide range of aspects related to euro introduction. The Czech National Bank will have to distribute euro
coins and notes and withdraw Czech crowns, commercial banks will have to adjust their ATM terminals for euro distribution, the same is true about various automatic vendor machines (for hot and cold drinks, snacks, toys, cigarettes, public transport tickets etc.). Enterprises will have to print information leaflets, catalogues, price lists and menu lists first with both currencies and then again in euro only.

Quantification of costs associated with software adaptation, administrative and various technical adjustments can be done by conducting a survey among enterprises, financial institutions and public authorities on their estimate of these costs. So far it is too early to do such a survey since euro adoption is far ahead and relevant actors have not considered them yet. Studies from other EU Member States however estimate these costs in the range of 0.3–0.8 GDP (Slovak National Bank, 2006, p. 26). The largest portion of these costs (some 60 %) is connected with IT adaptation. These costs don’t have to be, however, so large if the economic agents include them into software actualisation, which is carried regularly every couple of years, depending on type and size of business. Therefore, government should run information campaign some two years before euro adoption, which will be focused on these target groups and will advise them buying software ready for euro at the occasion of the next software actualisation.

Costs associated with software adaptation, administrative and various technical adjustments will occur shortly before and after euro introduction and thus will be of immediate nature and will represent one-off cost for the Czech economy.

1.2.6 **Lower income for state budget due to citizen-friendly tax rounding rule**

It is probable that government will try to show the private sector how to conduct the changeover policy citizen-friendly and will round taxes down (e.g. to accuracy of 10 cents), round benefits up (e.g. to accuracy of 10 cents), while penalties and fines will probably be rounded up, as suggested Estonia’s National Changeover Plan (Ministry of Finance of Estonia, 2006, p. 26). Such an arrangement would have negative impact on Estonia’s budget of 250 millions kroons, which is 0.1 % GDP in 2007.

Drop in budget incomes due to citizen-friendly tax rounding rule will occur shortly before and after euro introduction and thus will be an immediate and one-off cost for the Czech economy.
1.2.7 **Reduction of seigniorage income**

Seigniorage is the revenue from issuing bank notes and coins, which is every year transferred to the state budget. It can be seen as a transfer of all newly printed coins and banknotes to the state budget.

After joining the monetary union, the Czech Republic will lose income from Czech crown seigniorage but will get share of euro seigniorage. This amount is calculated according to the share of Member State on euro-area nominal GDP and according to share of Member State population on euro-area population.

Quantification of reduction of seigniorage can be made by comparing the current volume of seigniorage with share that would belong to the Czech Republic according to its GDP and population. National Bank of Hungary (p. 102) estimates hypothetical loss from seigniorage in the period 2006–2010 between 0.17 and 0.23 % GDP, which is 0.034–0.046 % of annual GDP.

Reduction of seigniorage income will be adjustments will be an immediate and permanent cost for the Czech economy.

### Table 2: Overview of costs of euro introduction

<table>
<thead>
<tr>
<th>Cost</th>
<th>Time horizon</th>
<th>Main target group</th>
<th>Sources of data for quantification</th>
<th>Estimated impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of sovereign monetary policy and loss of exchange-rate policy</td>
<td>– immediate</td>
<td>– economy as a whole</td>
<td>– comparison of GDP growth, inflation index and industrial production index</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>– permanent/diminishing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction of commission incomes</td>
<td>– immediate</td>
<td>– commercial banks</td>
<td>– volume of euro-currency operations of citizens and enterprises</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>– permanent</td>
<td></td>
<td>– cost of these transactions (half of the spread)</td>
<td></td>
</tr>
<tr>
<td>Increase of prices</td>
<td>Rounding-up:</td>
<td>– economy as a whole</td>
<td>– survey on price changes during changeover</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>– immediate</td>
<td></td>
<td>– comparison of inflation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– one-off</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Real convergence inflation:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>– medium-term</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>– permanent/diminishing</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Impact on savings and pensions

- medium-term
- permanent/diminishing

Savings:
- all economic agents

Pensions:
- citizens

modelling development of pensions with different inflation rates given the requirement on their valorisation

Software adaptation, administrative and technical adjustment expenses

- immediate
- one-off

enterprises
- financial institutions
- public sector institutions

survey on software adaptation, administrative and technical adjustments costs

Lower income for state budget due to citizen-friendly tax rounding rule

- immediate
- one-off

government

modelling development of budget revenues and expenditures

Reduction of seigniorage income

- immediate
- permanent

government

difference between current seigniorage and our share on euro-area seigniorage according to our GDP population

1 Estimated impact of costs on the Czech economy: scale 1 (negligible), 2 (small), 3 (medium), 4 (important), 5 (substantial).

2 Conclusion and discussion

The paper has identified the main groups of benefits and costs associated with euro-introduction in the Czech Republic. Besides description, we also focused on their classification from their time-horizon perspective. Some impacts were classified as one-off impacts that will occur just shortly before or after introduction of euro and are from their nature immediate impacts. The second category is represented by permanent impact that can occur either as immediate or may occur in medium/long-term.

