Academic year 2015-2016

**Erasmus Mundus Joint Master Degree
in Economics of Globalisation
and European Integration**

The economic benefits of EU membership: an empirical analysis

Master dissertation

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Submission date	September 2016

Acknowledgments

I would like to express my sincerest thanks Prof. Marcel Bluhm to for his guidance, support, patience and valuable recommendations.

Declaration of authorship

I, Anna Zhitina, hereby declare that the thesis "The economic benefits of EU membership: an empirical analysis" was written by myself, and that all presented results are my own, unless stated otherwise. The literature sources are listed in the References section.

Prague, September 2016 ....

Signature

Abstract:

This master thesis is devoted to the empirical analysis of the economic benefits of EU membership. The analysis aims to investigate what is the impact of EU membership on growth of the real GDP (in constant prices), unemployment rate and inflation rate for 16 states entering EU after the year 1995 (analysed period of years is 1991-2014). The applied method for evaluation in the current work is econometric analysis of panel data. The first part of the thesis is devoted to the literature review. The second part is describing data and variables that will be used for analysis, development of these variables over the time and stationary testing. The third part is dedicated to the regression analysis and includes models for GDP growth, unemployment growth and inflation. The last part of this master thesis will sum up the results and findings of previous parts.

The main source for the data used in this work is the statistical database of World Bank (2016).

Key words:

List of abbreviations

CPI	Corruption Perception Index
EU	The European Union
GDP	Gross Domestic Product
FDI	Federal Direct Investments
NMS	New Member States
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Square
UK	The United Kingdom
US	The United States

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Introduction

This master thesis is devoted to the empirical analysis of the economic benefits of EU membership. Debates about benefits, especially economic benefits, of European Union membership have begun long time ago and still remains the order of the day. Even though perception of the economic and employment situation have improved, the majority of European citizens are not positive about these aspects both on national and European level (European Commission, 2014, p.26). Other people think that despite there are some problems, the EU is a big economic success story and a perfect example how former enemies are working together, a guarantor of peaceful atmosphere and can make every member state to be heard on the international trade arena (Debating Europe, 2016). But at the same time the Eurozone debt crisis, migration and refugee problems, actual UK referendum and following perspective of leaving EU, lost of sovereignty for member states - made the question of EU membership benefits even more discussible and future of EU more uncertain.

According to the latest European Commission Press release growth in the euro zone is expected to increase by 0.1% (from 1.6% last year to 1.7% this year) with the prediction to be 1.9% in 2017 (Brussels, 2016). As for economic growth of the whole European Union – the predicted value is going to be 0.1% for the next year. But is it enough to reestablish the reputation of EU as a strong economic union that brings its' member states unique benefits? The current master thesis tries to answer some of the questions related to this problematic issue, analyzing sixteen European member states (1995, 2004, 2007 and 2013 enlargements) and five non-European states during the period of 1991-2014. The main reason for working on this topic is current contradictory of European Union and more than ever-intense debates about stay or leaving the EU.

These particular countries were chosen because it can be interesting to observe what was an impact of EU membership on the new member states. Moreover, especially these new members were affected most of all by global financial crisis that took place just a few years after the biggest enlargement in the EU history. The Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovenia, Slovak Republic, Romania, Bulgaria were among those who suffered in the first place (E. Terazi, S. Senel, p.186). Therefore, the research question of this master thesis is to assess the economic benefits of EU membership for 1995, 2004, 2007 and 2014 enlargements, compare particular EU members with a non-EU group of states and period before the entrance and observe the differences between them. Applied method for assessment is econometric analysis of panel data.

The current work is dedicated mainly to the empirical research and will be divided into several parts. The first part is devoted to the literature review. Few reports and empirical papers that have studied economic situation in European Union, its influence on member states will be presented in order to give a brief image about investigating topic. The second part is describing data and variables that will be used for analysis, development of these variables over the time and stationary testing. The third part is dedicated to the regression analysis and includes models for GDP growth, unemployment growth and inflation. The last part of this master thesis will sum up the results and findings of previous parts.

The main source for the data used in this work is the statistical database of World Bank (2016). The data includes GDP growth, unemployment, inflation, general government final consumption expenditure, exports of goods and services, foreign direct investment net inflows, merchandise trade, labor force with tertiary education. Corruption perception index and index of investment freedom were included as well for more diversified analysis.

1 Literature review

One of the most famous papers about benefits of EU membership is a discussion paper by N. F. Campos, F. Coricelli and L. Moretti (2014)[1]. The paper investigates countries that became a part of the European Union in the 1973, 1980s, 1995 and 2004 enlargement (excluding Malta and Cyprus because of the size; Bulgaria and Romania because of the short post-EU membership period). The GDP per capita level and labor productivity was chosen as two main estimates, which show what are the economic benefits from becoming a part of economic and political integration. With a help of Synthetic Counterfactuals Method it was compared what are the effects of joining EU and what would be the level of two estimates mentioned above, if the countries had not joint the European Union (N. F. Campos, 2014).

The paper claims that evidences and previous empirical researches of EU membership benefits are not fully sufficient. The study tries to fill this gap, answering mainly the following question: What would have been the current levels of per capita GDP and labour productivity in investigated countries had they not become full-fledged EU members?" (N. F. Campos, p.3).
After an empirical analysis, the positive effect of deep integration for all investigated countries except Greece was founded. According to N.F. Campos, F.Coricelli and L. Moretti per capita income would have been on average 12 per cent lower if countries had not became a part of the European Union. As for Greece, its' per capita GDP is expected to have higher level in case Greece would not have joined EU in 1981. Also, trade openness mentioned as one of the most important factor why countries benefit from EU membership. The biggest effect it has on the countries that entered EU in 2004 year.
Few more econometric methods were used in this paper in order to control the results and possibility of "anticipation effects": robustness test, difference-in-difference models.
It is worth mentioning, that according to the study "trade openness, financial integration and the adoption of Euro are the main factors that help understand the variations of benefits from EU membership across countries and over time" (N.F. Campos, p.23).
Also, in the end of the empirical paper authors give a few possible directions for the further research, which can be interesting for someone who is looking for an inspiration in this field.

Another interesting study that can shed light on the economic situation in the EU is a European Commission report *"Five years of an enlarged EU. Economic achievements and challenged" (2009).* It is provided vast information on the biggest enlargement in a history, focusing on 2004 to 2008 time period and compares it to the previous five years. Export and

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[1] *"Economic Growth and Political Integration: Estimating the Benefits from Membership in the European Union Using the Synthetic Counterfactuals Method"*

investment opportunities contribute to the economic growth and higher level of life in the new Member States according to this study. Rapid productivity growth, lower level of unemployment and fast income convergence are among benefits, which can get country after entering EU. European Union as a whole is better prepared to face some problems after these enlargements as well (European Commission, 2009).

According to the report income per capita rose from 40% of the old Member States' average in 1999 to 52% in 2008. The positive effect on economic growth was notices both for new and old Member States. For new Member States by 1,75 percentage points increase per year during 2000-2008. Average increase in 1999-2003 was 2,5%, in 2004-2008 counts to 5,5%. Average GDP share of exports and imports is 56% comparing to the 47% before the enlargement (for new Member States). As for old Member States the value is 38% (European Commission, p. 3). Modernization of economy is another benefit of EU membership. The share of services in GDP grew: in 1995 it counts to 56%, while in 2006 it is 63% (for old Member States is 72% of GDP) (European Commission, 2009, p.4). Among benefits for old Member States can be mentioned that with an enlargements appear new investment opportunities, which can raise global competitiveness through new markets for export and foreign investments. Without doubts, global economic crisis influence EU and especially euro zone and some efforts are made to protect achievements from previous enlargements. In the current master thesis the period of crisis included as well, so it will be seen what are the results for a particular group of states during that hard time.

Increasing level of total transfers from EU budget to the new Member Sates was expected (from 2% of GDP in 2007 to 3% by 2013) (European Commission, 2009, p. 7-8).

A comprehensive table is presented in this report on p.27 with a data on population, GDP current, GDP per capita, Gini coefficient, FDI inflows and Stock market capitalization for EU-27 and few countries for comparison: US, Japan, China, India, world (year 2007). It is interesting to notice, that current GDP was 12243,1 billions EUR, which is 30,8 percent of world GDP. GDP per capita was 24810 that is the third best value after US and Japan. Besides, foreign direct investment inflows account almost half of the world value (46,6% for EU-27). Comparing this values to the world significant economies such as US, Japan, China and India it can be said, that EU-27 is an important and competitive player on the world stage (European Commission, 2009, p.27).

