Prohlášení

Prohlašuji, že jsem bakalářskou práci vypracovala samostatně a použila pouze uvedené prameny a literaturu.

Declaration

Hereby I declare that I compiled this bachelor thesis independently, using only the listed literature and resources.

Prague, ___________________                             ________________________

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Acknowledgements

I would like to express my gratitude to my supervisor PhDr. Martin Gregor PhD whose support and valuable advices helped me to complete this thesis.
**Abstract**

The aim of this work is to compare the relative importance of the budgetary and non-budgetary benefits gained by the new member countries after their accession to the European Union in 2004. For this purpose a complex theoretical framework is created based on the historical aspects of the EU Eastern enlargement, theory of regional integration and theory of economic growth. Then the author presents a new multi-scenario approach to the estimation of the budgetary benefits, which is subsequently applied on the data from the new member countries. The results of the estimation support the hypothesis that the importance of the EU budget in comparison with other sources of benefits was relatively low.

**Abstrakt**

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1. Introduction

In 2004 ten countries (Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovenia and Slovakia) joined the EU. This historically biggest enlargement has brought many questions as early as the first proposal for it was put on the table. It was clear that the distribution of costs and benefits arising from the enlargement would be unequal due to the differences of the applicant countries from the incumbent ones. Given that it is not surprising that the question of “winners and losers” has become a great topic for discussion and research.

In this work I look at the enlargement from a little bit different point of view. In the accession of the ten in many respects similar countries at one time I see a great opportunity to analyze the determinants of the benefits they recognized right after their accession. Particularly the European budget is brought into focus, since it is the most visible tool enabling direct redistribution of funds between the member countries, object of hard intergovernmental negotiations and great topic for economists interested in power-politics, who try to discover the forces shaping the allocation of the funds. However its importance is generally overestimated as discussed in Benáček (2003), where it is argued that the negotiations concerning the EU enlargement were “obsessed by the issue of EU transfers”, although the main gains stem from other aspects of the EU membership than from the access to neighbours’ money. Particularly the “moral dimension of the consolidated community of European countries”, “adoption of unified and well-proven rules”, “returns from unimpeded trade and specialization”, “economies of mutual dependency and solidarity” and the future “participation in the monetary union” are highlighted as potential sources of pre- and post-enlargement benefits. In the same work it is also noted that the entitlement to appropriations can even hurt the overall performance of the countries giving them wrong signals guiding them to rent-seeking instead of promotion of restructuring and improvement in their growth potential.

A clear evidence of the limited “lifebuoy-potential” of the funds can be found studying the process of transformation and unification in Germany, where despite excessive reallocation of funds from the western Germany to the eastern regions (together with an easy access to high-quality institutions and modern technology) the economic performance of these regions have remained for a long time far behind the west. (Benáček, 2003; Gundlach, 2003) This clearly shows that without a substantial endeavour of the
countries to improve their economic performance, even the most suitable conditions do not suffice to “produce” growth. The moral of this is that the member countries should not focus only on reaping as much money from the budget as possible, but they should rather improve their ability to use the funds they obtain effectively and focus more on the other dimensions of the enlargement which are potentially much more important for their economic performance and the well-being of their citizens than the direct funding, although it might be more difficult to learn how to gain from them.

Considering the glamour of the budget perceived by economists as well as politicians, this work discusses its relative importance as a source of benefits for the new member countries in the post-enlargement period. After creating some background for the analysis by presenting a brief historical overview and summarising the effects of the enlargement perceived by the new member countries I focus on the question of the definition and measurement of the costs and benefits from the EU accession. Since the most desirable method of the assessment of the relative importance of the enlargement effects (through an evaluation of their impact on well-being of citizens) is rather unfeasible, the traditional approach estimating the impact on the overall economic performance is utilized. Following the growth theory presented in Acemoglu (2008) I make a link between the enlargement and economic growth and subsequently derive from the Cobb-Douglas production function a model of economic growth dependent on changes in production factors and technologies. Thereafter I convert the equation into a regression model and using the OLS method I estimate its parameters. Taking some assumptions about the productivity of the funding from the EU budget, whose determinants are discussed, I use the model to estimate its impact on economic growth. In particular, the estimation is done for different scenarios to show the sensitivity of the results on the assumptions taken. Then the estimates are also done assuming the countries obtain funds reaching 4% of their GDP, the highest level the transfers to the poorer countries can reach as mentioned in Schneider (2007). The budgetary benefits arising from the real amounts of EU transfers which the new member countries received are in the most realistic scenarios estimated to be not higher than 0.25%, in the upper bound scenario (the scenario with the most unrealistic assumptions) the estimates are for all the countries in question lower than 0.56%. Assuming the countries were eligible for transfers amounting to 4% of their GDP, the budgetary benefits in the most realistic scenarios are not higher than 0.4% and the upper bound estimates are in no country higher than 0.75%. Comparing these results with
the estimates of the additional growth induced by the other effects of the enlargement (about 2% or more) presented in the literature it is argued that the importance of the European budget as a source of benefits (as defined in this work) is relatively low. Thence it follows that given the enlargement costs and benefits can be expressed only in terms of economic growth, the EU budget alone is not a satisfactory tool for their redistribution.

2. **Historical overview**

Before one can speak about costs and benefits stemming from the enlargement, it is necessary to know, which changes has the accession to the EU brought. And since the effects of the enlargement depend largely on the stage of integration of the incumbent countries as well as on the pre-accession level of liberalization and/or co-operation between the incumbent and potential-member countries, it might be useful to present a brief summary of the evolution of their mutual relationships.

2.1. **First agreements**

The economic co-operation of the European Community with CEECs which joined the EU in 2004 has begun with the signature of the Joint Declaration of Mutual Recognition between the European Community and the Council for Mutual Economic Assistance (CMEA/COMECON) in June 1988. This was a very important step towards peace and stability in Europe, since it established diplomatic relations between two blocks of countries, which were rather separated during the most of the Cold War era. However, soon after that real epoch-making events occurred. The disintegration of the Soviet Union and the fall of communist regimes in the newly independent countries opened up new possibilities of cooperation and power redistribution in Europe. (Nello, 2008, ch.20; http://www.europarl.europa.eu/factsheets/6_3_3_en.htm).

2.2. **Beginning of the transition period**

After the massive turbulences on its eastern borders, the European Community was immediately willing (and able) to help the new independent states with transition promoting democracy and market economy. (Of course it was also on the behalf of the Community to have as large area of stability and security in its neighbourhood as possible.)
The advisory and financial assistance to the CEECs as well as the vision of the Eastern enlargement became important driving forces of the transition processes.

At the beginning of the 90’s, the Community recognized the new CEECs and concluded with them a new form of mutual relations based on a network of bilateral trade and cooperation agreements, which are usually called “first generation agreements”. (Nello, 2008, ch.20; http://www.europarl.europa.eu/factsheets/6_3_3_en.htm)

Since the European Community was conscious of the lack of capital in the CEECs, in 1991 the European Bank for Reconstruction and Development (EBRD) was established to attract more investment to these countries, supporting the process of transition. In the same year also the first of the “second generation” – Europe Agreements were signed¹, covering among other things (such as political and cultural co-operation) also the commitment of trade liberalization between the CEECs and European Community. Tariffs were dissolved asymmetrically, and step by step to prevent from excessive distortions on the CEECs’ markets. The trade in industrial products was liberalized by 1998, while the barriers to trade in agricultural products were cut under specific conditions by 2003. (Nello 2008, ch.20; http://www.europarl.europa.eu/factsheets/6_3_3_en.htm)

The last sentence in the preceding paragraph is of a high importance, since it tells that before the enlargement in 2004 the FTA between the CEECs and the EU already existed. Moreover it is worthy to mention that since early 1990s there were also two free trade areas within the block of CEECs, namely CEFTA and BAFTA, founded in 1991 and 1994 respectively (OECD, 2000, p.23), hence the effect of mutual tariffs dismantling between the CEECs at the time of EU accession was weaker and somehow distorted.

### 2.3. Copenhagen Criteria

The Copenhagen Council in 1993 considered the CEECs potential members of the EU and set the very famous Copenhagen Criteria as the essential conditions for their accession on top of the requirements implicitly included in the primary legislation (location in Europe, adoption of the whole Acquis Communautaire and participation in both communities as well as in the EU) (Svoboda, 2007). It was a great step towards the enlargement, since it changed the question “if the CEECs will join the EU” to the question “when will they do so”. (Neueder, 2003)

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¹ Poland and Hungary were followed by the Czech Republic and the Slovak Republic in 1993, Baltic countries in 1995 and Slovenia in 1996. European Commission (2003)
The Copenhagen Criteria required:

- “stability of institutions guaranteeing democracy, the rule of law, human rights and respect for and protection of minorities”;  
- “the existence of a functioning market economy as well as the capacity to cope with competitive pressure and market forces within the Union”;  
- “the ability to take on the obligations of membership including adherence to the aims of political, economic & monetary union”.


The Madrid Council in 1995 added one more condition to those from 1993 that the countries

- “had to create the conditions for their integration through the adjustment of their administrative structures”.

That means that they should have created an appropriate administrative structure that would ensure efficient implementation of the European Community legislation.


2.4. Applications for EU membership and Pre-accession Strategy

Shortly after the Copenhagen Council, the first Applications for EU Membership were on the table. Poland and Hungary decided to apply in 1994 and the rest of the CEECs presented their Applications within two years.

(http://europa.eu/legislation_summaries/enlargement/) Their efforts to become members of the EU were supported by the pre-accession strategy (since 1998 enhanced strategy), that provided assistance through PHARE, ISPA, SAPARD and other programmes.

- **PHARE** (Poland and Hungary Aid for Reconstruction of the Economy) programme came into operation in 1990 as an instrument assisting to Hungary and Poland at the beginning of the transition period, however its coverage was subsequently extended to all applicant countries which joined the EU in 2004 and 2007 and its mission was to assist the applicant countries in adopting and implementing the Acquis and enhancing their ability to absorb the Structural funds.

In 2000-2006 more than EUR 10 billion was allocated to the CEECs under this programme. (http://europa.eu/scadplus/glossary/programme_phare_en.htm)
**ISPA** (Instrument for Structural Policies for Pre-Accession) was established in June 1999 as an instrument supporting the economic and social cohesion in the applicant countries. In particular it should assist them with environmental and transport infrastructure issues identified in the Accession Partnership. It became an important source of funds for environmental and large-scale transport infrastructure projects.

Until 2003 the overall annual budget for the 10 countries of Central and Eastern Europe was about EUR 1.1 billion. Since 2004, this instrument was replaced by the Cohesion Fund, only Romania and Bulgaria remained ISPA beneficiaries. (http://ec.europa.eu/bulgaria/finance_business/pre-accession/ispa_en.htm)

**SAPARD** (Special Accession Programme for Agriculture & Rural Development) was established in 1999 to help the applicant countries with restructuring their agricultural sectors and rural areas, as well as with the implementation of CAP (Common Agricultural Policy).

