EU funds and old-age employment in the new member states

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Abstract

Unemployment is one of the biggest concerns of the developed and developing economies. Some marginal groups like women, minorities, elderly people are more vulnerable to this issue as others. One possible way of dealing this problem might be government intervention. Governments might introduce better environments for companies to hire more employees or increase public expenditures in order to increase GDP, consumption and employment. In this paper I analyze the impact of EU transfers on old-age employment in the 10 new member countries which joined the EU in 2004 over the time period 2004 till 2014. Using different econometric techniques - OLS regressions - I show that these funds have statistically significant positive impact on old-age employed. This impact is positive for both males and females; however, it is larger for the males. These result show that in case of old-age employment, EU transfers are an effective way to increase employment.

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1. Introduction

As the second decade of the twenty-first century started in the new member states, the problems in their labor market became apparent, with unemployment rates exceeding ten percent in some countries, far above other developed regions in the world. In addition, it is also becoming evident that asymmetries in unemployment levels not only persist, but become wider as the economic and financial crisis hit Europe in 2008 (Juan González Alegre, 2013). Since 2004, when ten new members (Estonia, Latvia, Lithuania, Poland, Czech Republic, Slovakia, Hungary, Slovenia, Malta, and Cyprus) joined the European Union (EU), the unemployment rate in most of the countries remained high. This issue was and is still a hot topic in Europe. One of the methods of the policymakers in Europe and in the new member states of the EU is to combat recession by increasing government expenditure and public demand as well. The EU is supporting labor market policies through different funds (e.g. European Social Fund). Ten new joining countries are eligible for transfers from these funds since 2004. Yet, there is a little research which would estimate the effect and the efficiency of these transfers.

In my thesis, I am going to analyze the employment in these 10 countries which joined the EU in 2004 and will be looking at the impact of EU transfers, too. I am also going to use econometric models to properly evaluate and identify the magnitude of different factors which might affect the employment. Looking at different papers which tried to estimate these effects I realized that most of them focused mainly on the old EU members and there is a lack of study and research on the new ones. Some other papers, on the other hand, do not use quantitative or econometric evaluations. One other important issue might be that different social groups (e.g. females, younger generation) might be facing different levels on unemployment. They might also respond differently to the changes on the job market. Since after the EU accession in 2004, there

was a large jump in the received transfers with the aim of reducing unemployment. This can give us a unique opportunity to investigate their success or failure.

In this paper, I am going to focus mainly on one of the discriminated groups on the labor market which, according to some organizations are not well legally protected, on the older generation. Differences of treatment on the grounds of age are often based on generalized assumptions or casual stereotypes. As there are no fixed characteristics that define particular age groups, age discrimination is a bit distinguished from other discriminations (Colm O'Cinneide, 2005). Age discrimination is also prohibited in the EU. Yet, some EU Directives provide that discrimination on the ground of age may be justified if there is a legitimate aim, labor market and vocational training objectives or employment policy or other reasonable objectives. The Directive gives also a non-exhaustive list of examples that may be justified. This discrepancy creates vulnerability for the older generation. There are also some reports which conclude that age discrimination is not exceptional in the EU, it happens in other developed economies outside the EU, too. Some countries are also conducting audits of their age-based legislation to determine if they are compatible with EU rules. Member states also have a considerable flexibility in the use of special measures to promote integration and protect older and younger workers on the labor market (Colm O'Cinneide, 2005).

Because of the low employment rates, the age group 50+ has benefited from a special attention on behalf of policy makers. In 2001, the European Council established the pension sustainability indicator in the fields of social inclusion and protection. Its goal is increasing employment levels of the 55-64 years old to 50% or more. Keeping older worker employed is associated with a triple benefit: more social security contributions, active ageing is considered

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beneficial for health by the WHO and employment can prevent old-age poverty, too (Arjeta Aliaj et All, 2016).

In my thesis I am going to use a modified version of the model used by González in 2013 to evaluate the efficiency of the European Social Fund in Spain. This model determines employment – the dependent variable - at time t as a function of the unemployment at time t minus one (in the previous period), public expenditures, vector of macroeconomic variables, and vector of county specific data and a vector of institutional variables. Unfortunately, as I was unable to receive significant macroeconomic and microeconomic data on regional level, because of this, I am going to omit these variables in my study.