Table 1 The enlarged EU in the global economy, 2007

	EU-27	NMS	US	Japan	China	India	world
Population, million	494	103	302	127	1 320	1 123	6 612
average % change, 2000-2007	0.4	-0.3	1.0	0.1	0.6	1.4	1.2
% of world total, 2007	7.5	1.6	4.6	1.9	20.0	17.0	100
million, 2050	479	82	402	103	1 409	1 658	9 191
% of world total, 2050	5.2	0.9	4.4	1.1	15.3	18.0	100
GDP current, billion EUR	12 243.1	852.8	10 093.5	3 198.6	2 397.1	855.8	39 717.9
% of world, current	30.8	2.1	25.4	8.1	6.0	2.2	100
% of world, PPS	22.2	2.6	21.1	6.5	10.8	4.7	100
GDP/capita in EUR	24 810	8 330	33 464	25 034	1 816	762	6 007
in PPS, average % change 2000-2007	2.5	6.2	1.5	2.1	11.2	7.7	2.6
real GDP, average % change 2000-2007	2.1	4.7	2.4	1.5	10.2	7.6	3.1
Gini coefficient	0.3	0.3	0.4	0.3	0.5	0.4	:
Share of world imports (excluding intra-EU)	18.0	1.6	18.6	5.6	8.8	2.2	100
Share of world exports (excluding intra-EU)	16.8	1.2	11.5	7.0	12.0	1.5	100
FDI inflows, % of world total	46.4	4.5	13.4	:	5.8	:	100
excluding intra-EU	19.0	:	20.0	:	9.0	:	100
Stock market capitalisation (% of GDP)	86.8	:	132.6	92.0	:	:	:
Stock trade (% of GDP)	160.8	17.1	308.5	148.4	237.5	94.6	181.8

Source: World Bank (World Development Indicators), Commission services (AMECO), Eurostat

Source: European Commission, 2009

Not only new Member States benefit after entering EU, but old Members who have higher FDI, a lot of trade operations with new Members can benefit in terms of their real per capita GDP growth rates (European Commission, 2009, p 39). Overall, due to the 2004 enlargements trade for old Member States grew by 6% and by 12% for the new Member Sates compared to the previous five-year period according to this report.

To sum up, it can be said that there are some achievements for European Union thanks to the new enlargements, both new and old Member States benefit, but there are some challenges as well. Income convergence, fully transposed EU legislation into national legislation - are mentioned among future goals.

Interesting results presents paper *"Does the Euro enhance Economic Growth? EU and EZ Growth Effects following the Introduction of the Euro" (2016)* by J. K. Dreyer and P. A. Schmid. Authors investigated 28 EU member states and EFTA countries (Iceland, Norway, Switzerland) during the 1999-2012 time period "applying an augmented Solow growth model using convergence analysis and the panel Generalized Method of Moments" (J. K. Dreyer, P. A. Schmid, 2016, p. 72). The positive effect of EU membership was founded, but as for Euro-zone membership results are different. During the financial crises in the 2007-2012 countries, which are members of Euro zone presented worse results than other EU members, but as explained later - the results depend on the way we look at the crisis (endogenous or exogenous variable of the EZ) (J.K. Dreyer, P. A. Schmid, 2016, p. 81). The negative relation between per

capita income and growth was founded. At the same time the more country is open to trade, the higher growth is expected in the future according to the authors.

The aim of the paper *"Growth Effect of Economic Integration"(2001)* by H. Baldinger is to answer the question "Has economic integration caused the EU's postwar economic growth'? To answer this question author investigates two hypothesis: permanent and only temporary growth effect on economic integration, taking into account increase level of efficiency and increase in factor accumulation. After an empirical analysis authors answered the question positively. Comparing to the previous study (Henrekson et al., 1997) H. Baldinger didn't find permanent growth effects of integration (H. Baldinger, 2001). But what he found is that due to the integration that had been in the year 1950 GDP per capita of the EU is about fifth higher today. Besides, average annual growth rate for the 1950-2000 time period would have been lower by 0,4 percentage point in case if EU integration didn't take place (H. Baldinger, 2001, p.26-27). Higher level of efficiency (technology-led growth) is mentioned as a main reason (70 to 90 percent) and integration induced investment led growth has a smaller share (H. Baldinger, 2001). One of the questions author asked in the end is whether small countries benefits more from integration or in other words if the effect is asymmetric. Following studies pay attention on this question as well.

J.K. Dreyer and P.A. Schmid argue that during the first 14 years of the Euro, poorer countries have been "catching up" with the richer ones. (J. K. Dreyer, 2016, p.81). Also there is an opinion that poorer countries benefits more from integration and richer countries have rather small gains from being a part of EU. In general it is easier to imagine why, for instance, Bulgaria and Croatia benefits a lot from joining EU, but it can be more difficult to find arguments for UK or Sweden (J. K. Dreyer, 2016). An article *"The eye, the needle and the camel: Rich countries can benefit from EU membership" (2016)* tries to answer this question. Author based on several studies claims that both types of countries benefit, but in a different ways. Richer countries have bigger gains in terms of per capita income, while pooper countries rather in terms of productivity.

Overall, it could be said that different researcheres have studied question of economic growth in EU, asking do countries benefit after becoming a part of European Union or not. Even though methods and numbers are differ, the answer in most cases is positive. According to the report of European Commission it was predicted an additional growth of 1.3/2.1% per year for the new Member States and a cumulative 0.5/0.7% growth for the old Member States (European Commission, 2001, p.30). In the paper by M. Henrekson, J. Torstensson and R. Torstensson *"Growth effect of European integration"* was mentioned 0,6 to 0,8 percentage

points p.a. growth effect (M.Henrekson, 1997, p. 1539). Next study which is worth mentioning is a paper by Andrea Boltho and Barry Eichengreen *"The economic impact of European integration"* (May, 2008). According to the result of this study the European Union GDP now is approximately 5 percent higher than it would be without integration (A. Boltho and B. Eichengreen, p.42). The same results has H. Baldinger in the paper *"Growth Effect of Economic Integration"(2001)*: "GDP per capita of the EU would be approximately one fifth lower today, if no economic integration had taken place since 1950." (H. Baldinger, 2001, p. 4). J.K. Dreyer and P.A. Schmid have found a positive effect of EU integration in their paper as well, but at the same time the effect of Euro-zone is considered as neutral during the first 14 years of the Euro (from 1999 to 2012).

2. Empirical part

The empirical analysis aims to investigate what is the impact of EU membership on growth of the real GDP (in constant prices), unemployment rate and inflation rate for 16 states entering EU after the year 1995 (analysed period of years is 1991-2014). The applied method for evaluation in the current work is econometric analysis of panel data.

In the following analysis are defined two groups of states: «EU member states» and the «Control Group» of non-EU states.

The first one includes sixteen countries that are current members of European Union, in other words: states that joined EU in the 1995, 2004, 2007 and 2013 enlargements. Time period is restricted to 1995-2014 for this group of states in order to investigate what is the level of studied variables after economic integration. It is important to underline, that each country was added to the "EU member states" group in a different moment, depending on the year, when it entered EU (for Austria, Finland and Sweden it is 1995 year, for Bulgaria and Romania - 2007, Croatia - 2013, etc.).

The "Control Group" includes five states, which were never part of the EU: Albania, Iceland, Macedonia, Norway, Switzerland and sixteen EU members before they had joined the European Union. Time period for the states in Control Group differs for every state as well. For five non-EU states it is 1991-2014 years, for the rest of the group it is the last year of its existence outside EU (1994 for Austria, Finland and Sweden, 2006 for Bulgaria and Romania, etc.).

From econometric point of view each state was assigned a value either 0 or 1 depending on its presence in the EU: 0 - if it not a member of EU and 1 - if it is in a relevant year. In other words: the group "EU membership states" contains all states with a 1 value and "Control group"

with a 0 value.

The aim of such distinguishing is to compare the level of GDP growth, Unemployment and Inflation in case of EU membership and without it.

Five non-EU states that were added to Control Group were chosen based on the similarities in size, basic macroeconomic indicators, social and political features. Unfortunately, because of the weak of data it was problematic to include more countries or bigger time period into current master thesis.

2.1 Data

In the data section variables used in the empirical analysis will be introduced as well as their sources and descriptive statistics. Variables used in this master thesis are supposed to represent economic situation in the sixteen EU countries and five non-EU countries during the 1991-2014 time period and were collected from different sources. Dependent and Independent variables are presented in the table below

Table 2 Variables for analysis

Dependent variables	*GDP_GROWTH* *UNEMPLOYMENT_TOTAL,* *INFLATION_GDP_DEFLATOR*
Independent variables	*CPI_INDEX* *EURO_ADOPTION* *EXPORTS_ANNUAL_GROWTH,* *FDI_NET_INFLOWS_SHARE_GDP,* *GOVERNMENT_EXPENDITURES,* *INFLATION_GDP_DEFLATOR,* *INVESTMENT_FREEDOM,* *MERCHANDISE_TRADE,* *TERTIARY_EDUCATION,* *UNEMPLOYMENT_TOTAL*

Source: Own elaboration

In the end of this part, there will be presented tests for stationarity of the variables in order to confirm, that econometric estimates are based on the stationary variables.