Until 2003 the overall annual budget for the applicant countries was about EUR 560 million. (http://ec.europa.eu/bulgaria/finance_business/pre-accession/sapard-programme_en.htm)

Since 2007 there is only one instrument for the pre-accession assistance (IPA), which replaces all the above mentioned programmes. (http://europa.eu/scadplus/glossary/programme_phare_en.htm)

### 2.5. Accession negotiations

When the Applications were submitted, the Commission was asked by the Council of Ministers to assess the ability of every single applicant country to meet the conditions for membership. On the basis of the assessments, the Council acting unanimously decided whether to open the Accession Negotiations with the individual countries. Due to their different level of readiness to make another step towards the enlargement, the Accession Negotiations were opened in two waves. The negotiations with the Czech Republic, Cyprus, Estonia, Hungary, Poland and Slovenia (Luxembourg group) began in March 1998, the rest of the countries, namely Latvia, Lithuania, Malta, Romania and Slovakia (Helsinki group) were considered prepared in February 2000. (European Commission 2003)
During the negotiations each of the applicant countries needed to prove, that its legislation is in compliance with the Acquis Communautaire, which is defined by the European Commission as “the body of common rights and obligations which bind all the Member States together within the European Union”. (http://europa.eu/scadplus/glossary/community_acquis_en.htm) The Acquis creates the legislative body of the EU comprising all the legislation in force that has been accumulated over the whole existence of the integrated block. Consisting of 31 chapters (at the time of the Eastern Enlargement) covering almost every aspect of the functioning of national economies, its adoption entailed a great change in the institutional framework in all the applicant countries. And it was this institutional change that together with the market forces (and some agreements on transitory periods) determined the outcomes of the accession.

According to Moravcsik and Vachudova (2003) the adoption of the Acquis imposed a heavy burden on the applicant countries, since they were compelled “to transpose and implement standards of internal democracy, state administration and detailed regulatory protection that EU-15 has had a half century to accommodate” and in some areas (e.g. ethnic minority rights) the future EU members had to meet standards, which were never set as binding for the incumbent countries. At the same time the suitability of some rules was at least questionable. However, comparing the data from the EU frontrunners and their south-eastern neighbours, the progressive approach to transformation (though not perfect in every detail) appeared to be more successful in terms of economic growth and low income inequality than that based on more gradual reforms and weakly defined objectives. (Hellman J.S., 2002 in Moravcsik and Vachudova, 2003) Becchetti et al. (2008) provide the evidence that “economic reforms began earlier and were stronger in the accession countries than in other transition countries” and that the preparations for the accession also positively affected the quality of institutions and the ability to decrease the exchange rate volatility. Subsequently they find a link between these improvements and the higher economic growth, which was not perceived in the other “similar” countries not applying for the membership. They conclude that the process of preparations for the enlargement itself had a significant effect on the economic development in the accession countries particularly that it positively influenced their economic growth.
The priorities for each candidate country during the negotiations were defined in the Accession Partnerships, whose purpose was to help the national authorities to meet the accession criteria giving them a “roadmap” how to bring their national legislations into compliance with the European law. These documents were adopted in 1998 (revised in 1999 and 2002) and became the basis for annual screenings. (http://europa.eu/legislation_summaries/enlargement/)

During the negotiations each country progressed at its own pace, hence their length was country-specific. Therefore, although the pre-accession negotiations for all the CEECs were opened in two waves, 10 of them were concluded at once in 2002, when the countries were considered as fulfilling the conditions for the accession. Namely it was the case of the Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia.

2.6. The act of accession and transitory periods

On April 16\(^{th}\) 2003 all the 10 countries, which were able to fulfil the requirements by the year 2002, signed their Accession Treaties. These were designed to be acceptable by both incumbent and acceding countries, since they needed to be unanimously approved during the ratification process. The acceptability was reached by implementation of transitory periods, whose purpose was to outweigh the excessive short-term costs, which were disproportionally distributed among the incumbent countries. (Moravcsik and Vachudova, 2003) In other words, the temporary discrimination of new members should have compensated the potential losers from the enlargement to make them abstain from casting their veto. (Plümptner and Schneider, 2007)

Finally, after the ratification process, on May 1\(^{st}\) 2004, the 10 CEECs have become members of the EU, followed by Bulgaria and Romania in the year 2007.

3. Effects of the enlargement

3.1. Enlargement process vs. the formal act of accession

The historical overview shows that the enlargement was a continuous process rather than a discrete step. It is also evident that the vision of EU membership was a driving force of the transition process in the candidate countries. Taking the enlargement from this point
of view, any analysis based on real data would be nearly unfeasible, since it would be only hardly contrivable to simulate the “anti-monde” scenario. Therefore this work focuses only on the implicit outcomes of the EU accession, rather than on the whole enlargement process. However, the definition of the pre- and post-accession stages of integration, which is crucial for the enlargement effects analysis, might still cause serious problems and some simplifications are unavoidable.

3.2. Pre- and Post-accession stage of integration

It is not surprising that attempting to link the theoretical framework with a real situation causes problems. However, a theory behind the analysis is very important and therefore I am willing to sacrifice some accuracy and define the pre- and post-accession relationships between the CEECs and the incumbent countries according to the general classification of stages of economic integration.

For the purposes of this work I will keep the framework used in Breuss (2001) and Malyszevska (2004), who assume a shift from a free trade area to single market. The only difference between the approaches of these two authors is that Malyszevska (2004) highlights the formal act of accession that could be treated as a direct shift from a free trade area to customs union, thus she assumes a three-stage process instead of a simple pre-/post- scenario. None of the authors discusses in detail the possible effects of the EMU (Economic and Monetary Union) accession, since even though the new member states were supposed to participate in the monetary union as soon as possible, no deadline was set. Therefore the EMU membership is not assumed to be a direct outcome of the enlargement.

The simplified description of the enlargement has apparently some shortcomings. Firstly the common policies in the pre- and post-accession period are not taken into account and secondly the movement of the production factors was not perfectly restricted before the accession and the barriers were not completely removed thereafter. (e.g., there was a great mobility of the foreign direct investment (FDI) flows already before the accession and in the post-enlargement period considerable restrictions on the mobility of labour were set). Hence the observed effects of factor mobility are distorted as well as some indicators can be influenced by the pre-enlargement common policies. But, as mentioned above, such a simplification is considered to be very useful and hence I keep it in the background of the analysis.
3.3. **Expected macroeconomic effects of the enlargement 2004**

Thanks to the simplification I can work with the standard effects of regional integration and classify the outcomes of the Eastern enlargement into following groups\(^2\):

- Trade effects
- Market size effects
- Factor mobility effects
- EU- Budget effects

3.3.1. **Trade effects**

Trade effects are linked to the creation of a customs union by an abolition of remaining costs at the borders and adoption of the Common External Tariff (CET). Although the trade between CEECs and EU-15 was liberalized already before the enlargement, the same is hardly true for the mutual trade relationships between the CEECs. In the 1990s two free trade areas (CEFTA and BAFTA) were created, but between these two blocks barriers to trade remained until the enlargement. Because ten of the CEECs joined the EU at once, when speaking about the enlargement effects one should not forget the effect of the liberalization of bilateral trade within this EU-10 block.

To highlight the two dimensions of the customs union creation, I distinguish between the trade volume and trade costs effect and domestic captured rent (DCR) effect.

3.3.1.1. **Trade volume and trade costs effect**

The trade volume effect was caused either by an elimination of remaining tariffs between CEECs (more precisely between the two free trade areas CEFTA and BAFTA) or by their change due to the adoption of CET and can be described as a change in the amount and price of imports and exports. The trade cost effect that followed the elimination of costs at the borders within the enlarged union had a similar impact on the new member states’ economies as the trade volume effect and therefore both these effects are discussed together. Because the elimination of tariffs and border costs was mostly discriminatory, both the trade creation and trade diversion occurred. However, since the trade of the EU with third countries was already strongly liberalized before the new members joined the EU, in the most cases of industrial production the lower level of external tariffs in general

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\(^2\) I took the inspiration from Breuss (2001), Breuss (2009) and Balcerowicz (2007)
boiled down to a pure improvement of market access for third countries eliminating the trade diversion induced by the discriminatory liberalization in the pre-accession period. The same was not true for many categories of the agricultural production, which have become more protected after the CET adoption. (Pelkmans and Casey, 2003) How important the (discriminatory) liberalization at the time of the accession is from the long-term perspective taking in the account the overall liberalization promoted by the WTO is questionable.

In general, there are seven changes in the trade costs that occurred after the enlargement.³

1) Remaining tariffs imposed on the imports from other CEECs were eliminated as well as the border costs implying cheaper imports, trade creation, lower prices for consumers, bigger variety of imports and less sales for domestic producers.

2) Remaining tariffs imposed on the exports to other CEECs were eliminated as well as the border costs resulting in more competitive exports, trade creation in partner countries, increase in the variety of exports and more sales of domestic producers.

3) Costs at the borders with EU15 were eliminated, which caused a decrease in price levels, increase in the intensity of trade and in the variety of traded goods.

4) New tariffs imposed on the imports from third countries were higher than before accession inducing higher prices for customers, less competitive imports from third countries and more sales for domestic producers.

In fact this change occurred only very rarely because of the GATT rule (Article XXIV) “the general incidence of duties and other regulations of commerce should not be higher than before creation of the regional trade agreement”. (Nello, 2008) In fact the average tariff rate imposed by the CEECs decreased from 8,9% to the EU average of 4,1% (Balcerowicz, 2007), whereas the average tariff on the industrial goods was around 2% and only the tariffs on the most of the agricultural and food production were around 7-11%. (Benáček, ³The impact on third countries is not mentioned, because its analysis is not the aim of this work.
2003) One of the few exceptions was Estonia, which had applied no industrial tariffs before the accession. (Pelkmans and Casey 2003)

5) New tariffs imposed on the imports from third countries were lower than before accession resulting in lower prices for customers, more competitive imports from third countries and fewer sales for domestic producers.

6) New tariffs imposed on the exports to third countries were higher than before the accession making the exports to the third countries less competitive.

   Since the EU should be mostly able to negotiate better terms of trade for its members, this change in tariffs is mentioned here only to cover all possible changes in the trade costs between different trading partners. In fact, there is no evidence of such consequences of the accession. The new member states rather benefited from the free trade agreements between the EU and third countries.

7) New tariffs imposed on the exports to third countries were lower than before the accession, which resulted in more competitive exports to the third countries and more sales for domestic producers.

   In general lower “trade costs” caused a decrease in prices and increase in the total amount of imports and exports and their variety. Moreover, the enlargement has contributed to an additional increase in the bargaining power of the integrated block, which subsequently induced an improvement in terms of trade with third countries.

3.3.1.2. DCR (Domestic captured rent) effect

   In contrast to the two above mentioned effects which in general positively influenced the material well-being in the new member countries, the DCR effect represents a net welfare loss. The elimination of tariffs within the enlarged EU and the adoption of the CET, which was on average lower than the tariffs imposed before the enlargement, caused a sharp decrease in tariff revenues. Moreover, because the EU has a common trade policy, all these yet much smaller tariff revenues are since then taken from the countries which collect them and which are only allowed to retain a given fraction of the total value of the tariff revenues to cover the administrative costs. The rest of the revenues creates one of the
EU budget traditional own resources. Briefly speaking, the new member states have lost all
tariff-revenues which were a source of funding of their national budgets before the
enlargement.

Due to the great liberalization of mutual trade between the incumbent and the
applicant countries in the pre-accession period, the losses to the national budgets (due to
the decrease in tariff-revenues) after the enlargement in 2004 were smaller representing
mostly the losses of revenues from trade with third countries.

3.3.1.3. Additional decrease in transaction costs
On the top of the effects of trade liberalization there have been significant gains
from the decrease in transaction costs due to easier access to information, decrease in
uncertainty in business relationships and from the harmonization and mutual recognition of
national regulations. (Benáček 2003)

3.3.2. Market-size effects
Market-size effects are effects resulting from the increased number of producers as
well as consumers on the enlarged Single Market of the European Union. In general they
can be classified into two groups:

- Economies of scale
- Increased competition

3.3.2.1. Economies of scale
The enlarged internal market of the EU became a great source of benefits for
companies operating in scale-intensive industries. They could decrease the average costs of
production by increasing their output. This resulted in a decrease in prices and an increase
in the competitiveness of domestic industries, which were able to expand into the internal
market fast enough.