This thesis is organized in the following way. The next chapter gives an overview of the relevant literature, summarizes their methods and results. The unemployment, social and macroeconomic situation in the new member states is discussed in the third chapter. Old-age employment is discussed in chapter four. The European Social Fund together with other different EU funds and their relevance for the 10 new joiners are introduced in chapter five. Chapter six starts with the data I am going to use and with the econometric model used in my thesis. In chapter seven, I am going to show and discuss my results. Finally, the last chapter concludes my thesis.

2. Literature review

From macroeconomics it is well known that some economic factors have a significant impact on the employment, like according to the Phillips Curve, there is a tradeoff between inflation and employment. The main idea is that policymakers cannot successfully fight both unemployment and high inflation. Okun was investigating the relationship between economic output and employment. According to his findings 1% change in employment causes around 2% change in the economic output (Okun, 1962). It is also an interesting issue to investigate the effect of governmental and other organizational supports' impact on employment as well.

2.1 EU funds and their efficiency

González, who was estimating the impact of public expenditures and the European Social Fund's (ESF) on the employment rate using panel data from 28 European countries between 1985 and 2011 and an alternative sample of 17 Spanish regions. His model was estimated by GMM (generalized method of moments), assuming the possible presence on endogeneity of the explanatory variables and non-stationary behavior of the variables. He was able to show that European Social Fund transfers are more beneficial for employment than aggregate public expenditures. González was also able to show that, using regional data, fiscal autonomy at regional level is correlated with larger levels of employment, which is reinforcing the hypothesis about the larger utility of public expenditure as the level of administration gets closer to the citizen (Juan González Alegre, 2013).

In 2014 Mara Giua tried to assess the impact of the EU Regional Policy in case of Italy. The analysis was able to capture the policy effect by defining and comparing randomly defined treatment and control groups. The spatial Regression Discontinuity Design model showed that

the EU regional policy produced a positive impact on employment levels. The positive impact is concentrated in a specific set of economic sectors directly relevant to the policy action (Mara Giua, 2014).

Philipp Mohl and Tobias Hagen in 2011 in the European Central Bank Working Paper analyze the employment impact of EU funding. Using a spatial dynamic panel approach, they find that regional spillovers do have a significant impact on the regional employment level. On the other hand, they did not find clear evidence that EU funding promotes employment. According to their findings, structural funds payments seem to have a positive impact on employment in regions with a low share of low-skilled population, and they have a negative impact on the employment level in regions with a high share of low-skilled population. Their results indicate that the high-skilled population in particular benefits from EU structural funds payment (Philipp Mohl and Tobias Hagen, 2011).

Albulescu and Goyeau have analyzed the cohesion funds and rural development funds absorption rate role in explaining short-term economic growth. The results obtained with a dynamic GMM estimator for the 2007-2011 periods show that the cohesion funds for growth and employment have no effect on the short-term growth rate. According to their opinion, it is risky to base the economic growth only on the EU funds' investment, without performing the necessary structural reforms to ensure the economic recovery (Albulescu and Goyeau, 2014).

Jerzy Pienkowski and Peter Berkowitz tried to summarize the different econometric approaches to address the impact of Cohesion Policy funds on economic growth and convergence. Most of the studies analyzed by them are based on neoclassical growth model. While some studies use quality data on Cohesion policy transfers, others use a dummy variable

instead of payments. Conclusions for Cohesion Policy drawn by the studies investigated by them are sometimes in contradiction with each other (Jerzy Pieńkowski - Peter Berkowitz, 2015).

2.2 EU funds and old-age employment

Arjeta Alial et all. have analyzed the old-age employment and their changes between 1997 and 2011 in 4 countries, Germany, Belgium, Netherland and Luxembourg. They distinguished this interval to three 5-year sub-periods. Using probit models of employment with micro-data from the European Union Labour Force Survey they were able to show that older workers had a significantly larger increase in employment than the general population. Their model contained the age, education, employment and marital status of the individuals. They concluded there were significant differences between men and women. However, vulnerable groups, like less educated and first-generation migrants fared less well (Arjeta Aliaj et all, 2016).

As we can see, there are many papers that try to investigate the magnitude of the impact of the EU structural funds on the GDP. On the other hand, I think that there are just a few studies which would try to assess the impact on employment and especially with focus on the older generation. For this reason I am going to evaluate the relationship between these EU structural funds and the old age employment in the new member states.