2.2 Dependent variables

One of the main inspected variables is *GDP_GROWTH,* which was obtained mainly from the World Bank database (2016). Unfortunately there were no full data in the World Bank database, that's why the other sources were used as well in order to get the more comprehensive data file and more accurate empirical results in the end. Among these sources were: report "EESTI ENERGEIKA 1991-2000", where values for *GDP_GROWTH* for Estonia from the 1991 to 1995 years were founded and UN Database for the rest of the data.

The variable *GDP_GROWTH* represents annual growth rate of Gross Domestic Product at market prices based on constant local currency in the constant 2010 U.S. dollars (WorldBank, 2016). Taking into account previous studies, it is expected to find the positive relationship between GDP growth and EU membership, which was extensively investigated in the literature. On average, GDP growth level in investigated EU countries during the analyzed period was 2.39% (median 2.78%) as presented in Table 3, in non-EU countries 2.06% (median 3.144%, Table 4). It can be said that EU countries have higher level of growth comparing to the non-EU states and period before the entrance.

UNEMPLOYMENT_TOTAL variable presents the share of the labor force that is without work but available for labor and seeking employment in a recent past period. Data were obtained by International Labor Organisation (WorldBank, 2016). For the purposes of this master thesis data were collected from World Bank database (2016). According to the results of previous empirical papers that investigate unemployment in EU, I assume the negative impact of EU on the level of unemployment, because the more country is open and integrated the easier it can be for labor force to find work (less bariers, less bureaucracy, more opportunities). Another reason could be that globalization increase demand for different types of labor and skills, so more peoples can find an employment. Average unemployment rate in sixteen EU countries is 8.62% (median 7.75%) and in non-EU 10.19% (median 8.1%) as can be seen in Table 3 and 4. It could be said, that on average EU countries is better off in terms of unemployment rate after the EU admission.

INFLATION_GDP_DEFLATOR variable depicts the rate of price change in the economy as a whole and measured by the annual growth rate of the GDP implicit deflator. The GDP implicit deflator is the ration of GDP in current local currency to GDP in constant local currency (WorldBank, 2016). Data for this outcome variable were collected from World Bank database as well as for previous two outcome variables. The theoretical assumption for the empirical model is that the EU membership will have a negative impact on inflation rate. Average inflation rate is 2.8% for investigated EU countries (median 2.12%) and 23.33% for non-EU members. The

reason for such a big difference can be found in the composition of the control group. Macedonia had an incredibly high level of inflation in the year 1992 (1271%) and Bulgaria in the year 1997 presented the value 958%. Both these values were included to the Control Group and apparently affected results of the descriptive statistics a lot, which makes it difficult for comparison.

Table 3 Descriptive statistics, EU states

EU MEMBERS	Mean	Median	Max	Min	Observations
GDP_GROWTH	2.389751	2.778650	11.90219	-14.81416	188
INFLATION_GDP_DEFLATOR	2.801310	2.118584	20.12795	-9.685556	187
UNEMPLOYMENT_GROWTH	-0.061702	-0.200000	9.700000	-4.400000	188
UNEMPLOYMENT_TOTAL	8.618617	7.750000	19.00000	3.500000	188

Source: Own elaboration

Table 4 Discriptive statistics, non-EU states

NON EU MEMBERS	Mean	Median	Maximum	Minimum	Observations
GDP_GROWTH	2.059274	3.144980	13.50117	-29.58900	316
INFLATION_GDP_DEFLATOR	23.33289	4.169214	1271.769	-5.204966	288
UNEMPLOYMENT_GROWTH	0.100000	0.000000	7.599999	-6.200000	273
UNEMPLOYMENT_TOTAL	10.18915	8.100000	37.30000	1.500000	295

Source: Own elaboration

2.3 Independent variables

All other variables except The Index of Investment Freedom and Corruption Perception Index were collected from the World Bank Database (2016): *General government final consumption expenditure (% of GDP), Exports of goods and services (annual %), Foreign direct investment net inflows (% of GDP), Merchandise trade (% of GDP), Labor force with tertiary education (% of total).*

GOVERNMENT_EXPENDITURES variable depicts general government final consumption expenditure and composed of all government current expenditures for purchases of goods and services, on national defense and security. At the same time it excludes government military expenditures, which are part of government capital formation (WorldBank, 2016). Basically this variable shows how much is government involved in providing goods and services for the direct needs of its citizens.

EXPORTS_ANNUAL_GROWTH depicts annual growth rate of exports of good and services based on constant local currency. Aggregates are based on constant 2010 US dollars. This variable shows the value of all goods and other market services that transferred to the rest of the world, but doesn't include compensation of employees and investment income and

transfer payments (WorldBank, 2016). Source of the data for both variables are World Bank national accounts data and OECD National Accounts data files. For the purposes of this thesis data were collected form the World Bank database (2016).

On average *government expenditures* were higher in EU member states than in non-EU (19,7% and 18,5% respectively) during investigated time period. In general, the higher value of GOVERNMENT_EXPENDITURES variable is expected in more developed and welfare states and the result mentioned before can be taken as anticipated.

As for *annual growth rate of exports* it could be said that on average its value is 6.48% for EU countries. Comparing to the group of presented non-EU states and period before the entrance it is more than three times lower (for non-EU states the value is 19.33%). According to the Eurostat (2014, 2016) export of goods and services plays a very important role for country's welfare, being a significant factor of economic growth for dynamic countries. It was a reason why this variable was included to the needs of empirical analysis in the current master thesis.

FDI_NET_INFLOWS_SHARE_GDP represents the net inflow of investment to achieve a long-term management interest in an enterprise operating in an economy other than that of the investor (WorldBank, 2016). According to the definition of IMF's Balance of Payments Manual (1993), which is accepted in international area, the components of FDI are: equity capital, reinvestment of earnings, short- and long-term inter-company loans between parent firms and foreign affiliates (United Nations, 2016). The data were collected thanks to the International Monetary Fund, International Financial Statistics and Balance of Payments databases, International Debt Statistics, World Bank and OECD GDP estimates. Unit of measurement is percentage.

This variable is important in terms of the exploring the single market, openness and competitiveness of the EU, which makes it logical to include into current analysis. According to the Table 5 an average FDI net inflows growth for the sixteen examined EU countries is negative during investigated period (-0.19%), which can be a sign of deteriorating investment situation. For non-EU group of states the value is positive (0.3%). The results can be surprising, because after accession EU it is assumed FDI level for the new Member-States to be higher or growth rate to be positive. Moreover, big capital inflows into the new EU member states are in line with the neoclassical growth model. But the results of descriptive statistics development show the opposite situation. The reason for this can be found in the financial crisis, when countries experienced large capital flow reversals, which definitely can affect outputs of the present analysis. Besides, some studies also expressed doubts regarding the massive foreign capital inflows even before crisis (Lane and Milesi-Ferretti, 2007). Economic paper *"Determinants of Capital Flows to the New EU Member States Before and During the Financial Crises"* confirms

the influence of world crises on the net Foreign Direct Investments into the new Member States (A. Jevčák, R. Setzer, M. Suardi, 2010).

MERCHANDISE_TRADE is presented as s share of Gross Domestic Product and depicts the sum of merchandise export and imports divided by the value of GDP (WorldBank, 2016). All data are shown in current U.S. dollars and were collected from the World Bank database (2016), which used the World Trade Organization and World Bank GDP estimates. According to the descriptive statistics in the Table 5 *Merchandise trade (% of GDP)* growth was higher for EU member states that for non-EU (2.03% and 1.11% respectively).

TERTIARY_EDUCATION represents the labor force with tertiary education. In this study it is presented as the share of the total labor force whose highest level of attained or completed education is a tertiary one (WorldBank, 2016).

Data for *The Index of Investment Freedom* were collected from Heritage Foundation database (2016). This index investigates how much country restricts investment activities, whether it has barriers to access foreign exchange, payments, transfers, capital transactions, if all industries are free to enter or not (Heritage Foundation, 2016). From methodological point of view it should be mentioned that the higher score of this index, the more economically free country is, which means that there are less constraints on the investment capital flows and "individuals and firms would be allowed to move their resources into and out of specific activities, both internally and across the country's borders, without restriction" (Heritage Foundation, 2016). The points for each country are subtracted or augmented for the following six categories: national treatment of foreign investment, bureaucracy, restrictions on land ownership, sectoral investment restrictions, expropriation of investments without fair compensation, foreign exchange and capital controls (Heritage Foundation, 2016).

Based on the description of the index and on previous research I assume that EU membership has a positive impact on the Index of Investment Freedom. From the Table 5 it can be seen that average Index of Investment Freedom growth is 1.98 points for EU countries and 1.19 points for non-EU. It means that EU Member States represent higher level of investment freedom growth, which makes this group of countries economically more open with less barriers and restrictions, more attractive for trade.