3.3.2.2. Increased competition
The enhanced competition effect is closely linked to the scale effect. After the
elimination of the barriers to trade, companies were no more defended by their national
governments. Due to the market forces only the most efficient companies could survive.
This resulted in a significant drop in mark-ups and hence in a decrease in costs and prices.
The contest for market power resulted in a decrease in the number of companies, restructuring of industries (specialization) and increased investment in R&D and innovations, which was followed by a significant technological spill-over.

Unfortunately the enlargement proved the very low competitiveness of companies in the CEECs. The pre-enlargement domestic production was partially replaced by foreign imports, which caused a short-term increase in unemployment.

3.3.2.3. Overall effect

The overall effect on the new member states depended largely on the scale-intensity of their industries and on the ability of national companies to produce goods at lower costs than their competitors (e.g. by decreasing mark-ups, utilizing economies of scale and/or investing in innovations).

3.3.3. Factor mobility effects

The factor mobility effects are induced by the free movement of capital and labour as well as by the free movement of services supporting their flows. I classify them into:

- Mobility of labour
- Mobility of FDI
- Mobility of Financial capital and liberalization of financial services (FC&FS)

3.3.3.1. Mobility of labour

As mentioned above, the enhanced competition had an impact on the levels of unemployment in the CEECs. However, the restructuring would have been somewhat less painful than it was, provided the movement of labour would not have been restricted by the majority of incumbent countries. On the one hand, from their point of view it was a reasonable step to avoid a short-term unemployment, income redistribution from labour to capital and deepening of government deficits due to an increased demand for social benefits. On the other hand, the overall efficiency within the EU was hurt. Benáček (2003) highlights the impact of the restrictions to the mobility of labour on the competitiveness of the European producers on the international markets and also reminds the low mobility of European workers, which would not allow for any massive migration. Considering many aspects of the mobility of labour he argues that the temporary barriers on the European labour market should not have caused significant problems from the economic point of
view, but they should have had important ethical implications in building distrust and suspicion within the Union. On the contrary, as mentioned in the historical overview, Breuss (2001) expected, that the unavoidable change in the conditions of labour mobility restrictions “might have caused serious problems falling disproportionally on the countries with higher level of social security”.

Following the European Integration Consortium (2001, p.101) in Kohler (2004) the total increase in migrants from EU-10 living in EU-15 was estimated from 850 thousand in 1998 to 3,9 Mio in 2030, the corresponding numbers for Germany are 550 thousand and 2,5 Mio. Kohler (2004) assumes a net increase in the labour force of 35% from the total migration flows with the share of high-skilled workers of about 40%.

The migration from third countries might not have been too much affected by the enlargement, because “national policies continue to play a predominant role in this policy area”. (Nello, 2008, p. 189)

3.3.3.2. FDI

Even though a great FDI inflow had been observed already in the pre-accession period a second wave came after the enlargement. According to Balcerowicz (2007) this might have occurred due to the promotion of stability and security and increased productivity of the real sector caused by the institutional improvement. Brück et al. (2004) argue that the attractiveness of the new members for the investors has been driven by the combination of high interest rates and credible exchange rate paths after the enlargement. However he also refers to the diminishing importance of the direct investment in contrast to the rising popularity of the portfolio investment.

Since the inflow of FDI did not represent only additional funds, but also an inflow of know-how, it generated positive externalities via technological spill-over, given the countries had a sufficient absorptive capacity. (Alfaro et al., 2010)

3.3.3.3. FC&FS

The mobility of financial capital was a very important component of the Single market. It increased the supply of capital and improved the efficiency of its reallocation. Although the restrictions on the movement of capital were largely dismantled in the pre-accession period, an increase in the confidence in the new member states’ economies promised a second wave of financial capital inflow. Moreover the enhanced competition
on financial markets increased the profits from savings and hence mobilized the domestic resources of financial capital. The additional capital resources maintained the competitiveness of domestic companies providing them cheaper funding on investment in innovations.

3.3.4. EU-Budget Effects

EU-Budget effects are ranked among those directly influencing the fiscal positions of the EU member countries and in some cases also of the non-member countries. In fact the CEECs were beneficiaries from the European budget already before the enlargement receiving funds under the pre-accession strategy. However after the enlargement their participation on the budget became much more intensive. They have become eligible for much higher appropriations for commitments as well as they have become obliged to pay regular contributions according to the Community rules. Now each of these two effects as well as the issue of co-financing will be discussed separately under the headings:

- Access to European Funds
- Co-financing
- National contributions to the EU budget

3.3.4.1. Access to European Funds

Although the budget of the EU is only about 1% of the Union’s GNI, the transfers to the CEECs in the pre-accession period as well as after the enlargement were not negligible, since they might “reach as much as 4% of their GDP” (Schneider, 2007).

While the pre-accession aid was dependent on decisions of the incumbent countries, after the enlargement the new member countries could actively participate in the “battle over the EU budget”. However, their power in the budgetary procedure was restricted for both the Agenda 2000 and Financial Perspective 2007-2013, as another discriminatory outcome of the pre-accession bargaining over the expected benefits. After the enlargement the CEECs actively participated on the negotiations over the annual budgets for years 2005 and 2006 within the framework of Berlin Agreement (1999) which was revised in Copenhagen 2002 and which covered the period 2000-2006. At the end of this period they bargained for the first time about a financial perspective, concretely about the perspective for the period 2007-2013, whereas the appropriations for CAP spending were not concerned, because they were already negotiated in 2002. (Schneider, 2007; Plümper and
Schneider, 2007) To sum it up, the enlargement enabled the new member states to influence the redistribution of funds within the EU (except for the appropriations for the CAP) already in the first years of membership.

### 3.3.4.2. Co-financing

Each programme, which uses EU funds, must be co-financed from domestic funds. The minimum percentage of the total costs that is not covered by the EU budget expenditures differs among the items of the EU budget according to the purposes for which the funds under the particular items are dedicated. It is questionable, whether the co-financing requirements have an effect on the tax-rate imposed by the government. According to Jan in’t Veld (2007) “Existing national resources that were used to finance similar areas of interventions can be ‘earmarked’ to co-finance Structural Fund transfers” and hence „the principle of additionality is hard to verify and thus not always binding”. Based on the information in the additionality tables of the member states he argues that “national public expenditure concerned by additionality usually exceeds the co-financing needs by far” and hence I do not treat the co-financing as a new spending, which needs to be covered via an increased tax burden.

### 3.3.4.3. National contributions to the EU budget

Although all the new member states are net receivers from the EU budget, the contributions they have to pay since 2004 play an important role in the costs-benefits analysis. Firstly only the net transfers should be considered as benefits from the EU budget, secondly, if the contributions would be perceived by the government as new expenditures, this should induce an increase in tax rates, which would subsequently cause a decrease in GDP growth. In Schneider (2007) the recognition of the transfers from the member countries to the European budget as a new spending requiring an increase in taxes together with the assumption that only the “productive” expenditures contribute to the economic growth leads to very low and in the case of Slovenia even negative estimated growth effects stemming from the participation on the European budget.

### 3.3.4.4. Overall effect

In general, the entitlement to participate on the EU budget induces in the most new member countries an increase in capital in the economy and an increase in consumption,
but at the same time it could result in an increased pressure on the government deficit (in some cases due to the co-financing requirement but more importantly due to the obligatory contributions to the EU budget) and this pressure might induce an increase in tax rates deteriorating their economic performance. Both the increase in deficit and/or tax rates might negatively affect domestic GDP growth on the contrary to the effect of increased capital and consumption. However, according to the literature the positive effect should mostly exceed the negative one in the new member countries and the right to participate on the European budget should bring them net gains in terms of economic performance.

For a table summarizing the expected changes in macro-indicators see Appendix 1.

4. Costs and benefits of the enlargement: definition and classification

4.1. How to define costs and benefits

In the literature the aim of the costs-benefits analyses of the enlargement is usually to describe its impact on the welfare perceived by the inhabitants of the countries in question, but any precise definition of costs and benefits is (to my knowledge) provided. To capture the real impact of the enlargement on the accessing (and incumbent) countries, the definition should be based on the changes in the overall well-being perceived by their citizens, since this is the way, policies should be evaluated. More precisely, the benefits (costs) stemming from the enlargement should be defined as an increase or improvement (decrease or deterioration) in the components of the multi-variable welfare function which are determining the perceived well-being of the population (income, health, environment, quality of institutions, freedom, and others) and the best way to compare their relative importance would be to evaluate their impact on the welfare. Obviously, this is rather unfeasible. Using the country-wide welfare function, many problems occur, which can be derived from the properties of the personal utility function. The most important difficulties are stemming from its ordinality and from the subjectivity of preferences. The former makes any measurement, thus also any aggregation infeasible and the latter embarrasses the basic costs-benefits classification. Then it would be desirable to find a proxy for the welfare variable, which would be comparable across the countries and which could be
considered as representing the well-being of the individuals despite their various preferences.

Searching for such a variable is in the economic literature still a hot topic and trying to solve it here in one chapter would be at least too ambitious. Therefore I rather look in the literature and build up a simplified framework in which the importance of the EU funding would be estimable.

4.2. GDP as a proxy: Pros and cons

There is a lot of literature using GDP per capita as a measure for economic well-being. (Report 2009) The question is, whether this measure is the right one. In the Report (2009) it is said that GDP is rather a measure of market production than of the living standards of the citizens and even though it is correlated with some indicators of well-being, this correlation is not very significant at least in some sectors of the economy. As an example the differences between the changes in GDP and real household income (considered to be a better measure of well-being) are mentioned. However GDP still remains a very popular indicator of living standards. This is not much surprising, since it has some very pleasant properties, from which I would highlight these three:

- There are international standards for its calculation;
- There are long data series available;
- It is tightly linked to the economic theory, which enables putting real data into theoretical models.

But can we say that it is a measure of welfare?

In fact, welfare is a multi-variable function. Some of its variables are at least roughly measurable (income, consumption, unemployment, distribution of income, etc.); some of them are not (quality of healthcare, quality of environment, political environment, security, etc.). There are lots of determinants of well-being with different levels of importance and it is not possible even to define them let alone to aggregate them into a single index. Therefore it is important to find a proxy, which would approximately

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4 The evaluation of the GDP per capita as a proxy for welfare, which I present here, is from the biggest part based on the arguments propounded in the Report published by the Commission on the Measurement of Economic Performance and Economic Progress (Report 2009, in the bibliography as Stiglitz, Joseph et al., 2009). Since the Report was elaborated by the 25-member group created by the professors Joseph Stiglitz, Amartya Sen and Jean-Paul Fitoussi and including other 22 great economists and was presented recently (September, 14, 2009 according to http://www.stiglitz-sen-fitoussi.fr/en/documents.htm) I consider it as a relevant source of information on this topic.
correspond to the well-being of the individuals. For this purpose usually the real GDP per capita is used standing for the income that each citizen could get provided the total value produced in the economy is equally distributed among the population. Of course, this variable is not perfect.

One of the problems is that it contains the value of capital goods which need to be replaced due to their depreciation. (Report 2009) This problem relates to the sustainability of the income, since when nothing from the current period would be reinvested, the income in the next period decreases. But since the welfare function is not cardinal, assuming a constant rate of depreciation, this should not cause great problems and the GDP would be almost as good proxy for the welfare as the net domestic product (NDP), which could be under some (unfortunately very restrictive) conditions considered as relevant measure of living standards. Here the Report (2009) refers to the work of Weitzman (1976) arguing that “in a world where all transactions take place on competitive markets and where economic well-being depends only on the consumption of marketed goods, changes in net domestic product (GDP adjusted for depreciation) are a good gauge of changes in economic well-being...”. In the reality, none of the conditions hold, but the “theorem” can be used as something to glance off when trying to answer the question: Why is the GDP a suboptimal measure for welfare?

1) The rate of depreciation is not constant, due to the change in the structure of production towards IT assets, which depreciate faster than other capital assets. However as mentioned in the Report (2009), on the country-level the differences in GDP and NDP growth caused by this structural change have not been very significant yet.