3. Unemployment, social and macroeconomic situation in the 10 new EU member states

3.1 From the '90s

At the beginning of the transition, labor markets of the acceding countries were characterized by full employment where unemployment did not exist. When these economies opened to the world market, the result was a steep decline in the economic performance and rising unemployment. The average unemployment rate in 2003 in these 10 countries was 14.4% which was higher than the 8.0% of the EU-15. In 2004 when ten new countries joined the EU, 5 out of 10 had a higher unemployment rate than the EU average. That time two countries had great problems with it, Poland and Slovakia, where unemployment almost reached 20% (Sjef Ederveen - Laura Thiessen, 2004).

After the collapse of the socialist regime, these countries became more and more open and started liberating their trade. Foreign direct investments were flowing in rapidly and multinational corporations were quickly changing the previously closed economies to export oriented ones. Most of the governments tried to stimulate growth and consumption with increasing public expenditures and lending which led to rising public and private debt. This made them vulnerable and as the financial crisis hit these countries they were unable to boost further consumption and restore the investors' confidence. During the crisis, the government gross debt was rising fast as it tried to compensate for the lower public consumption and lower demand. Even in countries like Latvia, where before the crisis in 2007 the government debt was around 8% of the GDP in just a few years this debt reached 40% due to the recession. Because of the crisis most of the governments adopted reforms and started cutting down on unnecessary public

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expenses. The crisis also shifted the balance of trade. Previously most of the states had a huge deficit, meaning that they were importing more than exporting. This changed as imports were declining faster than the exports. The excessive lending to the private sector also dropped.

3.2. Convergence

Most of these countries recorded substantial progress in terms of nominal convergence; five of them even joined the euro area. Even though they were hit severely by the global financial and economic crisis, they gradually improved in the post-crisis period. Due to differences in relative prices and monetary policy credibility inflation targets varied considerably across states. As the policy credibility was built-up, inflation targets were getting closer to 2%, which is the ECB definition of price stability. The average real GDP growth of the region was almost 6% between 2004 and 2008 which was twice as high as of the old member states. This good performance was affected by the 2008 financial crisis; all the countries expect Poland hat negative growth in 2009. Except for Latvia, all the countries exhibited a growth the next year. However, the growth rates since crisis remained lower than before. The average real GDP growth rate was just around 2% between 2010 and 2014, which was still above the average of the old members. Pre-crisis expansion was accomplished by an investment boom, too. Apart from Estonia, government balances were negative in the pre-crisis era. The crisis had a significant negative impact on their fiscal positions. This suggested that rapid economic expansion in the pre-crisis era was not sufficiently exploited to make these economies resilient to economic downturns (Balazs Forgo - Anton Jevcak, 2015).

GDP per capita of the new joiners in purchasing power standards was and is still rising and getting closer to the averages of the euro area. In countries like Slovakia and Poland these figures rose from just above 40% in 2000 to more than 60% in 2013 and are still improving.

Other countries like Hungary and Slovenia, which were more developed before the accession, have a smaller pace of growth. The IMF classifies now Slovenia, Czech and Slovakia as advanced, and Poland and Hungary as transition ones. The following graph is illustrating how the GDP per capita in purchasing power standard was developing in the new joining countries and in Romania and Bulgaria as well, which joined the EU in 2007.

Figure 1: GDP per capita in purchasing power standards

GDP Per Capita in Purchasing Power Standard
(Percent of the euro area)
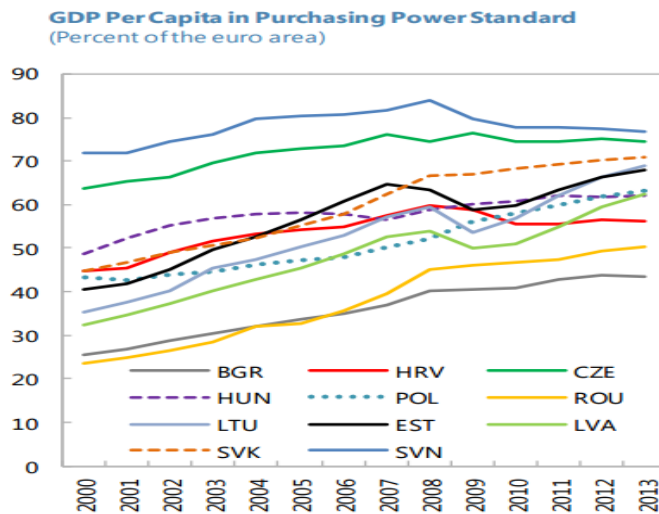
Source: IMF("Central and Eastern Europe: New Member States (NMS) Policy Forum, 2014 - Selected Issues; IMF Country Report 1598; February 26, 2015 - cr1598.pdf" 2016 page 12)