Table 5 Descriptive statistics, independent variables

EU MEMBERS	EU		Non-EU	
	Mean	Median	Mean	Median
CPI_GROWTH	1.390319	0.000000	1.141131	0.000000
CPI_INDEX	6.321702	5.800000	5.578655	4.600000
CRISIS	0.239362	0.000000	0.056962	0.000000
EU_MEMBERSHIP	1.000000	1.000000	0.000000	0.000000
EURO_ADOPTION	0.345745	0.000000	0.000000	0.000000
EXPORTS_ANNUAL_GROWTH	6.477560	6.573983	19.33101	13.72000
FDI_GROWTH	-0.190706	-0.100288	0.300929	0.251685
FDI_NET_INFLOWS_SHARE_GDP	8.199276	3.838349	3.969775	2.882118
GDP_GROWTH	2.389751	2.778650	2.059274	3.144980
GOV_EXP_GROWTH	-0.077544	-0.117218	-0.128557	-0.097605
GOVERNMENT_EXPENDITURES_	19.74230	19.32281	18.59930	19.34457
INFLATION_GDP_DEFLATOR	2.801310	2.118584	23.33289	4.169214
INVESTMENT_FREEDOM	71.92513	70.00000	64.27885	70.00000
INVESTMENT_FREEDOM_GROWT	1.979235	0.000000	1.180971	0.000000
MERCHANDISE_TRADE	91.93252	82.64758	68.86236	61.32166
MERCHANDISE_TRADE_GROWTH	2.026200	1.933907	1.107726	0.968281
TERTIARY_EDUCATION	25.54628	25.10000	21.09455	19.05000
TERTIARY_EDUCATION_GROWT	0.968817	0.900000	0.167836	0.500000
UNEMPLOYMENT_GROWTH	-0.061702	-0.200000	0.100000	0.000000
UNEMPLOYMENT_TOTAL	8.618617	7.750000	10.18915	8.100000

Source: Own elaboration

Corruption Perception Index was collected from the web of Transparency International. It displays the perceived level of public sector corruption in different countries based on the views of people from business and analytic area, opinion of experts are taking into account as well. Data used in CPI had to be from credible institutions and repeat regularly, based on reliable and valid methodology (Transperency International, 2016).

Until the year 2012 scale is presented as 0-10 range, where 0 is the highest level of perceived corruption and 10 is the lowest level of perceived corruption. From the year 2012 the scale is given as 0-100 range, but the principle remains the same – the higher the score, the lower is expected corruption level. For the purposes of this master thesis is used 0-10 scale during all time period (after the year 2012 the score is divided by 10 in order to get the same scale). I assume that after EU membership countries will have higher level of this index, which means that the level of expected corruption is lower. Average score of CPI index is represented in the Table 5 and counts to 6,32 and 5.58 for EU member states and non-EU member states respectively. On average Corruption Perception Index growth is lower for non-EU member states than for EU member states in this case (1.39 for EU countries and 1.41 for non-EU). The results can be surprising, expecting higher score of CPI for EU member states. But according to the *Caccilia Malmstrom's* (EU Home Affairs Commissioner) report EU is not an exception

when it comes to the corruption problems even thought Member States have a lot of legal instruments and institutions that try to fight and prevent corruption (European Commission, 2014). Moreover on average 76% of EU population think that corruption is widespread in their country. In Greece, Italy, Lithuania, Spain and the Czech Republic the perception of citizens is even worse (above 95% in every state) (European Commission, 2014). Mrs. Malmstrom claims that corruption costs at least 120bn euros for EU and the real costs were probably even higher. Taking into account that a current master thesis was restricted for countries entered EU after 1994 enlargements, which includes Croatia, the Czech Republic, Lithuania, Bulgaria, Romania, Poland, Slovak Republic and Hungary – the descriptive statistics represented in the Table 5 are not unusual. Exactly these countries are among those with higher level of potential bribes: from 6 to 29 percent of respondents confirm that they had been asked for a bribe or expected to pay it during past year (European Commission, 2014, p.6).

At the same time Fabio Mendez and Facundo Sepulveda released a controversial study on this topic: *"Corruption, Growth and Political Regimes: Cross Country Evidence"(2005).* Authors investigated the effects of corruption on long run growth taking into account the level of political freedom in the country. While an overwhelming majority thinks that corruption has a negative impact on economic growth, authors of this paper claims that corruption can be even beneficial when it is not widespread and has a low level of incidence (Sepulveda and Mendez, 2005).

To sum up, it could be said that the question of relationship between EU membership and level of corruption is difficult to answer and problematic for any predictions, but without doubts members of European Union club are affected by this phenomenon as well as the rest of the world.

2.4 Development of variables over the time

Following graphs of outcome variables development over the time present an average values of all states in each group.

Figure 1 Mean of GDP growth

EU member states   Control group
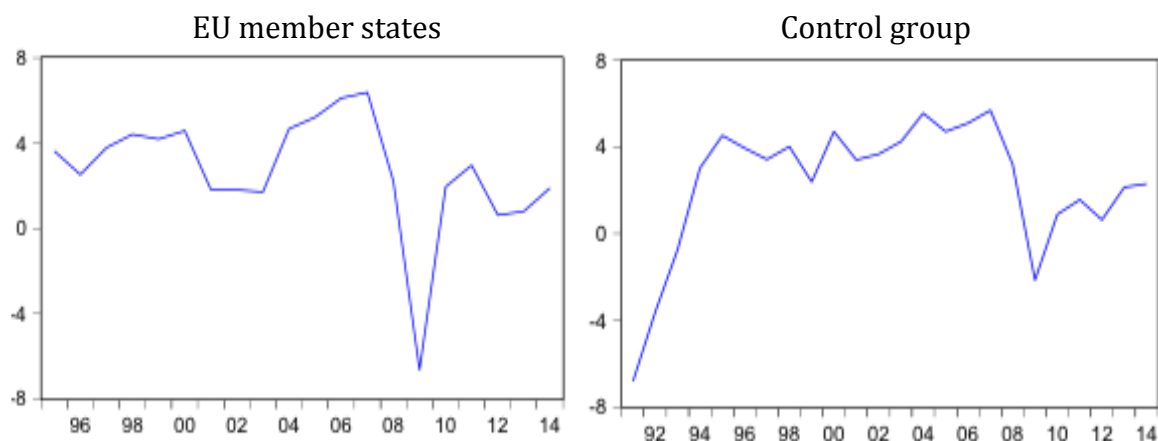
Looking at the development of the GDP_GROWTH variables over the time it could be said that the EU member states were affected more by the crisis in the year 2007. The mean value sharply decreased for both groups (EU states and Control Group), but countries which were already in EU experienced more substantial slump of GDP growth (annual %) from the middle of the year 2007 with the bottom in the middle of 2009. For both groups situation became more stable after the middle of 2010 according to the graphs below. But still economy doesn't reach its' pre-crisis level. As it is mentioned in the European Commission report *"Economic Crisis in Europe: Causes, Consequences and Responses" (2009)* it was the deepest recession of European economy since the 1930s with a decrease in GDP by 4% in 2009. The reason that were introduced in this report are relatively long period of rapid credit growth, low risk premiums, abundant availability of liquidity, strong leveraging, soaring asset prices and the development of bubbles in the real estate sector (European Commission, 2009, p.8).

In case of UNEMPLOYMENT_GROWTH variable we can see an impact of crisis as well. Again group of EU countries represented more noticeable increase during 2007-2010 years comparing to the Control Group. While Control Group experienced rather small increase of UNEMPLOYMENT_GROWTH rate from the middle of 2007 with a peak in the middle of 2009, EU members suffered of a much more significant increase during this period. To be more precisely, slight changes begun in the middle of 2007, but the main increase took place approximately in the middle of 2008. Which is in compliance with a R. Hijman report for Eurostat (2009) that claims that even though the EU as a whole begun to suffer of crisis from the March 2008, there is no identical patter for all member states and turning point for countries differs (R. Hijman, Eurostat, p.3). Most of the countries, which are in the focus of this master thesis (the Czech Republic, Poland, Slovenia, Slovakia, Hungary, Bulgaria) experienced rising of

Unemployment rate in September 2008 according to the R. Hijman's report (Eurostat, 2009. Table1). This confirms the results that we got from analysis.