2) In all markets the competitiveness is more or less restricted, hence the market prices are higher than the social value of the goods and the deadweight loss occurs, since the gains of the producers from the higher prices do not outweigh the losses of consumers. Then the GDP growth overvalues the improvement in well-being provided the growth in the recognized value of the total production is at least partly driven by the increased market force of some companies.

3) Some goods and services are not marketable at all, such as those produced at home and consumed without being traded (from the own-account goods and services only the rents of own-occupiers are imputed), some services are not
perceived as objects of transactions (some financial services are “paid” by decreasing the interest rates paid to depositors) and consumption of free time is not taken in the account. Provided these items have a constant share on the total production (consumption), their omission would not cause serious problems, since it would not change the growth rates. But when the share changes, then the faster the share of these goods and services on the total production decreases, the more the GDP growth as a measure for an improvement in well-being is likely to be overvalued. However, since they create a big part of the total production, their imputation would cause serious problems, since their total amount can be only very roughly estimated and the mistakes in its estimation would cause significant biases. (Report 2009) Taking the sensitivity of the results on the accuracy of estimates in the account and assuming only slow decrease in the share of own-account production, the growth in the improvement in the well-being should be better approximated by the GDP growth than by the growth in GDP adjusted for the not-traded production.

4) The change in the quality might be underestimated, which has the same effect as the overvaluation of the inflation; hence it undervalues the improvement in well-being. Possibly the biggest problems with qualitative evaluation occur when assessing the value of publicly provided goods and services. (Report 2009)

5) Since the distribution of income among the population is unequal, the aggregated production cannot say much about the living standards of the individuals in the economy. Hence the improved measure for well-being should be sensitive to the changes in the income dispersion.

6) The main problem is that the well-being does not depend only on the consumption of marketed goods and services, not even when the own-account production is added. The well-being is multidimensional and its components need to be taken in the account together rather than separately.

For example when the production is accompanied by pollution the “consumption of environment” is not reflected in the GDP. However, it should be recognized in some environmental indicator, which should be used when assessing the net welfare impact of the production. This is only an example, but in the reality there are many dimensions of the well-being which are mutually interconnected and should be controlled together when estimating welfare
changes. In the Report (2009) the unfeasibility of construction of a single welfare index is discussed and eight key dimensions of well-being are discussed, which should be represented by a set of indicators to create a sufficient source of information. The key dimensions mentioned in the Report are:

I. Material living standards (income, consumption and wealth)
II. Health
III. Education
IV. Personal activities including work
V. Political voice and governance
VI. Social connections and relationships
VII. Environment (present and future conditions)
VIII. Insecurity, of an economic as well as a physical nature

Obviously searching for methods of their measurement and assessment of their relative importance is a long-distance run. However, since the new set of indicators could largely improve the policies making them more welfare-enhancing the research project is considered to be worthwhile.

Although it would be really interesting to try to assess the impact of the enlargement on all the above mentioned dimensions of well-being, at this time I put up with the GDP per capita measure. But on the contrary to the economists who present this macroeconomic indicator as a proxy for welfare, I will consider it only as a proxy for the potential material well-being (PMW) of the population, assuming that all the produced value could be redistributed equally among the citizens. Alternatively it can be interpreted as a measure of economic performance of the country which is comparable among countries being standardized by the number of inhabitants.

4.3. Budgetary vs. Non-budgetary benefits

Now I classify the enlargement effects into two groups and define the net benefits stemming from each of these groups of effects separately, taking in the account the method of their measurement in terms of PMW, which is discussed above. Concretely, I classify the total net enlargement benefits into:

- **Budgetary benefits** defined as the net cumulative increase in the GDP growth directly induced by the EU-Budget Effects.
• **Non-budgetary benefits** defined as the net cumulative increase in the GDP growth induced by all enlargement effects, but the EU-Budget Effects.

The relative importance of these two groups of benefits is to be estimated in the following parts of the thesis.

5. **Eastern enlargement and economic growth**

5.1. **Determinants of economic growth**

Although the effects of the enlargement were already discussed, the overall impact on the economic growth is rather not clear. Firstly, there is a difference between the changes which were directly caused by the enlargement and the subsequent changes we are able to observe and measure. Secondly, it is difficult to isolate the effects of the enlargement from the effects of other exogenous shocks, changes in endogenous variables driven by the equilibrium dynamics or caused by changes in other variables, which may or may not be included explicitly in the model. Unfortunately, even if we would assume, that the enlargement was the only exogenous shock to the economy, due to the complexity of the system of endogenous variables, it would not be possible to search for causes of economic growth using only a simple correlation between growth and macroeconomic variables without any theoretical background. Thus it is important to analyze the mechanism of transmission of the growth incentives through the economy.

According to Acemoglu (2008), determinants of the economic growth can be classified into two groups: proximate causes of growth and fundamental causes of growth. The former can be interpreted as inputs of a production function, which directly affect the output of the economy. The latter, defined in the book as geography, culture, institutions and luck are assumed to determine the differences between growth levels in the individual countries via their impact on the proximate causes of growth. It is also worthy to distinguish between the proximate causes of economic growth and correlates of economic growth, because it seems to be a very problematic issue causing substantial mistakes in growth analyses. Correlates of the economic growth are all variables revealing a positive correlation with the economic growth. However they do not need to be necessarily its determinants. They can be divided into three subgroups: proximate causes of economic growth, variables affected by the economic growth and variables affected by the
fundamental causes of economic growth independent on the growth process. Although all these groups reveal a positive correlation with the economic growth, only the first of them should be considered as its determinants (however only proximate).

Hence to analyse the impact of the EU accession on the economic growth it is important to answer three main questions:

- How did it affect the fundamental causes of growth?
- How were these changes transferred into changes in the proximate causes of economic growth?
- How did it change the output of the economy?

5.2. EU accession and fundamental causes of growth

As already mentioned above, Acemoglu (2008) distinguishes between four fundamental causes of growth: geography, culture, institutions and luck. Geography is assumed to affect human behaviour and technology (effects of temperature, diseases and natural resources including arable land), culture determines the behaviour of citizens within the framework of formal institutions and luck stands for random selection in the situation of multiple equilibria. At this point I change the classification a little bit, because I think, that these four groups are not mutually independent. Therefore I divide the group of fundamental causes of growth into 3 levels. Level 1 represents the initial endowment of a country and a mechanism generating decisions in case of multiple equilibria. These two items together with the international environment determine the evolution of the culture (Level 2), which in turn influences the creation and evolution of formal and informal institutions (Level 3). These have together with the international environment, current economic situation and geography (direct effect additionally to the indirect effect through culture and institutions) direct impact on the proximate causes of growth, such as capital, labour and/or technology.
The EU accession was a reaction on a sequence of historical events, which were determined by luck (e.g. choice of national leaders), interactions of cultures with different historical experiences and the economic situation. The accession caused great changes in formal institutions and affected the process of change in the informal institutions. Although most of the legislation has been adopted already before the accession and is hardly separable from the process of transition in the post-communist countries, there is evidence (e.g. Breuss, 2009; Breuss, 2001; Balcerowicz, 2007; Böwer and Turrini, 2009) that the changes accompanying the formal accession have caused an additional increase in the economic growth in the new member countries. The most important legislation determining the post-enlargement gains was the dissolving the remaining trade costs, establishing the Single market, hence improving the mobility of production factors and the giving the right to the new member countries to participate in the EU budget. The adoption of new legislation has changed the set of opportunities and prospects for the domestic companies, as well as it has brought new threats associated with the elimination of protectionist policies within the union and measures promoting the environmental
protection. Responses of the individual economies on these changes had a direct effect on their economic performance.

Graphs of the GDP in PPS per capita, its’ three-year averages and its’ three-year average growth rates are presented in Appendix 2.

5.3. Through proximate causes to growth

Proximate causes of the economic growth can be defined as correlates of economic growth, whose impact on it is supported by theory, and hence it is believed, that they actively influence its level. In other words, they create a transmission channel between the fundamental factors and the economic growth. To measure how the enlargement influenced the economic growth in the new member states, it is important to analyse the links between proximate causes and growth and then estimate the impact of the fundamental causes of growth on the proximate ones.

5.4. Theoretical model

Since there is no model describing the economic growth perfectly and the variables used are always only proximate causes of growth, the form of the model and the dataset are usually chosen arbitrarily according to the purpose of the study. As mentioned in Durlauf et al. (2004) “choices of the method involve significant trade-offs, which depend partly on statistical considerations and partly on the economic context”. Since there are many correlates of the economic growth which are not its causes, I try to link the model to the theory as much as possible to avoid an inverted causality and multicollinearity of the explanatory variables. However, the choice of the functional form of the model is constrained, because it is important to keep the parameters easily estimable.

Therefore I assume a simplified production function of a representative economy. Particularly, I use a Cobb-Douglas production function with decreasing marginal product of effective unit of labour and effective unit of capital and constant returns to scale in terms of effective units of production factors. Formally it can be defined as:

\[ Y(t) = (A_K(t)K(t))^\alpha(A_L(t)L(t))^{1-\alpha} \]

(Acemoglu, 2008, p.87)

where:
\[ Y(t) \quad \text{GDP} \]
\[ A_K(t) \quad \text{Capital augmenting technology} \]
\[ K(t) \quad \text{Capital} \]
\[ A_L(t) \quad \text{Labour augmenting technology} \]
\[ L(t) \quad \text{Population} \]
\[ \gamma(t) \quad \text{Participation rate at time } t \]
\[ \gamma L(t) \quad \text{Total available workforce at time } t \text{ (index common to both } L \text{ and } \gamma \text{)} \]
\[ \alpha \in (0,1) \quad \text{In the theoretical framework the parameter } \alpha \text{ is usually estimated around } 1/3. \]

Separating the terms I can rewrite it as:

\[ Y(t) = A_K^\alpha(t)K^\alpha(t)A_L^{1-\alpha}(t)\gamma^{1-\alpha}(t)L^{1-\alpha}(t). \quad (2) \]

To get the growth variable on the left hand side I divide the equation by \( Y(t) \) and add the time index \((t+1)\) to the variables in the numerators on the both sides of the equation:

\[ \frac{Y(t+1)}{Y(t)} = \frac{A_K^\alpha(t+1)K^\alpha(t+1)A_L^{1-\alpha}(t+1)\gamma^{1-\alpha}(t+1)L^{1-\alpha}(t+1)}{A_K^\alpha(t)K^\alpha(t)A_L^{1-\alpha}(t)\gamma^{1-\alpha}(t)L^{1-\alpha}(t)}. \quad (3) \]

and rewriting the term \( Y(t) \) according to (1) I get:

\[ \frac{Y(t+1)}{Y(t)} = \frac{A_K^\alpha(t+1)K^\alpha(t+1)A_L^{1-\alpha}(t+1)\gamma^{1-\alpha}(t+1)L^{1-\alpha}(t+1)}{A_K^\alpha(t)K^\alpha(t)A_L^{1-\alpha}(t)\gamma^{1-\alpha}(t)L^{1-\alpha}(t)} \cdot \quad (4) \]

what can be rewritten as:

\[ \frac{Y(t+1)}{Y(t)} = \left( \frac{A_K(t+1)}{A_K(t)} \right)^\alpha \left( \frac{K(t+1)}{K(t)} \right)^\alpha \left( \frac{A_L(t+1)}{A_L(t)} \right)^{1-\alpha} \left( \frac{\gamma L(t+1)}{\gamma L(t)} \right)^{1-\alpha}. \quad (5) \]

If I divide both sides of the equation by the number of inhabitants, I get the ratio for change in GDP per capita depending on the change in production factors per capita and change in capital and labour augmenting technologies:
\[
\frac{Y(t+1)}{L(t+1)} = \left(\frac{K(t+1)}{L(t+1)}\right) = \left(\frac{A_L(t+1)}{A_L(t)}\right)^{1-\alpha} \left(\frac{\gamma(t+1)}{\gamma(t)}\right)^{1-\alpha}. \tag{6}
\]

What exactly model (6) describes? On the left hand side of the equation there is the growth in GDP per capita and on the right hand side there are changes in production factors which determine this growth. Separating the numerators we get:

\[
\frac{Y(t+1)}{L(t+1)} = \left(\frac{K(t+1)}{L(t+1)}\right) = \left(\frac{A_L(t+1)}{A_L(t)}\right)^{1-\alpha} \left(\frac{\gamma(t+1)}{\gamma(t)}\right)^{1-\alpha}. \tag{7}
\]

This equation shows that the product per capita depends on the capital augmenting technology, capital per capita, labour augmenting technology (human capital) and the participation rate, which can be interpreted as total available labour force per capita. (This equation can be as well derived from the equation (2) by dividing both sides of the equation by population \(L(t)\).)