4. Old age employment in the EU and in the new member states

4.1. Changing age distribution

Over the past two decades, there have been considerable changes in the age distribution of the population in Europe. A large and growing population of older people can lead to changes in the patterns of the labor market and the social security system. In 2001 the European Council agreed to support the labor force participation of the older generation and increase the employment rate of the population aged 55-64 to 50% by 2010 from 37% in 2000. Unfortunately, as the employment rate of this generation reached 46% in 2010 this goal was not reached. In the Europe 2020 growth strategy the European Commission has indicated 75% full employment rate. This means necessarily that the underrepresented groups such as the older generation should be more integrated into the labor market as earlier. Currently the employment rates of the older generation ranges from 30% in Malta to 70% in Sweden. The proportion of the older generation is and will be rising both in absolute terms and as a share of the overall population. For the first time, the share of the population aged 55 – 64 even surpassed the share of 15 - 24 in the EU. According to Eurostat forecasts, the number of those aged 65+ doubles by 2040. From a positive perspective, this is a testament to the improvement of living conditions in the EU, but sustaining this is a new challenge (European Foundation for the Improvement of Living and Working Conditions, 2012). The next figure is showing the EU population by age category:

Figure 2: EU27 population by age category

Figure 1: EU27 population by age category, 1985–2040 (forecast)
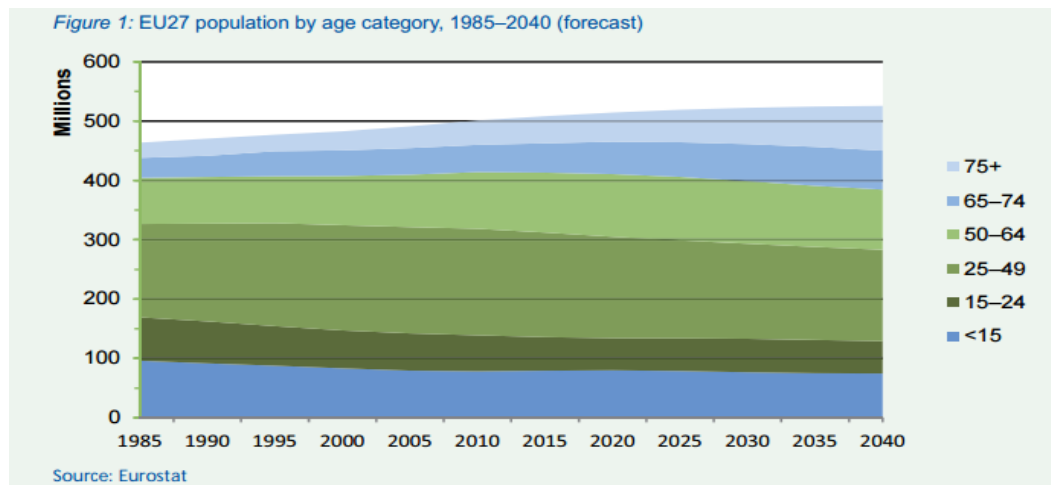
Source: Eurostat

Source: (European Foundation for the Improvement of Living and Working Conditions, 2012)

4.2 Impact of the crisis

The 2008 financial crisis affected mainly the younger generation with less work experience. Employment rates of the older generation within the EU continued to grow during and even after the recession. Between 2000 and 2010, all EU member with exception of Greece, Poland, Portugal and Romania recorded an increase in the employment rate of the workers aged 60-64. Between 2000 and 2010, the youth unemployment rate increased from 16.1% to 20.9% and over this period the unemployment rate of the older generation decreased from 7.6% to 6.9%. The ageing population of the EU is likely to require employees to work to an older age to render social security and pension systems. The recessions in the 1970s and 80s showed that early pensioning of a significant number of employees was not a good idea. While it seemed to be financially feasible in the short run, it poses a financial sustainability issue in context of increasing post-retirement life expectancy (European Foundation for the Improvement of Living and Working Conditions, 2012).

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Some member states adopted special laws in order to protect the elderly workers. For example, in Hungary employers can fire those employees who are within 5 years of pensionable age only in particularly justified cases and such employees are entitled to higher severance pay. In Lithuania, those with 3 years to pensionable age receive job security priority in an organizational restructuring. Latvia is giving the same treatment to the elders as Hungary (Declan O'Dempsey - Anna Beale, 2011).