The paper also identified target groups most affected by each of the benefits and costs, although it is sometimes difficult to choose some since most benefits and costs will usually have impact on all economic agents. Further, we provided proposals of how to measure the identified impacts but we have not conducted our own calculations yet. In this paper we only provided overview of calculations made for some other countries that joined or are preparing for joining the euro-area, mainly Slovakia, Poland, Hungary and Slovenia. Results of those analyses serve rather as a basis for estimation of magnitude of the impacts associated with euro-introduction. This magnitude is represented on scale 1 (negligible impact) to 5 (substantial impact).
Graph 1 summarizes finding on timing and estimated size of identified positive and negative impacts of euro-introduction. There are no one-off benefits of joining euro-area; all benefits are of a permanent nature. Most of them will occur in the medium- or long term: stimulation of foreign trade, decline in interest rates due to elimination of risk premium, increase of investment, better price transparency and integration of financial markets. Two benefits can be expected to prove immediately: elimination of exchange-rate volatility and reduction of transaction costs.

**Graph 1: Summary of benefits and costs classification**

<table>
<thead>
<tr>
<th>Estimated impact</th>
<th>Immediate</th>
<th>Medium/long-term</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>☺☺ ☺☺</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>☻ ☺</td>
<td>☻</td>
</tr>
<tr>
<td>3</td>
<td>☻ ☻ ☻ ☻</td>
<td>☻</td>
</tr>
<tr>
<td>2</td>
<td>☻ ☻ ☻ ☻</td>
<td>☻</td>
</tr>
<tr>
<td>1</td>
<td>☻ ☻ ☻ ☻</td>
<td>☻</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time horizon</th>
<th>Immediate</th>
<th>Permanent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate</td>
<td>☻ ☻ ☻ ☻</td>
<td>☻ ☻ ☻ ☻</td>
</tr>
<tr>
<td>Medium/long-term</td>
<td>☻ ☻ ☻ ☻</td>
<td>☻ ☻ ☻ ☻</td>
</tr>
</tbody>
</table>

**Benefits:**
- a) Elimination of exchange-rate volatility: 4
- b) Reduction of transaction costs: 3
- c) Better price transparency: 1
- d) Decline in interest rates due to elimination of risk premium, increase of investment: 2
- e) Integration of financial markets: 1
- f) Stimulation of foreign trade: 3

**Costs:**
- g) Loss of sovereign monetary policy and loss of exchange-rate policy: 4
- h) Reduction of commission incomes: 2
- i) Increase of inflation (rounding up): 2
- j) Increase of inflation (real convergence inflation): 2
- k) Impact on savings and pensions: 1
- l) Software adaptation, administrative and technical adjustment expenses: 2
- m) Lower income for state budget due to citizen-friendly tax rounding rule: 1
- n) Reduction of seigniorage income: 1

Estimated impact of benefits and costs on the Czech economy: scale 1 (negligible), 2 (small), 3 (medium), 4 (important), 5 (substantial).

☺: benefit, ☻: cost.

On the side of costs, three of them will have just one-off impact: increase of inflation due to rounding-up during changeover, software adaptation, administrative and technical adjustment expenses carried out shortly before and after changeover and lower income for state budget due to citizen-friendly tax rounding rule. Of the permanent costs, loss of sovereign monetary policy and loss of exchange-rate policy, reduction of commission incomes and reduction of seigniorage income will occur immediately. However, even though loss of sovereign monetary policy and loss of exchange-rate policy, increase of inflation due to real convergence and impact on pensions will represent permanent (or long-term) cost to our economy, their impact should be gradually diminishing as the Czech Republic converges to EU average GDP *per capita* level and as our economy accommodates in the euro-area environment.
As regards magnitude of the various impacts, most of them were found as having either negligible or small impact on the Czech economy. Only four of them were estimated as having medium or important impact, three of them represent benefits: elimination of exchange-rate volatility, reduction of transaction costs and stimulation of foreign trade, one of them costs: loss of sovereign monetary policy and loss of exchange-rate policy. These impacts should be considered most carefully when deciding on whether or when to join monetary union. Other impacts are not so important (especially the one-off costs) since they will not constitute any major change for the benefit-takers or cost-bearers.

The Czech Republic cannot decide not to adopt euro since we are obliged to its adoption by the Accession treaty. Calculation of most benefits and costs is sometimes rather an obscure mathematical and statistical exercise since data is not always available or too difficult to gather and we never can exclude completely all not relevant external factors. On the other hand, it is rational to expect that for a country like the Czech Republic, adoption of a currency common with its major trading partners and its neighbours will bring more benefits than costs. The only really crucial question therefore is when to join euro-area and the timing should respect level of synchronisation of our economy with euro-area.

Therefore, we suggest to devote time and energy of economists on focusing on just one aspect of the wide debate on euro-introduction – on analysing the cost of loss of sovereign monetary policy and loss of exchange-rate policy, i.e. on measuring degree of synchronisation of the Czech economy with euro-area so that timing of our monetary union membership ensures prevention of asymmetric shocks occurrence.
References


<http://www.nbs.sk/PUBLIK/06_KOL1.PDF>.