### 5.5. Regression model

#### 5.5.1. Model

Although the equation (6) is well interpretable, for the purposes of the estimation of its parameters it is useful to isolate the effect of population growth and rewrite the equation as:

\[
\frac{Y(t+1)}{L(t+1)} = \left(\frac{K(t+1)}{L(t+1)}\right) = \left(\frac{A_L(t+1)}{A_L(t)}\right)^{1-\alpha} \left(\frac{\gamma(t+1)}{\gamma(t)}\right)^{1-\alpha}. \tag{8}
\]

Since all the variables are positive by definition, I rewrite it into the form:

\[
\ln \Delta \bar{y} = \alpha \ln \Delta A_K + \alpha \beta \ln \Delta K + (1 - \alpha) \ln \Delta A_L - \alpha \ln \Delta L + (1 - \alpha) \ln \Delta \gamma \ , \tag{9}
\]

where:
\[ \frac{y(t)}{L(t)} = \tilde{y} \]  
\[ \Delta \tilde{y} \]  
\[ \Delta A_K \]  
\[ \Delta K \]  
\[ \Delta A_L \]  
\[ \Delta L(t) \]  
\[ \Delta \gamma(t) \]  
\[ \Delta \gamma(t) \]  
Finally, to estimate the parameters of the model I convert it into the form:

\[
\ln \Delta \tilde{y} = \beta_0 + \beta_1 \ln \Delta A_K + \beta_2 \ln \Delta K + \beta_3 \ln \Delta A_L + \beta_4 \ln \Delta L + \beta_5 \ln \Delta \gamma + \epsilon ,
\]  
(10)

where:
\[ \beta \]  
Regression coefficients
\[ \Delta \tilde{y} \]  
GDP per capita growth
\[ \Delta A_K \]  
Change in capital augmenting technology (proxy)
\[ \Delta K \]  
Change in capital stock (proxy)
\[ \Delta A_L \]  
Change in human capital (proxy)
\[ \Delta L(t) \]  
Change in population
\[ \Delta \gamma(t) \]  
Change in participation rate
\[ \epsilon \]  
Disturbances

5.5.2. Linking theory to the real data

Of course putting the data into the model is problematic.

Firstly, there are insufficiently long data series for the countries, which joined the EU in 2004, causing very limited number of observations for regressions. The availability of data differs among the countries, but usually the series are no longer than twenty years. This causes serious problems especially when estimating the economic growth, where more-years averages should be used.

Secondly, some data are not available, since they cannot be measured or calculated because of the character of the transition economies. Concretely, there are no data for the total value of the capital stock in the new member states, since the method used by the
European Commission needs to assume that in some year in the past, the share of capital on the GDP reached its theoretical value of 1/3 and since then it evolved according to the net capital formation data (observed in the AMECO database). It is obvious, that in the early 1990s the assumption, that the theoretical level in the CEECs was reached is not plausible.

Thirdly, some theoretical variables are not measurable in the real world, such as the change in the labour-augmenting technology (human capital) or in the capital augmenting technology. These variables comprise all aspects of the economy, which affect somehow the productivity of the production factors (labour and capital), thus we do not know their real values. Then we need to use some proxies for them. The proxy should reveal the trend of the variable whose values we are not able to measure. But there is a great problem that using a real-world variable we do not follow the theoretical model, which we are applying. And leaving the theory, we are starting to torture the data to get numbers we want. Therefore, when using proxies one should always ask, if the method and the results are well interpretable and compliant with some theoretical rules, even though the artificially high R-squared values might be very tempting.

5.5.3. Dataset

As written above, the length of the data series for the individual countries is limited. Using 3-year average data (of course, 5-year averages would be more relevant in the economic growth analysis, but it would cause such a decrease in observations, that the regression could not be made), the total number of observations covered by the analysis is 40. The same number of observations is used for example in Rapacki and Próchniak (2009). On the contrary to their dataset covering the period 1996-2007 I use the data from 1995-2006 to be able to distinguish between the pre-accession period 1995-2003 and the short post-accession period 2004-2006. Although also the data for the years 2007 and 2008 were available at the time of writing this work, they are not used, since the great turbulences in the economies caused by the financial crisis and the second wave of the Eastern enlargement could significantly affect the results of the estimation.

Since one of the underlying assumptions of the estimation is that the parameters in the production function are the same for all the countries concerned, the choice of countries for the regression cannot be random. I follow the method used in Rapacki and Próchniak (2009) and use the data for the eight CEECs joining the EU in 2004 and then the
data for Romania and Bulgaria instead of those for Cyprus and Malta, since these two countries (Cyprus and Malta) differ a lot from the other countries, which joined the EU in 2004, and their accession to the EU was also different from the historical point of view. Romania and Bulgaria should be comparable with the rest of the countries used in the analysis.

In the regression I use two groups of variables. The first covers the change in the population and in the participation rate, which can be directly measured. The second comprises proxies for variables, which are for some reasons not measurable. It covers a constant term, which stands for all constant effects determining the level of economic growth (constant change in productivity of production factors), and proxies for the change in capital and labour augmenting technologies and the change in the capital stock, since its real level is not known as mentioned above.

5.5.4. Regression

During the first estimations none of the proxy variables for the changes in technologies was considered significant and usually an inverted causality or some dependency on another variable have occurred. Moreover, there were no relevant technology indices available. Therefore I take the assumption that there has been a constant progress in both of the technologies before the enlargement, which is represented in the model by the constant term. The possible impact of the EU membership on the technological progress is tested through a dummy variable (const2004). The final version of the model is:

\[
\ln \Delta \tilde{y}(t) = \beta_0 + \beta_1 \ln \Delta K + \beta_2 \ln \Delta L + \beta_3 \ln \Delta \gamma + \beta_4 \text{const2004} + \varepsilon ,
\]

where:
- \( \beta \) Regression coefficients
- \( \Delta \tilde{y} \) GDP per capita growth
- \( \Delta K \) Change in capital stock
- \( \Delta L \) Change in population
- \( \Delta \gamma \) Change in participation rate
- \( \text{const2004} \) Dummy for EU membership
- \( \varepsilon \) Disturbances
Applying the OLS method of estimation on this model its coefficients are estimated and the results of the regression are presented in the following table.

**Figure 2: Regression**

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Slope coefficient</th>
<th>Standard error</th>
<th>t-stat</th>
<th>p-value</th>
<th>Signif.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant term</td>
<td>0.002721</td>
<td>0.00693498</td>
<td>0.3923</td>
<td>0.6974</td>
<td></td>
</tr>
<tr>
<td>Capital</td>
<td>0.171296</td>
<td>0.0629843</td>
<td>2.72</td>
<td>0.0105</td>
<td>**</td>
</tr>
<tr>
<td>Participation</td>
<td>0.521392</td>
<td>0.186246</td>
<td>2.799</td>
<td>0.0086</td>
<td>***</td>
</tr>
<tr>
<td>Population</td>
<td>-3.00482</td>
<td>0.619078</td>
<td>-4.854</td>
<td>3.04E-05</td>
<td>***</td>
</tr>
<tr>
<td>Const2004</td>
<td>0.008922</td>
<td>0.00276774</td>
<td>3.224</td>
<td>0.0029</td>
<td>***</td>
</tr>
</tbody>
</table>

For the detailed results of the regression see Appendix 3.

### 6. Estimating the budgetary benefits

#### 6.1. EU-Budget and proximate causes of growth

Having estimated the parameters of the regression model, it is important to assess the impact of the EU budget on the explanatory variables. My first idea was to utilize a part of the model presented in Breuss (2009) and make a country-specific regression models explaining the impact of the Structural funds (the only item of the budget assumed to affect the economic growth) on the capital formation in the individual countries. However, after consulting the method of estimation of the equation parameters with the author of this model (Prof. Fritz Breuss) and thinking about the results presented in his work concerning the effects of the enlargement expected to be experienced in Bulgaria and Romania after their accession, I decided to make it differently, because my suspicion that the method is not right was too strong.

#### 6.1.1. Doubts about the model presented in Breuss (2009)

The model in Breuss (2009) has a form:

\[ I = \beta_0 + \beta_1 I(t - 1) + \beta_2 COH_{GDP} + \beta_3 FDI(t - 1) + \beta_4 Y\% + \varepsilon, \quad (12) \]
where:
\[ \beta \quad \text{Regression coefficients} \]
\[ I \quad \text{Investment quota in \% of GDP} \]
\[ Y\% \quad \text{Real GDP growth} \]
\[ COH\_GDP \quad \text{Structural funds transfers out of the EU budget (in \% of GDP)} \]
\[ FDI \quad \text{FDI inflows in \% of GDP} \]
\[ \varepsilon \quad \text{Disturbances} \]

(For Bulgaria \( \beta_4 = 0 \), for Romania \( \beta_1 = 0 \))

The models in the work are country-specific and the parameters are estimated using the OLS method.

Sources of my suspicion:

• The country specificity of the model causes a very limited number of observations for the OLS regression;

• The model is very simple and hence many variables determining the investment are omitted. Then the regression coefficients are biased. As a proof of the little reliability of the regression coefficients I take the results of the estimation for Bulgaria and Romania presented by the author. For Bulgaria \( \beta_2 = 0,03 \) and for Romania \( \beta_2 = 2,25 \). Assuming that the author used the same units for both regressions, the estimates seem to be not well interpretable.

6.1.2. Method used in this work

Instead of trying to make a regression, I estimate the levels of budgetary benefits under different sets of assumptions about the ability of the EU funds to affect the capital stock in the individual countries. For this purpose I constructed a nicely working table in MS Excel, which enables to calculate the budgetary benefits based on a broad variety of assumptions about the “productivity” of different groups of items of the EU Budget.

After estimating the possible level of the budgetary benefits which have been experienced by the new member countries after the enlargement, I estimate the maximum possible benefits, which could have been gained by the countries under the 4% rule\(^5\) for the

\[ ^5 \text{Total transfers to the poorer countries cannot be higher than 4\% of GDP (Schneider, 2007)} \]
EU transfers. The results should represent the maximum possible gains from the EU budget over which the countries could bargain before the enlargement.

6.2. Productivity of EU funds

The EU budget comprises many items which are dedicated to specific purposes and therefore the growth effects of the funding under the individual items may differ. Schneider (2007) distinguishes between the productive and unproductive spending, whereas the items under the productive spending are characterized as a potential GDP growth boosters and the unproductive spending is assumed to be only an instrument of income redistribution. Such a framework for the analysis seems to be very useful. However, it has some quite important shortcomings.

Firstly it assumes that the whole value of the productive spending increases the economic growth as if it was a part of the national public expenditures, which ignores all inefficiencies which could occur.