5. The European Structural and Investment funds

In the EU, there are five different structural and investment funds: The European Regional Development Fund, Cohesion Fund, European Social Fund, European Maritime and Fisheries Fund and the European Agricultural Fund for Rural Development. The main aim of these funds is to promote employment, create social inclusion and combat disparities. The first three mentioned funds are more important compared to the last two in case of Slovakia. Since 2004, ten new member states are eligible to receive support from these funds.

The oldest of these funds is the European Social Fund (ESF). This fund helps to improve the lives of millions in Europe by investing in their training and skills to help them find a better job. Over the 2014 – 2020 period, the ESF will provide 80 billion euros in funding to train people and help them get into the labor market. Due to the recent economic recession and fiscal budget constraints, concerns about the effective use of the funds have grown. Recent studies done by the European Commission have shown that, for example in Estonia, those who participated in work-related training programs implemented by the Ministry of Education and Research in Estonia with the aim of increasing labor market competitiveness financed by the ESF had a small but positive impact in terms of earnings and employability compared to those who did not participate in any of those programs. The evaluation of ESF-funded labor market measures in Lithuania the 'Subsidized employment' intervention (an employee has to pay lower taxes and social contributions by hiring somebody from a vulnerable group) positively affected the labor market outcomes of participants. On the other hand, the 'Vocational training' intervention had a small but negative outcome in the short run. This might be explained by the lower intensity during the program (Leandro Elia et All., 2015).

Since 2014 one of the goals of the ESF is to allocate at least 20% of the Fund to social inclusion. The ESF is also going to provide a greater support to social innovation and creating equal opportunities for all. Closer cooperation between public authorities and social partners is also an important issue, not to mention the need for a better education and an improved quality of governance (European Social Fund - European Commission, 2016).

The European Regional Development Fund (ERDF) aims to reinforce economic cohesion and a sustainable growth. For the 2014-2020 period, the ERDF has a budget of almost 200 million €. By the end of 2013, the ERDF had paid over 9 billion euros into different financial instruments. Over 200 thousand individuals and firms had received ERDF support for business development and other investments. ERDF financial instruments can be used for a wide range of projects, from public infrastructure to support for households to improve their energy efficiency (European Regional Development Fund (ERDF), 2016).

The financial crisis dramatically altered the context of the ERDF policy. Between 2008 and 2012 more than six million jobs were lost. According to the European Commission, the economic crisis and the responses to it are leading to widening regional disparities. It is estimated that between 2007 and 2013 thanks to ESF and ERDF 400 thousand jobs were created and more than 53 thousand start-ups were supported through the EU. Studies show that these programs are many times necessary in terms of economic modernization and competitiveness. The flexibility and the ability to reprogram the funds have enabled regional and national needs to be met (Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, 2013).
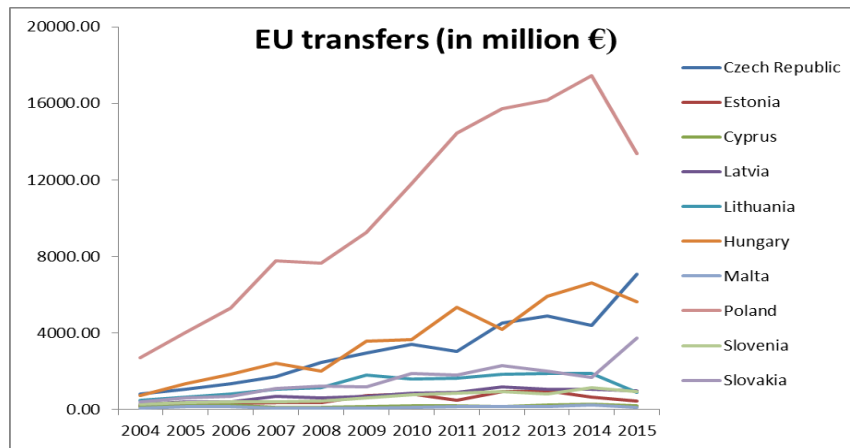
The Cohesion Fund aims to strengthen the social, economic and territorial cohesion of the EU. For the 2014-2020 period, it has a budget of 63 billion euros. The support is provided to member states whose Gross National Income per inhabitant is less than 90% of the EU average, which means that mainly the new member states receive support from this fund. This financial instrument can be used for areas where the banks are unwilling to lend or where the private sector is unwilling to invest (The Cohesion Fund - Financial Instruments, 2015).