EU member states   Control group
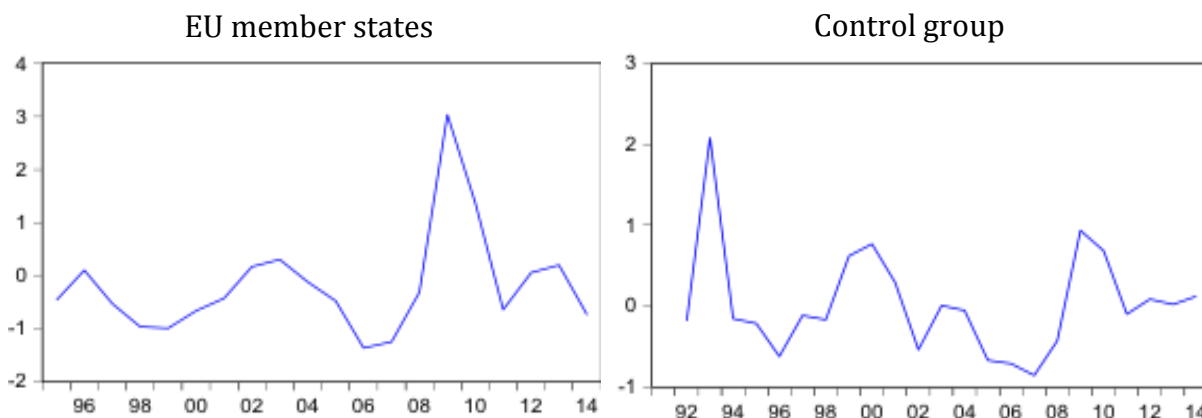
The same as in the situation of *GDP_GROWTH* indicator, UNEMPLOYMENT_GROWTH rate still can't achieve the level it had before the crisis and we can see an impact of the economic crisis on the labor market up to 2014.

Comparing changes in the GDP_GROWTH and UNEMPLOYMENT_GROWTH it can be noticed that crisis influences Gross Domestic Product more than the level of Unemployment. At the same time, on average, EU member states were affected more by economic recession that began in the middle of 2007 year than non-EU states according to the development of these two variables over the time. On the other hand, mean value of *UNEMPLOYMENT_GROWTH* variable for EU member states can be describes as more stable than for non-EU states.

As it was mentioned in the previous part, the *INFLATION_GDP_DEFLATOR* variable performace was affected a lot by two extremly hight values (Macedonia in the year 1997 with a value 1271% and Bulgaria in 1997 year with 958%), which makes it difficult to compare EU member states and non-EU states based on graphs above. But according to the left-side graph that represents EU members, the highest value of inlation was spotted during the crisis time. The same as previous variables Inflation_GDP_deflator was influenced a lot by that fact.

Figure 3 Mean of inflation

EU member states	Control group
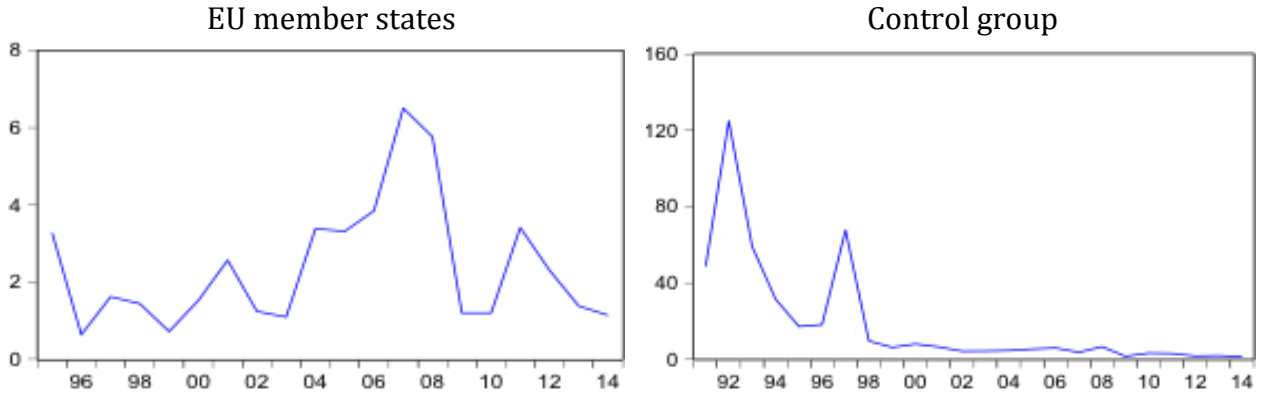
2.5 Stationary testing

We cannot estimate regressions on the non-stationary data. Econometric models based on non-stationary variables are called spurious regressions and may lead to unreliable results, as for example notes Verbeek (Verbeek, 2012). To test stationarity, Levin, Lin and Chu unit root test for panel data was used in the current work. Null hypothesis states non-stationarity, if it is rejected, it is possible to proclaim that the variable is stationary. Testing variables on the level revealed, that several variables are non-stationary. As a remedy, variables was transformed into annual percentage growths which were found to be stationary at least on 10% level of statistical significance as can be seen in the following table.

Table 6 Stationarity

Variable	P-value	Result of the test on 10% level
CPI_INDEX	0.19	Non-stationary
CPI_GROWTH	0.00	Stationary
EXPORTS_ANNUAL_GROWTH	0.00	Stationary
FDI_NET_INFLOWS_SHARE_GDP	0.00	Stationary
FDI_GROWTH	0.00	Stationary
GDP_GROWTH	0.00	Stationary
*GOVERNMENT_EXPENDITURES_*	0.00	Stationary
GOV_EXP_GROWTH	0.00	Stationary
INFLATION_GDP_DEFLATOR	0.00	Stationary
INVESTMENT_FREEDOM	0.85	Non-stationary
INVESTMENT_FREEDOM_GROWT	0.00	Stationary
MERCHANDISE_TRADE	0.12	Non-stationary
MERCHANDISE_TRADE_GROWTH	0.00	Stationary
TERTIARY_EDUCATION	1.00	Non-stationary

TERTIARY_EDUCATION_GROWT	0.03	Stationary
UNEMPLOYMENT_TOTAL	0.00	Stationary
UNEMPLOYMENT_GROWTH	0.00	Stationary

Source: Own elaboration

3. Regression analysis

For econometric estimates on the panel data, it is needed to select the most appropriate technique. The options include Pooled Ordinary Least Squares Model (OLS), Random Effects and Fixed Effects. For states and relatively stable units Wooldridge (2006) suggests to use fixed effects. However, the most suitable is to use diagnostics tests of redundant fixed effects and Hausman test. Following models are estimated on stationary variables. In the current empirical approach three regression models for three outcome variables was estimated in order to evaluate the impact of EU membership. Tested outcomes are: annual growth of GDP per capita, unemployment rate and inflation rate.

These three variables were used because there are three main variables used in macroeconomics. They can also help to characterize an efficiency of the national economy. GDP, Unemployment and Inflation are typically used as the key indicators of the conomic growth and health, being measured in almost every empirical work, which makes it reasonable to include them into current analysis as well.

3.1 Model for GDP Growth

The model is estimated using fixed effects approach. Likelihood ratio test rejected the null hypothesis assuming fixed effects to be zero and confirmed that fixed effects estimation approach is appropriate. The test is depicted below.

Table 7 Redundant fixed effects test, GDP model

Redundant Fixed Effects Tests
Equation: MODEL_GDP
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	5.080606	(20,269)	0.0000
Cross-section Chi-square	96.133385	20	0.0000

Source: Own elaboration

Regression model was estimated with robust standard errors, commonly used as a remedy for violation of econometric assumptions in terms of heteroscedasticity and autocorrelation.

Level of correlation among explanatory variables was measured using test of variance inflation factors (VIF) presented below. The model was found to be statistically significant. All values were lower than ten and that makes all standard econometric assumptions to be fulfilled (Verbeek, 2012).

Table 8 Multicolliearity test, GDP model

Variance Inflation Factors
Date: 08/17/16   Time: 15:16
Sample: 1991 2014
Included observations: 300

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
EU_MEMBERSHIP	0.177419	5.899882	1.261539
EURO_ADOPTION	0.195097	1.957788	1.364575
UNEMPLOYMENT_GR OWTH	0.011049	1.239264	1.234984
FDI_GROWTH	1.78E-05	1.166847	1.143862
GOV_EXP_GROWTH	0.050276	1.837830	1.830548
EXPORTS_ANNUAL_ GROWTH	0.000732	16.08002	2.149588
INVESTMENT_FREED OM_GROWT	0.000190	1.277122	1.224876
CPI_GROWTH	0.000528	1.176584	1.130426
TERTIARY_EDUCATI ON_GROWT	0.008258	1.425635	1.213534
CRISIS	0.166858	1.443264	1.277586
C	0.287987	22.71869	NA

Source: Own elaboration

R-squared informs tells us that the model was able to explain 71 % of the variability of the dependent variable – annual growth of GDP. Estimated model is presented below together with graph of actual and fitted values. Unfortunately, not all variables were found to be statistically significant on at least 10% level of statistical significance. As a statistically significant were found variables representing *EU_MEMBERSHIP, EURO_ADOPTION, UNEMPLOYMENT_GROWTH, GOV_EXP_GROWTH, EXPORTS_ANNUAL_GROWTH* and *CPI_GROWTH*.

Table 9 GDP model

Dependent Variable: *GDP_GROWTH*
Method: Panel Least Squares
Date: 08/17/16   Time: 11:01
Sample (adjusted): 1996 2014
Periods included: 19
Cross-sections included: 21
Total panel (unbalanced) observations: 300
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.