According to Hervé and Holzmann (1998) in Jan in’t Veld (2007) there are several reasons why the real impact of the EU funding on the increase in production capacities should be smaller than what could be expected under an optimal use of all these transfers. Concretely they mention following problems:

- Transfers may be invested in projects with low economic returns due to the inadequate administrative environment;
- There are additional administrative costs of the funding;
- Competition for EU funds absorbs some domestic resources that could be otherwise invested in production capacities;
- The economic agents can change the amount and structure of their investment due to the positive income shock induced by the EU spending.

In other words, the growth effects of the EU funding largely depend on the absorption capacity of the individual countries.

Secondly, it does not take into the account possible adjustments of the structure of national budgets, given the governments know in advance the amount and structure of the EU transfers available. Unlike the above mentioned problems, this entirely changes the framework for the estimation of the budgetary benefits, since it means that the growth effect of the EU expenditures does not depend only on the purposes for which the funds are dedicated, but it depends also on the structure of the public expenditures promoted by the
national governments and on the feasibility to substitute some items in the national budgets by EU transfers.

Making the estimates of the budgetary benefits for several scenarios, all these issues can be discussed and their importance can be assessed. To create a theoretical framework for the estimation that takes into account the above mentioned issues it is important to define the productivity of the EU spending and discuss its determinants.

For the purposes of this work I define the “productivity” of the EU spending as its ability to increase the capital stock. In general, it can reach any value from zero to one. Zero means, that nothing from the funds covered by this item affects the capital stock. When the productivity is assumed to be one, the item is supposed to increase the capital stock by its whole value.

6.2.1. Potential productivity of the EU funding

As such the productivity is country-specific and hence the individual items of the EU budget can be classified only according to their “potential productivity”, defined as the ability to increase the capital stock under the assumption of perfect absorption capacity and entirely inflexible national budgets. However, since the potential productivity would be a key determinant of the real productivity given the absorption capacity is good and the possibility of substitution of some items in national budgets is small, such a classification seems to be useful.

Since the analysis of the budgetary benefits covers only the period 2004-2006, the estimation is based only on the transfers from and to the EU budget under Agenda 2000. Hence when classifying the EU spending into different groups, no conversion of the items due to the change in the accounting standards by 2007 needs to be made.

Under the scheme of Agenda 2000 I distinguish between the productive and unproductive expenditures and the expenditures covering the administrative costs. The classification is based on the framework presented in Schneider (2007), only the group of administrative expenditures is added, little adjustment in the group of productive spending is made and the productivity of the national contributions to the EU budget is discussed.

**Productive expenditures** are defined as the expenditures from the EU budget, which are assumed to have a high potential productivity. The group of productive expenditures comprises the spending on “Structural actions”, “Training, youth, culture, audiovisual, media, information & social actions” and the spending “Research and
technological development”. To these items explicitly mentioned in Schneider (2007) I add also the “Pre-Accession Aid” to the new member countries. The accession to the EU had not only an impact on the availability of new sources of funding for the accessing countries, but it also initiated a gradual decomposition of the pre-accession aid. Since these expenditures should belong by their nature to the most productive ones, their extinction might have a significant impact on the net effect of accession. Since the total appropriations for the new member countries were increasing over time, it might be possible to imagine, that some of the new productive expenditures compensated primarily the loss in the pre-accession aid and only the expenditures above that threshold might be regarded as a new spending. This assumption should be supported by the fact that it is rather improbable that the countries would not take into account the amount of pre-accession spending at the time they were deciding about the overall spending.

The **unproductive expenditures** are defined as the expenditures from the EU budget, which are assumed to have a low (or zero) potential productivity. The group of unproductive expenditures covers the spending on “Agriculture”, rest of “Internal policies” and “Compensation payments”.

The **expenditures covering the administrative costs** create a special group, because on the contrary to the both above mentioned groups, these expenditures are assumed to have always a zero potential productivity and zero real productivity.

For detailed classification of the expenditures under Agenda 2000 and their amounts see Appendices 4 and 5.

6.2.2. **Productivity of the national contributions**

When assessing the productivity of the individual items of the EU budget, it is important to discuss the **productivity of the national contributions** to the EU budget, since it is important not only how much the countries pay, but also how would the funds be spent by the governments being not sent to the EU budget. Under the assumption that the main objective of the national governments is the maximization of the economic growth, the contributions would have the lowest possible productivity. However, since the structure of the public spending is determined by many different factors, the productivity of the contributions can reach relatively high levels. Of course, the higher this productivity is, the more significant is the loss perceived by the contributing country.
6.2.3. **Absorption capacity**

As mentioned above, the real productivity of the EU spending is much affected by the ability of the countries to use the available funds effectively. Given the absorption capacity is perfect, then (ignoring the effect of national budget adjustment) the real productivity would be equal to the potential one. However, given some inefficiencies occur, the real productivity would become lower. For estimating the effects of changes in the absorption capacity on the real productivity, it can be defined as a variable with values from zero (no absorption capacity) to one (perfect absorption capacity) and by multiplying the potential productivity by this coefficient the real productivity can be (under the assumption of inflexible national budgets) estimated.

6.2.4. **Compatibility with national budgets**

- Flexibility of national budgets (flexibility)
- Substitutability of the expenditures from national budgets by EU funds (substitutability)

The possibility to substitute some of the expenditures under the national budget items by the EU funding highly determines the real productivity of the EU spending. For example, let’s assume that a country receives EU funds to cover the costs of a project, which has no impact on the production capacities within the country. Then under the assumption of inflexibility and/or no substitutability, the real productivity of the funding will be zero. However, given the project subsidized from the EU budget is a sufficient substitute for some project that would be otherwise financed from the national budget and the government is enough flexible to take the EU funding into account when deciding the structure of the national public expenditures, the EU funds would despite their zero potential productivity induce an increase in financial means whose spending would not be dedicated to any specific purposes, hence the productivity would depend on the marginal productivity of the national public expenditures. Obviously, assuming a perfect absorption capacity and flexibility of the national budgets, even the EU spending with the lowest potential productivity can induce as much economic growth as the productive spending.

As in the case of the absorption capacity, the impact of the changes in the flexibility and substitutability on the real productivity can be estimated by defining them as variables with values between zero and one and multiplying the potential productivity by these coefficients (assuming a perfect absorption capacity).
6.3. Estimates

As already mentioned, since the productivity of the individual items of the EU budget is not known, I make the estimates under 24 scenarios, which differ in the assumptions about the productivity of the individual groups of EU expenditures as well as in those concerning the productivity of the national contributions to the EU budget. Moreover, after estimating the budgetary benefits using real data, it is simulated what would happen, if the countries could draw expenditures reaching 4% of their GDP.

Covering a broad spectrum of possible situations, the relative importance of the budgetary benefits can be better assessed than using only a single estimate for each country. The results of the estimation are summarized in the following table, which can be also found in the Appendix 6, where the results are supplemented by graphs.

Figure 3: Estimates of budgetary benefits

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Prod</th>
<th>Unprod</th>
<th>Contr 4%</th>
<th>CZ</th>
<th>EE</th>
<th>LV</th>
<th>LT</th>
<th>HU</th>
<th>PL</th>
<th>SI</th>
<th>SK</th>
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<tr>
<td>A) Evidence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
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<td>-0.13</td>
<td>-0.14</td>
<td>-0.14</td>
<td>-0.13</td>
<td>-0.14</td>
<td>-0.13</td>
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<tr>
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<td>1</td>
<td>1</td>
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<td>0.27</td>
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<td>0.42</td>
<td>0.14</td>
<td>0.16</td>
<td>0.08</td>
</tr>
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<td>1</td>
<td>0</td>
<td>-0.06</td>
<td>0.11</td>
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<td>0.00</td>
<td>0.01</td>
<td>-0.07</td>
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<td>0.23</td>
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<td>0.6</td>
<td>0</td>
<td>0.03</td>
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<td>0.22</td>
<td>0.23</td>
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</tr>
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<tr>
<td>0,6;0,2;0,4</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>0</td>
<td>1</td>
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<td>0.73</td>
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<td>0.73</td>
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<tr>
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<td>0</td>
<td>1</td>
<td>1</td>
<td>-0.13</td>
<td>-0.13</td>
<td>-0.14</td>
<td>-0.14</td>
<td>-0.13</td>
<td>-0.14</td>
<td>-0.13</td>
</tr>
<tr>
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<td>1</td>
<td>1</td>
<td>1</td>
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<td>0.61</td>
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<td>0.60</td>
<td>0.58</td>
<td>0.59</td>
</tr>
<tr>
<td>4% : 0/1 approach a)</td>
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<td>0</td>
<td>1</td>
<td>1</td>
<td>0.59</td>
<td>0.61</td>
<td>0.61</td>
<td>0.60</td>
<td>0.60</td>
<td>0.58</td>
<td>0.59</td>
</tr>
<tr>
<td>4% : 0/1 approach b)</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0.73</td>
<td>0.75</td>
<td>0.75</td>
<td>0.73</td>
<td>0.73</td>
<td>0.72</td>
<td>0.72</td>
</tr>
<tr>
<td>4% : 0,8;0,4;0,6</td>
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<td>0.4</td>
<td>0.6</td>
<td>1</td>
<td>0.50</td>
<td>0.52</td>
<td>0.52</td>
<td>0.50</td>
<td>0.51</td>
<td>0.49</td>
<td>0.50</td>
</tr>
<tr>
<td>4% : 0,8;0,2;0,5</td>
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<td>0.2</td>
<td>0.5</td>
<td>1</td>
<td>0.51</td>
<td>0.53</td>
<td>0.53</td>
<td>0.52</td>
<td>0.52</td>
<td>0.51</td>
<td>0.51</td>
</tr>
<tr>
<td>4% : 0,6;0,2;0,4</td>
<td>0.6</td>
<td>0.2</td>
<td>0.4</td>
<td>1</td>
<td>0.38</td>
<td>0.40</td>
<td>0.39</td>
<td>0.39</td>
<td>0.39</td>
<td>0.38</td>
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</tr>
<tr>
<td>C) Share of prod. Real</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4% : Upper</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0.72</td>
<td>0.74</td>
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<tr>
<td>4% : Lower</td>
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<td>0</td>
<td>1</td>
<td>1</td>
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<td>-0.13</td>
<td>-0.14</td>
<td>-0.14</td>
<td>-0.13</td>
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<tr>
<td>4% : All productive</td>
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<td>1</td>
<td>1</td>
<td>1</td>
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<td>0.59</td>
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<td>1</td>
<td>1</td>
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<td>0.16</td>
<td>0.22</td>
<td>0.22</td>
<td>0.08</td>
</tr>
<tr>
<td>4% : 0/1 approach b)</td>
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<td>0</td>
<td>1</td>
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</tr>
<tr>
<td>4% : 0,8;0,2;0,5</td>
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<td>0.2</td>
<td>0.5</td>
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<td>0.25</td>
<td>0.35</td>
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<td>0.26</td>
<td>0.29</td>
<td>0.29</td>
<td>0.21</td>
</tr>
<tr>
<td>4% : 0,6;0,2;0,4</td>
<td>0.6</td>
<td>0.2</td>
<td>0.4</td>
<td>1</td>
<td>0.21</td>
<td>0.27</td>
<td>0.27</td>
<td>0.21</td>
<td>0.23</td>
<td>0.23</td>
<td>0.18</td>
</tr>
</tbody>
</table>
6.3.1. Evidence (A)

At first, using real data, I estimated the budgetary benefits perceived by the new member countries in the post-accession period. The “upper bound” estimation is based on the assumption that the whole EU budget spending was productive\(^6\) and the contributions to the EU budget did not decrease the capital stock in none of the economies in question. Moreover, the productivity of the spending is assumed to be equal to one. Even such overestimation of the effects does not contribute to the economic growth more than by 0,56% (Lithuania). The “lower bound” was constructed inversely to the “upper bound”. No spending was considered to increase the capital stock and the contributions were assumed to drain from the countries funds, which would be otherwise used fully to increase the domestic capital stock (productivity equal to one). Under these assumptions, all countries are facing a net loss of about 0,14% of annual GDP growth. The next scenario shows the results when assuming that all spending as well as contributions have the productivity equal to one. “0/1 approach” assumes that the productive spending has the productivity equal to one and that the unproductive items cannot influence the capital stock. Scenario a) assumes that the productivity of the national contributions is equal to one and scenario b) ignores any effect of the national contributions on the capital stock. The three following scenarios are based on the assumption that none of the items reveals either unitary or zero productivity. That means that all funds either gained or lost have some potential to increase the capital stock in the economy. It is assumed that the productive spending has the biggest potential to contribute to growth in the capital stock, the unproductive expenditures have somewhat smaller potential to do so and that the productivity of the contributions lies somewhere between the productivities of the former two kinds of expenditures.

6.3.2. Maximal benefits under 4% rule (B,C)

After assessing the benefits which could have been perceived by the new member countries after the enlargement, I estimate the maximal total gains they could get under the 4% rule. Since they could depend on the productivity of the individual items of the EU budget as well as on the distribution of these 4% of GDP among the groups of funds with different levels of potential productivity, I divide the estimation into two parts. In the first part (B) it is assumed, that all the funds received from the EU budget are productive and in

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\(^6\) When the term “productivity” is used, it always stands for the real productivity. When the potential productivity is concerned, it is always explicitly mentioned.
the second part (C) the real shares from the Agenda 2000 are used. In both sections the same set of assumptions about the productivity as in the section A are used and the levels of national contributions are assumed to reach the real levels. I will not discuss in detail all the results, which can be viewed in the table above, but I only highlight the upper bound estimate, which represents the total budgetary benefits negotiable under the 4% rule. According to the results, the maximal possible benefits from the EU budget could not have been higher than 0.74% on the top of the baseline growth. However, this growth effect is based on highly improbable assumptions. Much more reliable estimates are around 0.3% (in my favourite scenario 0.8; 0.2; 0.5) or reaching values from the interval from 0.08% to 0.31% in the scenario “4% 0/1 approach a)”, which is by its results the closest to the results presented in Schneider (2007) (at least when the real amounts of transfers are concerned).

6.3.3. Comparison with Schneider (2007)

There are not big differences between the estimates presented in Schneider (2007) and the results obtained in my “0/1 approach a)” scenario. The relative positions of the countries are almost the same; the only exception is the relative position of Estonia and Lithuania, since in Schneider (2007) Lithuania gains more than Estonia. But the difference between their gains is very small, thus the inconsistency of our results cannot be considered very significant. Moreover, our results are very similar also in absolute terms.

6.4. Budgetary vs. non-budgetary benefits

Since the evaluation of the non-budgetary benefits is due to its complexity much above the scope of this work, I compare my estimates of the budgetary benefits with the estimates of the non-budgetary benefits presented in the literature.

Comparing the overall results with the estimates of the total growth effect of the EU accession presented in Backé (2002) (2-3 percentage points of GDP in medium run), European Commission (2001) (1.3-2.1%) or in Commission of the European Communities (2008) reaching about 1.79 percentage points, the budgetary benefits gained by the New Member Countries does not look to be much important. Using the results of country-specific estimates of the enlargement growth effects, this conclusion is only supported.

Benáček (2003) presents an estimate that the non-budgetary effects would have increased the annual economic growth rate in the Czech Republic by about 1.3-2.1%. The estimate in Breuss (2001) concerning the Czech Republic is 2.92% excluding the EU-
Budget effect. Given the estimates of the budgetary benefits gained by the Czech Republic (-0.06 in the “0/1 approach a”), 0.02% in the scenario 0.8; 0.2; 0.5, which I prefer, 0.21% in the upper-bound estimation) or looking at the estimates of the maximal possible growth effect of the EU budget under the 4% rule (extremely unrealistic scenario), reaching 0.72%, the EU-Budget growth effect seems to be rather small.

In the case of Hungary Breuss (2001) expected a growth effect of about 6% excluding the EU-Budget effect (this estimate is supported by Maliszewska (2004) estimating the overall enlargement effect around 7% of additional annual growth), while according to the estimates of the budgetary benefits presented in the table above, the EU-Budget effect is assumed to be neutral or only slightly positive (zero under the 0/1 approach a) scenario and 0.07% under the 0.8; 0.2; 0.5 scenario), reaching at maximum 0.3% (upper bound). Again, in the most unrealistic scenario, the budgetary benefits reach 0.73%, but under more realistic assumptions even obtaining transfers in the total value of 4% of Hungarian GDP, the growth effect of these transfers would be only around 0.3%.

For Poland Breuss (2001) presents an estimate of 3.4% of additional growth rate induced by the enlargement excluding the EU-Budget effect (the same additional growth rate is presented in Maliszewska 2004). According to my estimates, the budgetary benefits gained by Poland are very close to those perceived by Hungary. The most realistic scenarios show the growth effect to be around 0.01-0.10%.

7. Conclusion

In 2004 ten countries (Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Poland, Slovenia and Slovakia) joined the EU. After more than a decade of intensive preparations for the enlargement, they could finally assess their ability to maximize the gains stemming from the membership as well as to identify their main sources. In fact, analyses concerning both these issues are very important, since they could provide the national authorities some guidance for their policies. Concretely, it could help them to answer the question what priorities they should follow. Should they primarily fight for the EU funds? Or should they rather focus on the potential benefits from the single market? Could they promote some policies enhancing the ability of the country to gain from the membership? Moreover, based on the estimates of the structure of the
enlargement benefits the strategies of the national authorities in the pre-accession negotiations can be evaluated.

With a view to assess the reasonability of the tough bargaining over the European budget before the Eastern enlargement of the EU, the present thesis analyses its relative importance as a source of benefits in the comparison with the cumulative gains from all other effects of the enlargement perceived by the new member countries. For this purpose a complex theoretical framework is created based on the historical aspects of the EU Eastern enlargement, theory of regional integration and theory of economic growth. The main contribution of this work is the proposal of a new, “multi-scenario” approach for estimation of the budgetary benefits. It is pointed out that the productivity of the EU transfers\(^7\) depends not only on the purposes for which the funds are dedicated, but also on their compatibility with the national budgets and on the absorption capacity of the countries. That means that the productivity is country-specific and even not constant in time. Therefore it is argued that estimating the budgetary benefits only for an arbitrarily chosen set of country-specific productivity levels ignores the issue of sensitivity of the results on the assumptions taken. As an alternative to such an approach, the estimates are made under different sets of underlying assumptions about the productivity of the EU spending. This allows not only assessing the benefits really gained by the new member countries, but it also makes possible to estimate the potential gains from the improvement in their absorption capacities or in the compatibility of the EU spending with their national budgets.

Applying the method on the data from the new member countries it is shown that the budgetary benefits were in comparison to other gains from the enlargement rather low. Moreover, considering the relatively low upper bound estimates it can be argued that although there is some room for an improvement in the ability of the new members to gain from the EU budget, even the best policies could not turn it into a main source of enlargement benefits.

\(^7\) Definition is provided in chapter 6.2
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2) epp.eurostat.ec.europa.eu [online, 2010 April]

### APPENDICES:
**Appendix1: Which variables are supposed to be affected by the enlargement?**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Variable</th>
<th>Effect affecting the variable</th>
<th>Impact</th>
<th>Overall change</th>
</tr>
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<tbody>
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<td>Price level</td>
<td>Volume + Trade cost effect</td>
<td>decrease</td>
<td>decrease</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Economies of scale</td>
<td>decrease</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased competition</td>
<td>decrease</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Export</td>
<td>Volume + Trade cost effect</td>
<td>increase</td>
<td>increase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Economies of scale</td>
<td>increase</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased competition</td>
<td>increase</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Import</td>
<td>Volume + Trade cost effect</td>
<td>increase</td>
<td>uncertain (increase)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Economies of scale</td>
<td>decrease</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased competition</td>
<td>increase</td>
<td></td>
</tr>
<tr>
<td>TRADE</td>
<td>Intensity of trade</td>
<td>Volume + Trade cost effect</td>
<td>increase</td>
<td>uncertain (increase)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Economies of scale</td>
<td>uncertain</td>
<td>(increase)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased competition</td>
<td>increase</td>
<td></td>
</tr>
<tr>
<td>NX</td>
<td>Net export</td>
<td>Volume + Trade cost effect</td>
<td>uncertain</td>
<td>uncertain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Economies of scale</td>
<td>increase</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased competition</td>
<td>uncertain</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>Savings</td>
<td>FC&amp;FS</td>
<td>increase</td>
<td>increase</td>
</tr>
<tr>
<td>IPC</td>
<td>Investment in physical capital</td>
<td>FC&amp;FS</td>
<td>increase</td>
<td>increase</td>
</tr>
<tr>
<td>FFI</td>
<td>Inflow of Financial capital</td>
<td>FC&amp;FS</td>
<td>increase</td>
<td>increase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EU-budget (productive)</td>
<td>increase</td>
<td></td>
</tr>
<tr>
<td>FDI</td>
<td>Inflow of FDI</td>
<td>Mobility of FDI</td>
<td>increase</td>
<td>increase</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>Investment in R&amp;D</td>
<td>Increased competition</td>
<td>increase</td>
<td>increase</td>
</tr>
<tr>
<td>INN</td>
<td>Investment in innovations</td>
<td>Increased competition</td>
<td>increase</td>
<td>increase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FC&amp;FS</td>
<td>increase</td>
<td></td>
</tr>
<tr>
<td>U</td>
<td>Unemployment</td>
<td>Increased competition</td>
<td>increase</td>
<td>increase</td>
</tr>
<tr>
<td>BD</td>
<td>Budget Deficit</td>
<td>DCR effect</td>
<td>increase</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EU-budget (co-financing)</td>
<td>increase</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EU-budget (contributions)</td>
<td>increase</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>Tax Rate</td>
<td></td>
<td>increase</td>
<td>increase</td>
</tr>
<tr>
<td>TR*</td>
<td>Unproductive expenditures</td>
<td>EU-budget</td>
<td>increase</td>
<td>increase</td>
</tr>
</tbody>
</table>
Appendix 2: GDP per capita in the new member countries and EU-15

Figure 1: GDP per capita in 1000 PPS

![Graph showing GDP per capita in 1000 PPS from 1991 to 2009 for various countries including EU-15, Bulgaria, Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovenia, and Slovakia.](image)

Figure 2: Average GDP per capita in 1000 PPS

![Graph showing average GDP per capita in 1000 PPS from 1995-1997 to 2004-2006 for various countries including EU-15, Bulgaria, Czech Republic, Estonia, Latvia, Lithuania, Poland, Romania, Slovenia, and Slovakia.](image)
Figure 3: Average growth in GDP in PPS per capita
Appendix 3: Regression

1) **Model**

Model 3: OLS  
Dependent variable: GDP_growth

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>const</td>
<td>0.0027208</td>
<td>0.00693498</td>
<td>0.3923</td>
</tr>
<tr>
<td>Participation</td>
<td>0.521392</td>
<td>0.186246</td>
<td>2.7995</td>
</tr>
<tr>
<td>Population</td>
<td>-3.00482</td>
<td>0.619078</td>
<td>-4.8537</td>
</tr>
<tr>
<td>Const2004</td>
<td>0.00892183</td>
<td>0.00276774</td>
<td>3.2235</td>
</tr>
<tr>
<td>Capital</td>
<td>0.171296</td>
<td>0.0629843</td>
<td>2.7197</td>
</tr>
</tbody>
</table>