EU_MEMBERSHIP	-1.906178	0.421212	-4.525463	0.0000
EURO_ADOPTION	-1.102027	0.441698	-2.494978	0.0132
UNEMPLOYMENT_GROWTH	-1.134795	0.105115	-10.79574	0.0000
FDI_GROWTH	0.003812	0.004215	0.904456	0.3666
GOV_EXP_GROWTH	-0.892064	0.224223	-3.978469	0.0001
EXPORTS_ANNUAL_GROWTH	0.125269	0.027057	4.629826	0.0000
INVESTMENT_FREEDOM_GROWT	0.019130	0.013770	1.389308	0.1659
CPI_GROWTH	0.042559	0.022970	1.852812	0.0650
TERTIARY_EDUCATION_GROWT	0.145496	0.090876	1.601042	0.1105
CRISIS	-0.672690	0.408482	-1.646805	0.1008
C	2.112393	0.536644	3.936304	0.0001

Effects Specification				

Cross-section fixed (dummy variables)

R-squared	0.707201	Mean dependent var	2.693636
Adjusted R-squared	0.674547	S.D. dependent var	3.758951
S.E. of regression	2.144424	Akaike info criterion	4.461215
Sum squared resid	1237.011	Schwarz criterion	4.843939
Log likelihood	-638.1822	Hannan-Quinn criter.	4.614382
F-statistic	21.65734	Durbin-Watson stat	1.477689
Prob(F-statistic)	0.000000		

Source: Own elaboration

Graph 1 Actual fitted residual, GDP model
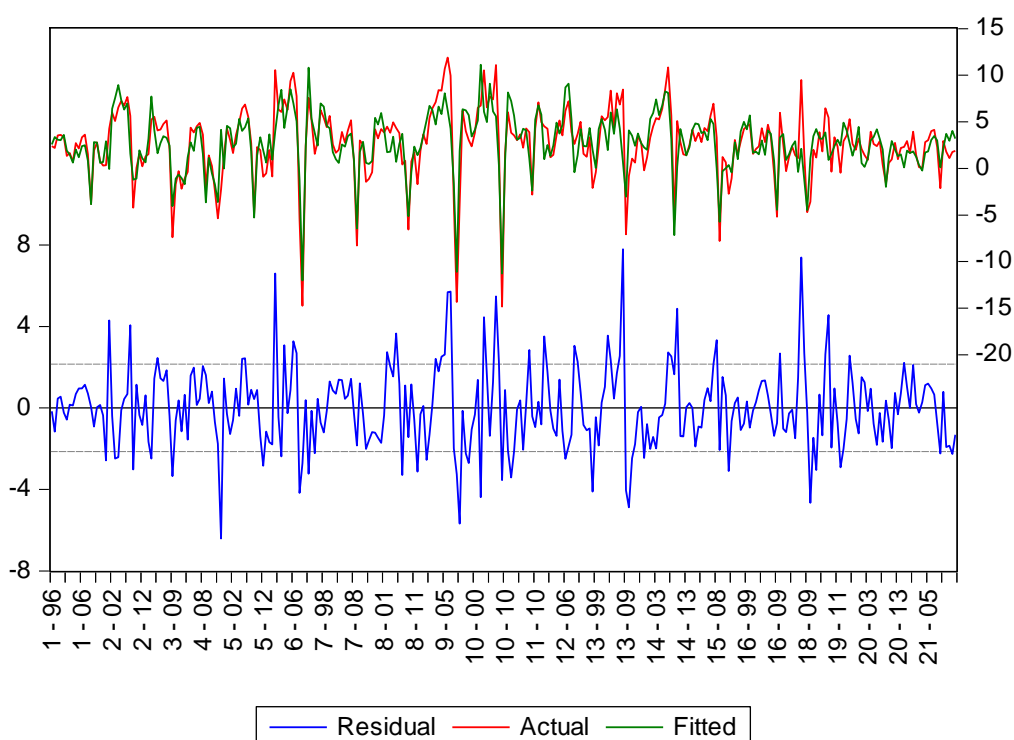
Source: Own elaboration

The most important variable for the analysis is the variable EU_MEMBERSHIP, which tells us that on average, after the EU admission, was growth of GDP lower compared to the non-EU group of states and period before the entrance. Based on the previous scholars, the opposite result was expected, predicting that after joining EU the GDP growth will be higher for EU memebr states, than for non-EU and period befor the entrance. The interpretation for these results can be found in political dimension, bureaucracy, lost of competitiveness that slowdown

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productivity, employment, prosperity and influence on the level of GDP. According to the fact that investigating time period is not so long and economic crisis took place during that time, it can be said that results are acceptable.

Negative influence on the GDP growth, was also found for Euro adoption, growth of unemployment rate and government expenditures.

Trying to explain the negative influence of Euro adoption on the GDP growth, it is necessary to mention that there is a widespread opinion that adoption of European currency will momentarily increase GDP level, eliminate transaction costs and exchange rate risks for the local business, stimulate the inflow of foreign direct investment and brings a lot of economic benefits in terms of international trade. But at the same time such a big change in monetary system brings additional costs for the state in form of adjustment of information system, currency exchange, conversion of prices, dual pricing, personnel training (Suster, 2006, p.3). The negative effect on bank sector after adoption of euro could take place as well. Especially banks that obtain big part of its profit from foreign exchange transactions would be among those who suffer (Suster, 2006). One of the biggest disadvantages of euro adoption that mentioned in most of the studies is the loss of independent monetary policy for a state that changes its local currency into common European. After that state is dependent on the decisions of European Central Bank, which are not always suitable for every local economy. All this reasons could partially explain controversial results of an empirical analysis. Moreover, taking into account that we investigate just a particular group of states and time horizon may not be long enough for these states to recover after changing currency, the negative influence after euro adoption on its gross domestic product can be predictable.

The negative influence of unemployment growth on the GDP growth rate is expected, because usually increase in the unemployment is reflected in a decrease of GDP. Moreover, the results comply with the Okun's law, which empirically prove the relationship between unemployment and country's production level.

The negative influence on GDP growth was founded for government expenditures as well. The relationship between these two indicators is widely discussed in literature, presenting different opinions. The Wagner law claims that if the economy growth, the size of public sector will grow as well. Another author (Richard W. Rahn) proposed an economic theory that investigates the level of government spending, which can maximize economic growth. This theory said that in the beginning the low level of government spending encourage economy to grow, but with rising share of expenditures in economy, the growth began to be slower and

eventually it comes to the point where government spending slow down economic growth.[2] Keynesians are expecting the positive relationship between growth of government expenditures and growth of output. Grier and Tullock (1989) came to the conclusion that the growth rate of real GDP and the share of government spending to GDP have negative relationship. More recent research of Saez and Garcia (2006) has found the opposite results – positive influence of government spending on economic growth, investigating fifteen European Union member states. Current empirical analysis is in contrast with Saez and Garcia (2006) scholar, but it can be said that it is in conformity with the study of Grier and Tullock.

Positive impact on GDP growth was obtained for growth of exports and growth of Corruption Perception Index.

The positive relationship between GDP growth and export growth is predictable, because the more country exports, the more money it brings into the country, which stimulates and increases the GDP level for exporting state. Even classic economists as A. Smith and D. Ricardo claims the importance of international trade and its significant influence on economic growth. This result supports several studies that have investigates the relationship of GDP growth and export growth in different countries. One of them is a scholar of Yuhong Li, Zhongwen Chen and Chandjian San (Modern Economy Journal, 2010), which states that foreign trade has a positive impact on the GDP growth both in short-term and long-term time horizon. This empirical study was focused on east China from 1981 to 2008 time period. Another study is an economic researh by Fouad Abou-Stait from Helwan University, who examined the export-led growth paradigm for Egypt from 1977-2003 year and came to the conclusion that export of goods remains a significant source of economic growth for Egypt as well. A paper *«The Causal Relationship between Exports and Economic Growth in Jordan»* provide support for growth-led export for an investigating country during the period 2000-2012 (Ruba A. Shihab, Thikraiat S. S. Abdul Khaliq, 2001).

All these papers paid its attention on different countries with a very different background, but as we can see that all of them came to the same conclusion, whcih was confirmed by the current thesis as well.

Positive association between GDP growth and Corruption Perception Index was founded druing an analysis. Remebering that the higher CPI index is, the lowel level of perception corruption in the country, it could be said that results are logical. However opinions in the literature about this question differ. Some authors claim that there is a positive effect of corruption on growth, «most likely by allowing people to circumvent inefficient public policies» (J. C. Heckelman, B. Powell, 2008). Other states that a negative correlation among corruption

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[2] The Rahn curve.

level and long-term economic growth takes place (J. Shao, P.Ch. Ivanov, B. Podobnik, H. E. Stanley, 2007). Results of this master thesis state that lower level of perception corruption leads to higher GDP growth, which can be support by the J. Shao (2007), P. Mauro (1995), George T. Abed and Hamid R. Davoodi (2000), V. Tanzi and H. Davoodi (1997), C. Leite and J. Weidmann (1999) studies.