Mean dependent var | 0.027726  | S.D. dependent var | 0.009718 |
Sum squared resid  | 0.001398  | S.E. of regression | 0.006609 |
R-squared          | 0.588818  | Adjusted R-squared | 0.537420 |
F(4, 32)           | 11.45608  | P-value(F)         | 6.96e-06 |
Log-likelihood     | 135.8986  | Akaike criterion   | -261.7971 |
Schwarz criterion  | -253.7425 | Hannan-Quinn       | -258.9575 |
Observations       | 37        |

2) **Multicollinearity:**

- **Variance Inflation Factors**

Obs.1-37  
Minimum possible value = 1.0  
Values > 10.0 may indicate a collinearity problem

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation</td>
<td>1.042</td>
<td>Population</td>
<td>1.156</td>
</tr>
<tr>
<td>Const2004</td>
<td>1.100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP_average_exp</td>
<td>1.137</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

VIF(j) = 1/(1 - R(j)^2), where R(j) is the multiple correlation coefficient between variable j and the other independent variables

Properties of matrix X'X:

1-norm = 48.959033  
Determinant = 4.0521764e-007  
Reciprocal condition number = 2.2083615e-006
3) **Normality of residuals**

![Graph showing frequency distribution for uhat3, obs 1-37]

Frequency distribution for uhat3, obs 1-37
number of bins = 7, mean = 3.09437e-018, sd = 0.00660927

<table>
<thead>
<tr>
<th>interval</th>
<th>midpt</th>
<th>frequency</th>
<th>rel.</th>
<th>cum.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; -0.011288</td>
<td>-0.013624</td>
<td>2</td>
<td>5.41%</td>
<td>5.41% *</td>
</tr>
<tr>
<td>-0.011288</td>
<td>-0.0066171</td>
<td>4</td>
<td>10.81%</td>
<td>16.22% ***</td>
</tr>
<tr>
<td>-0.0066171</td>
<td>-0.0019461</td>
<td>8</td>
<td>21.62%</td>
<td>37.84% ***</td>
</tr>
<tr>
<td>-0.0019461</td>
<td>0.0027250</td>
<td>8</td>
<td>21.62%</td>
<td>59.46% ****</td>
</tr>
<tr>
<td>0.0027250</td>
<td>0.0073960</td>
<td>11</td>
<td>29.73%</td>
<td>89.19% ********</td>
</tr>
<tr>
<td>0.0073960</td>
<td>0.012067</td>
<td>3</td>
<td>8.11%</td>
<td>97.30% **</td>
</tr>
<tr>
<td>&gt;= 0.012067</td>
<td>0.014403</td>
<td>1</td>
<td>2.70%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Test for null hypothesis of normal distribution:
Chi-square(2) = 0.554 with p-value 0.75822
4) **Heteroskedasticity**

- **White's test for heteroskedasticity:**

OLS, Dependent variable: $\text{uhat}^2$

<table>
<thead>
<tr>
<th>coefficient</th>
<th>std. error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>const</strong></td>
<td>0.000403205</td>
<td>0.000340603</td>
<td>1.184</td>
</tr>
<tr>
<td>Participation</td>
<td>-0.00934219</td>
<td>0.0143415</td>
<td>-0.6514</td>
</tr>
<tr>
<td>Population</td>
<td>0.0163225</td>
<td>0.0441308</td>
<td>0.3699</td>
</tr>
<tr>
<td>Const2004</td>
<td>0.000205842</td>
<td>0.000197107</td>
<td>1.044</td>
</tr>
<tr>
<td>GDP_average_exp</td>
<td>-0.00693437</td>
<td>0.00631312</td>
<td>-1.098</td>
</tr>
<tr>
<td>sq_Participat</td>
<td>-0.176881</td>
<td>0.160148</td>
<td>-1.104</td>
</tr>
<tr>
<td>X2_X3</td>
<td>-1.21975</td>
<td>1.64314</td>
<td>-0.7423</td>
</tr>
<tr>
<td>X2_X4</td>
<td>0.0606551</td>
<td>0.0112833</td>
<td>0.5366</td>
</tr>
<tr>
<td>X2_X5</td>
<td>0.0646412</td>
<td>0.150424</td>
<td>0.4297</td>
</tr>
<tr>
<td>sq_Population</td>
<td>-0.757963</td>
<td>2.92944</td>
<td>-0.2587</td>
</tr>
<tr>
<td>X3_X4</td>
<td>0.0039518</td>
<td>0.0226701</td>
<td>0.1743</td>
</tr>
<tr>
<td>X3_X5</td>
<td>-0.146319</td>
<td>0.370246</td>
<td>-0.3952</td>
</tr>
<tr>
<td>X4_X5</td>
<td>-0.0021714</td>
<td>0.00192639</td>
<td>-1.127</td>
</tr>
<tr>
<td>sq_GDP_average</td>
<td>0.0335385</td>
<td>0.0293928</td>
<td>1.141</td>
</tr>
</tbody>
</table>

Unadjusted R-squared = 0.188918
Obs.1-37
Test statistic: $TR^2 = 6.989964$, with p-value $= P(\text{Chi-square}(13) > 6.989964) = 0.902668$

- **Breusch-Pagan test for heteroskedasticity**

OLS, Dependent variable: scaled $\text{uhat}^2$

<table>
<thead>
<tr>
<th>coefficient</th>
<th>std. error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>const</strong></td>
<td>1.42940</td>
<td>1.45939</td>
<td>0.9794</td>
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<tr>
<td>Participation</td>
<td>19.6391</td>
<td>39.1936</td>
<td>0.5011</td>
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<td>Population</td>
<td>173.361</td>
<td>130.278</td>
<td>1.331</td>
</tr>
<tr>
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<td>-0.417504</td>
<td>0.582443</td>
<td>-0.7168</td>
</tr>
<tr>
<td>GDP_average_exp</td>
<td>-0.937203</td>
<td>13.2544</td>
<td>-0.07071</td>
</tr>
</tbody>
</table>

Explained sum of squares = 4.22646

Test statistic: $LM = 2.113228$, with p-value $= P(\text{Chi-square}(4) > 2.113228) = 0.714943$
## Appendix 4: Productive vs. unproductive expenditures Agenda 2000

<table>
<thead>
<tr>
<th>EXPENDITURES</th>
<th>Subheading</th>
<th>Objectives</th>
<th>Funds</th>
<th>P/U/A*</th>
</tr>
</thead>
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<td>AGRICULTURE</td>
<td>Direct Aid</td>
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</tr>
<tr>
<td></td>
<td>Export refunds</td>
<td></td>
<td></td>
<td>U</td>
</tr>
<tr>
<td></td>
<td>Storage</td>
<td></td>
<td></td>
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<td></td>
<td>Rural development</td>
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<td>STRUCTURAL ACTIONS</td>
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<td>EAGGF, FIFG, ERDF, ESF</td>
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<td>Objective 2</td>
<td>EAGGF, ERDF, ESF</td>
<td>P</td>
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<tr>
<td></td>
<td></td>
<td>Objective 3</td>
<td>ESF</td>
<td>P</td>
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<td></td>
<td>Other Structural measures</td>
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<td>EAGGF, FIFG</td>
<td>P</td>
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<tr>
<td></td>
<td>Community initiatives</td>
<td></td>
<td>EAGGF, FIFG, ERDF, ESF</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Innovatory measures and Technical assistance</td>
<td></td>
<td>EAGGF, FIFG, ERDF, ESF</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Cohesion Fund</td>
<td></td>
<td>CF</td>
<td>P</td>
</tr>
<tr>
<td>INTERNAL POLICIES</td>
<td>Training, youth, culture, audiovisual, media, information &amp; social actions</td>
<td>Education, vocational training and youth</td>
<td></td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Energy, Euratom nuclear safeguards and environment</td>
<td>Energy, Euratom nuclear safeguards</td>
<td></td>
<td>U</td>
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<tr>
<td></td>
<td>Consumer protection, internal market, industry and trans-European networks</td>
<td>Trans-European networks</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Research and technological development</td>
<td></td>
<td></td>
<td>P</td>
</tr>
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<td>EXTERNAL ACTIONS</td>
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<td>COMPENSATIONS</td>
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</table>

*Productive / Unproductive/ Administration
### Table 1:

<table>
<thead>
<tr>
<th>Year</th>
<th>CZ</th>
<th>EE</th>
<th>LV</th>
<th>LT</th>
<th>HU</th>
<th>PL</th>
<th>SI</th>
<th>SK</th>
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</thead>
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<tr>
<td>2000</td>
<td>100,3024</td>
<td>44,60942</td>
<td>50,89646</td>
<td>48,20561</td>
<td>155,6908</td>
<td>248,0463</td>
<td>34,18458</td>
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### Table 8:

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### Budgetary benefits

**Appendix 6: Budgetary Benefits: Different scenarios**

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<tr>
<td>4% :All productive</td>
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<td>1</td>
<td>1</td>
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</table>
A) Evidence

**Upper bound**

- CZ: 0.56
- EE: 0.28
- LV: 0.4
- LT: 0.38
- HU: 0.35
- PL: 0.3
- SI: 0.25
- SK: 0.2

**Lower bound**

- CZ: -0.142
- EE: -0.14
- LV: -0.138
- LT: -0.136
- HU: -0.134
- PL: -0.132
- SI: -0.13
- SK: -0.128

**All productive**

- CZ: 0.45
- EE: 0.4
- LV: 0.35
- LT: 0.3
- HU: 0.25
- PL: 0.2
- SI: 0.15
- SK: 0.1

**0/1 approach a)**

- CZ: 0.2
- EE: 0.15
- LV: 0.1
- LT: 0.05
- HU: 0
- PL: -0.05
- SI: -0.1
- SK: -0.15

**0/1 approach b)**

- CZ: 0.3
- EE: 0.25
- LV: 0.2
- LT: 0.15
- HU: 0.1
- PL: 0.05
- SI: 0
- SK: 0

**0,8;0,4;0,6**

- CZ: 0.25
- EE: 0.2
- LV: 0.15
- LT: 0.1
- HU: 0.05
- PL: 0
- SI: 0
- SK: 0
B) Appropriations 4% of GDP: Share of productive spending on the total = 1

4% GDP: Upper: 1

4% GDP: Lower bound: 1

4% GDP: All productive: 1

4% GDP: 0/1 approach a): 1
C) Appropriations 4% of GDP: Real share of productive spending on the total
Akademický rok 2008/2009

TEZE BAKALÁŘSKÉ PRÁCE

Student: Lucie Kraicová
Obor: Ekonomická teorie
Konzultant: PhDr. Martin Gregor PhD

Garant studijního programu Vám dle zákona č. 111/1998 Sb. o vysokých školách a Studijního a zkušebního řádu UK v Praze určuje následující bakalářskou práci

Předpokládaný název BP:
Distribution of Enlargement Benefits among the EU New Member States

Charakteristika tématu, současný stav poznání, případné zvláštní metody zpracování tématu:
The purpose of the study is to find economic and political determinants of the distribution of budgetary and non-budgetary benefits of EU enlargement for the new member states entering the EU in the year 2004. The thesis will apply these determinants on the states that have been recognized as candidate countries for future enlargement (e.g., Croatia, Macedonia, and Turkey).

Struktura BP:

Osnova
- Introduction
- Benefits of the EU membership
- The ratio of budgetary and non-budgetary benefits
- Determinants of the distribution of these benefits among the new member states of the EU
- Possibility to predict the amount and structure of benefits
- Possibility to use these predictions in the pre-enlargement negotiations
- Conclusion
Seznam základních pramenů a odborné literatury:


European Central Bank: http://www.ecb.int
Eurostat: http://epp.eurostat.ec.europa.eu

Datum zadání: červen 2009
Termín odevzdání: červen 2010

Podpisy konzultanta a studenta:

V Praze dne 8. června 2009

S předloženou tezí souhlasím. Martin Gregor v.r.