3.2 Model for unemployment growth

The model is estimated using fixed effects approach. Likelihood ratio test rejected the null hypothesis assuming fixed effects to be zero and confirmed that fixed effects estimation approach is appropriate. The test is depicted below.

Table 10 Redundant fixed effects test, unemployment model

Redundant Fixed Effects Tests
Equation: MODEL_UNEMPLOYMENT
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	1.521017	(20,324)	0.0719
Cross-section Chi-square	31.498773	20	0.0489

Source: Own elaboration

Regression model was estimated with robust standard errors, commonly used as a remedy for violation of econometric assumptions in terms of heteroscedasticity and autocorrelation. Level of correlation among explanatory variables was measured using test of variance inflation factors (VIF) presented below. All values were lower than ten and that makes all standard econometric assumptions to be fulfilled (Verbeek, 2012).

Table 11 Multicolliearity test, unemployment model

Variance Inflation Factors
Date: 08/17/16   Time: 15:47
Sample: 1991 2014
Included observations: 351

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
EU_MEMBERSHIP	0.046723	5.543082	1.288977
EURO_ADOPTION	0.058746	1.724872	1.402090
GDP_GROWTH	0.001429	5.999391	1.832667
GOV_EXP_GROWTH	0.011391	1.648515	1.642258
TERTIARY_EDUCATION_GROWT	0.000390	1.074787	1.061707
CRISIS	0.042373	1.524828	1.338212
C	0.042353	11.34944	NA

Source: Own elaboration

R-squared informs us that the model was able to explain 45 % of the variability of the dependent variable – annual growth of unemployment rate. Estimated model is presented below together with graph of actual and fitted values. The model was found to be statistically significant. Unfortunately, not all variables were found to be statistically significant on at least 10% level of statistical significance. As a statistically significant were found variables representing EU_MEMBERSHIP, EURO_ADOPTION, GDP_GROWTH, GOV_EXP_GROWTH, and CRISIS.

Table 12 Unemployment model

Dependent Variable: UNEMPLOYMENT_GROWTH
Method: Panel Least Squares
Date: 08/17/16   Time: 11:00
Sample (adjusted): 1992 2014
Periods included: 23
Cross-sections included: 21
Total panel (unbalanced) observations: 351
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EU_MEMBERSHIP	-0.578793	0.216156	-2.677667	0.0078
EURO_ADOPTION	-0.451424	0.242377	-1.862491	0.0634
GDP_GROWTH	-0.303540	0.037796	-8.030938	0.0000
GOV_EXP_GROWTH	-0.211051	0.106727	-1.977488	0.0488
TERTIARY_EDUCATION_GROWT	-0.002445	0.019757	-0.123734	0.9016
CRISIS	0.597678	0.205846	2.903521	0.0039
C	1.047080	0.205798	5.087912	0.0000

Effects Specification			

Cross-section fixed (dummy variables)

|			
R-squared	0.453407	Mean dependent var	-0.056125
Adjusted R-squared	0.409544	S.D. dependent var	1.644875
S.E. of regression	1.263940	Akaike info criterion	3.380148
Sum squared resid	517.6043	Schwarz criterion	3.677132
Log likelihood	-566.2160	Hannan-Quinn criter.	3.498346
F-statistic	10.33702	Durbin-Watson stat	1.528889
Prob(F-statistic)	0.000000		

Source: Own elaboration

The most important variable for the analysis is the variable EU_MEMBERSHIP which tells us that on average, after the EU admission, was growth of unemployment rate lower compared to the non-EU group of states and period before the entrance. Negative influence on unemployment growth, was also found for Euro adoption, growth of GDP and growth of government expenditures.

Graph 2 Actual fitted residual, unemployment model
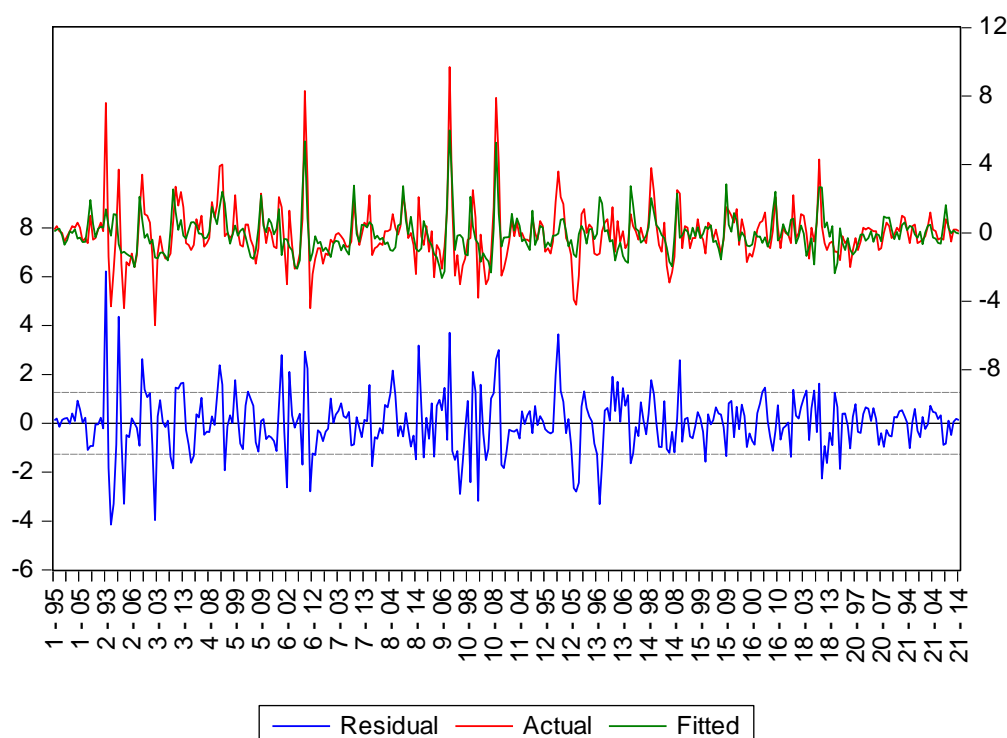
Negative relationship between unemployment growth rate and Euro adoption, which was founded after analysis, is a very discussed question. The European Commission report *«Employment and Social Developments in Europe 2013''* acknowledges that there are some significant problems with unemployment caused by common currency. Euro makes inequality higher and inability to have its local monetary policy has led to "increased unemployment and social hardship" and making its more difficult to react on the economic crises in some member states according to the report (European Commission, 2013).

The recent crisis made gap between rich and poor, North and South even bigger according to the various authors.

Mario Draghi, President of the ECB, in his speach in 2014 recognizes some challenges in the Euro area. He said that the euro zone «has suffered a large negative shock to GDP with a serious consequences for employment». Mr. Draghi mentioned crisis as one of the reasons of increased structural unemployment across the euro zone. Differentiated demand shocks across states and heterogeneity in labor market institutions were refereed as other reasons of worsening situation with unemployment in euro area (M. Draghi, 2014).

Negative influence on unemployment growth was observed for growth of government expenditures. It means that the higher growth of government expenditures is, the lower unemployment growth will be. Similar results was founded by S. Holden and V. Sparrman (*Do government purchases affect umemployment?*, 2016), who investigated 20 OECD countries for

the period 1980-2007 and came to the conclusion that 1 percent increase of GDP is resulted in 0,3 percentage points decrease in unemployment rate in the same year.

3.3 Model for inflation

The model is estimated using fixed effects approach. Likelihood ratio test rejected the null hypothesis assuming fixed effects to be zero and confirmed that fixed effects estimation approach is appropriate. The test is depicted below.

Table 13 Redundant fixed effects test, inflation model

Redundant Fixed Effects Tests
Equation: MODEL_INFLATION
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	1.891599	(20,451)	0.0116
Cross-section Chi-square	38.261962	20	0.0082

Source: Own elaboration

Regression model was estimated with robust standard errors, commonly used as a remedy for violation of econometric assumptions in terms of heteroscedasticity and autocorrelation. Level of correlation among explanatory variables was measured using test of variance inflation factors (VIF) presented below. All values were lower than ten and that makes all standard econometric assumptions to be fulfilled (Verbeek, 2012).

Table 14 Multicolliearity test, inflation model

Variance Inflation Factors
Date: 08/17/16   Time: 16:03
Sample: 1991 2014
Included observations: 475

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
EU_MEMBERSHIP	23.08970	3.805512	1.023509
GDP_GROWTH	2.706027	18.36549	5.273332
CRISIS	93.67832	7.109292	5.292984
C	80.09043	27.24665	NA

Source: Own elaboration

R-squared informs us that the model was able to explain 17 % of the variability of the dependent variable – inflation rate. Estimated model is presented below together with graph of

actual and fitted values. The model was found to be statistically significant and all variables were found to be statistically significant.

Table 15 Inflation model

Dependent Variable: INFLATION_GDP_DEFLATOR
Method: Panel Least Squares
Date: 08/17/16   Time: 11:02
Sample: 1991 2014
Periods included: 24
Cross-sections included: 21
Total panel (unbalanced) observations: 475
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EU_MEMBERSHIP	-13.26725	4.805174	-2.761035	0.0060
GDP_GROWTH	-4.096490	1.645000	-2.490267	0.0131
CRISIS	-23.02414	9.678756	-2.378833	0.0178
C	34.15500	8.949326	3.816488	0.0002

Effects Specification				

Cross-section fixed (dummy variables)

R-squared	0.137883	Mean dependent var	15.24993
Adjusted R-squared	0.093917	S.D. dependent var	79.80456
S.E. of regression	75.96466	Akaike info criterion	11.54762
Sum squared resid	2602554.	Schwarz criterion	11.75798
Log likelihood	-2718.559	Hannan-Quinn criter.	11.63034
F-statistic	3.136136	Durbin-Watson stat	1.611396
Prob(F-statistic)	0.000002		

Source: Own elaboration

Graph 3 Actual fitted residual, inflation model
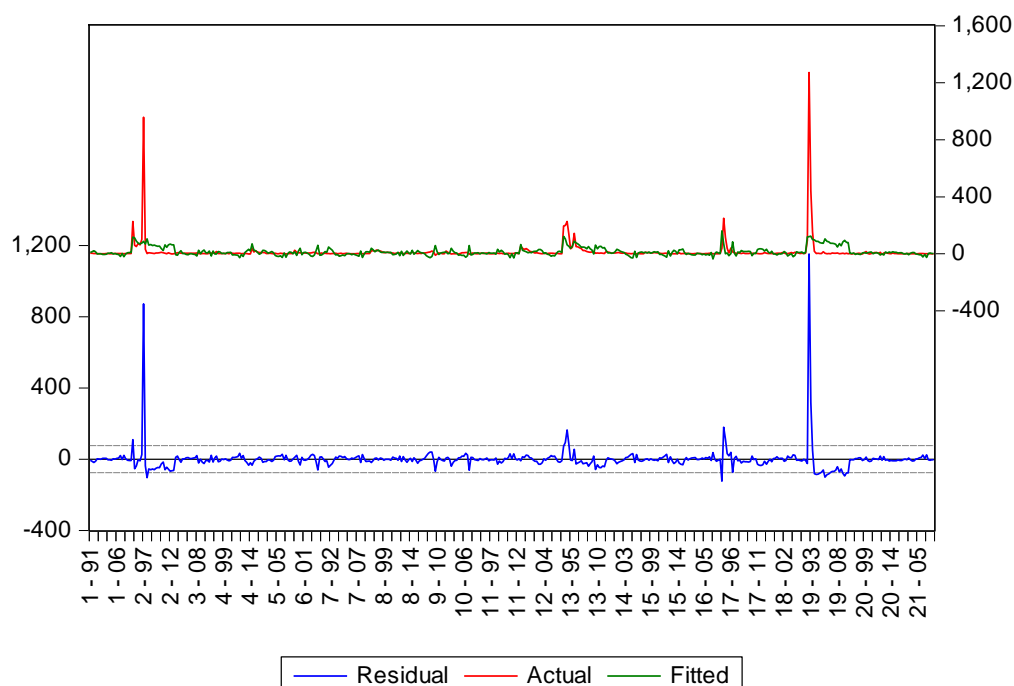
Source: Own elaboration

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The most important variable for the analysis is the variable EU_MEMBERSHIP which tells us that on average, after the EU admission, was inflation lower compared to the non-EU group of states and period before the entrance. Negative influence on inflation, was also found for Euro adoption, growth of GDP and crisis.

The results of negative influnece on inflation for euro adoption was analysed in a lot of papers and there are different opinions considering relationship of these two variables. The study *«The Euro and Inflation. Devergence in Europe»* claims that «inflation dispersion and inflation differentials within the Euro area have increased since countries lost monetary independence» (M. Duarte, 2003).

Another report investigated the effects of euro adoptions and concluded that joining Euro zone has not big influence on the aggreagte inflation rates in countries. The results differs for various group of products: for some of them (mainly service sector) the significant increase in prices was found (European Commission, 2009).

According to the analysis in the current master thesis euro adoption has a negative influence on the inflation rate. It is necessary to take into account that investigated time period includes euro crisis years, so the results can be influenced by that fact. Numerous studies agreed that an absence of independent monetary policy is one of the biggest risks from joining Euro zone. The IMF study *"Adopting the Euro in Central Europe—Challenges of the Next Step in European Integration"* mentioned as a potentional risk from euro change-over "large and volatile capital inflows and lending boom" and high level of inflation according to the Balassa/Samuelson effect.

Connection between GDP growth and inflation was investigated in various papers and the negative relationship between them was founded in present work. Michael Sarel in his paper *"Nonlinear effects of Inflation on Economic Growth"* acknowledges that the effect on GDP growth can be different depending on the inflation rate. Below 8% inflation rate the influence is not significant or can be a bit positive, above 8% the estimated effect is very substantial and negative (M. Sarel, 1996). Similar research, but with the usage of new econometric technics, was made by M. S. Khan and A. S. Senhadji (2001). The paper concluded that there is a negative relationship between inflation and growth once inflation rate reaches 1-3% and 11-12% for industrial and developing countries respectively.

Overall, it could be said, that results gained in current work are in line with mentioned studies.

4. Summary of empirical results

Based on the descriptive statistics in the current study EU member states present higher values in terms of GDP growth comparing to the non-EU states and period befor the entrance. At the same time they depicts lower level of Inflation (GDP deflator, annual %) and Unemployment (total, % of total labor force, national estimate). Moreover, in case of unemployment rate EU member states represents negative value, while Control group (non-EU states and period before the entrance) had positive value. Better values in case of EU members were founded for general government final consumption expenditure (% of GDP), merchandise trade (% of GDP), index of investment freedom variables. At the same time EU member states display worse numbers when we assess exports of goods and services (annual %) growth, foreign direct investment net inflows (% of GDP) growth and corruption perception index growth.

Few graphs were presented to check the development of variables over the time. Based on these graph it could be said that the economic crisis influences a lot members of European Union. All three dependent variables (GDP growth, unemployment growth and inflation) displays significant changes during 2007-2010 years.

From econometric analysis of panel data it was founded that on average, after the EU admission, was growth of GDP lower compared to the non-EU group of states and period before the entrance. Negative influence on the GDP growth was founded for Euro adoption, growth of unemployment rate and government expenditures as well. Positive impact on GDP growth was obtained for growth of exports and growth of Corruption Perception Index.

In case of Unemployment it could be said that on average, after the EU admission, was growth of unemployment rate lower compared to the Control group. Negative influence on unemployment growth, was also founded for Euro adoption, growth of GDP and growth of government expenditures.

Talking about inflation, the results of the analysis said that on average, after joining EU, was inflation lower compared to non-EU group of states and period before the entrance. Negative influence on inflation, was also founded for Euro adoption, growth of GDP and crisis.

Conclusion

The current master thesis analysed economic benefits of EU membership for particular group of states and was dedicated mainly to the empirical analysis. The aim of that work was to assess how change the values of investigated variables after joining European Union. For that purpose was used econometric analysis of panel data.

In the beginning of the work the brief literature review was provided, describing some results of previous studies. According to the past researches, it could be said that most of the authors agreed on the fact that after EU admission states have higher economic growth and both new and old member states gain some benefits.

At the same time the latest analysis of Eurostat (2016) presented mixed results on the economic situation in European Union. EU28 showed a 0,4% increase of the seasonally adjusted GDP during the second quarter of 2016 compared to the previous quarter; and 1,8% increase compared to the second quarter of 2015 (Eurostat, 12 August 2016). But according to that release economy still cannot recover after the 2008 economic crises. Similar results were obtained in the current master thesis: all dependent variables were affected a lot by the crisis. That can be the reason why EU group of states showed lower level of export of goods and services, FDI inflows and CPI index in descriptive statistics. But still EU states represented lower values of inflation and unemployment and higher value of GDP growth comparing to the Control group.

According to the empirical research the negative influence of euro currency on GDP growth was founded. This result is in line with a numerous studies that investigate the relationship of these two variables. According to the Nobel Prize laureate Josehp E. Stiglitz adoption of Euro was "the chief source of Europe's malaise is its 17-year-old currency experiment. While there are many factors contributing to Europe's travails," he said, "there is one underlying mistake: the creation of the single currency, the euro." (The New York Times, August 2016).

Overall, it could be said that there are some benefits of EU membership, but at the same time the accession of EU brings particular challenges to the member states. Lost of sovereignty in some aspects, budgetary, administrative and operation questions influence economic situation in new member states.

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