Empirical analysis shows that EU regional policy expenditures are associated with stronger regional growth rates in all regions. This positive influence is stronger in regions with the most favorable socio-economic environment. It was also shown that due to the Agricultural Fund's support, growth can emerge in in the most disadvantageous areas of the EU, with less infrastructure and innovation. Policy coordination is also important for economic growth. Economic growth is maximized when countries use support from more funds (Riccardo Crescenzi - Mara Giua, 2014).

5.1 New joiners and EU funds

The 10 new EU members are since 2004 eligible to receive support from the EU funds. The biggest and most populated new member state Poland received between 2004 and 2015 more than 125 billion euros from different EU funds. Even Malta, which is the least populated new member, received 1.5 billion euros from these EU funds. From the new 2014-2020 EU budget, most of the support is provided through the Smart and Inclusive Growth programs, which include competitiveness for growth and jobs and social and economic cohesion of the whole EU.

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Figure 3: EU transfers to the 2004 joiners

EU transfers (in million €)

Legend: Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia, Slovakia

Y-axis: 0.00, 4000.00, 8000.00, 12000.00, 16000.00, 20000.00
X-axis: 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

Source: European Commission

As we can see from the graph above, Poland received the highest support from the EU among the new joiners. Hungary and the Czech Republic are on the second and on the third place. For most of the countries, the amount of the funds is continuously rising from year to year. This trend is likely to continue in the following years as well. We can also observe here some seasonality, as the EU budget is planned for 7 years most of the countries try to apply with new and new projects for the still available funds before the 7 years period ends. Usually, the transfers are lower in the beginning of the period. This can be exactly observed in case of Poland, as the transfers skyrocketed between the years 2009 and 2014, but fell considerably in the following year.

6. Econometric model

As mentioned earlier, I am going to use a modified version of the model used by Gonzalez. This model is good for panel data. It can be described in the following way:

$$\text{Employment}_t = \rho\ \text{Employment}_{t-1} + \beta\ \text{lmp}_t + \gamma\ m_t + \sigma\ n_t + \varepsilon_t \qquad (1)$$

Equation 1 estimates the employment, which is the dependent variable, as a function of earlier employment (Employment_{t-1}), vector of labor market policies (lmp_t), vector of macroeconomic variables (m_t) and vector of institutional variables (n_t), ε is the error term and the small index t is the time period. The m vector includes parameters like GDP, labor productivity. The lmp includes the level of public expenditures as share of GDP and also the EU transfers. The n vector includes institutional setting of the different regions within the country. The last term ε is the error term.

My model will not include the institutional parameters. The reason for this is that they are based on different countries' legislations, which is hard to measure and compare in a reliable way. My lmp vector is going to take the following variables: EU transfers and it is also going to include the level of public expenditures in euro for the different years for the 10 countries. My m vector is going to include the following variables: GDP in millions of euros at current price, inflation and the daily interest rates.

For my analysis I am going to use the Eurostat database. There I find all the relevant data for the ten countries. Data is available for the time period between 2004 and 2014, which means for 11 years. This means a total of 110 observations. All my data is going to be seasonally adjusted.

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To summarize, my exact model is going to be:

$$Emp_t = \rho\, Emp_{t-1} + \beta_1\, EUT_t + \beta_2\, GOV_t + \gamma_1 GDP + \gamma_2 INT + \gamma_3 INF + \varepsilon_t \qquad (2)$$

In Equation 2 Emp_t is the number of old age (between 55 and 65 years) employed at time t, Emp_{t-1} is the number of old age employed at time t minus one. GDP_t is the Gross Domestic Product at current prices at time t, EUT is the amount of EU transfers in euros, GOV is the government expenditures of the given country, INT is the daily interest rate, INF is the annual consumer prices inflation and ε_t is the error term at time t.

In order to correctly estimate the results, I am going to use robust standard errors in my analysis. Another problem might be the so called spurious regression, which means that a certain unseen factor is causing the causality and not the variables themselves. By taking differences of the variables I can solve this problem as well.

Altogether it means that I have 2 models, one is the standard and one by taking the differences between time t and t plus one. In addition, I was also able to find statistics about the sex of the old age employed as well. I am going to use this in order to distinguish between male and female employees and see if there are differences.

7. Econometric evaluation and results

7.1. Summary of the data

First, I am going to summarize the downloaded data. As mentioned earlier, I have data for 10 countries for eleven years. After that I run my model using the OLS method. After that I will ran a regression for the differences. I will also run the model separately for women and men to see if the effects are similar or not.

After downloading the data from Eurostat and putting into Stata I summarized it and received the following table. It contains the number of observations, means, standard deviations the minimums and maximums as well. The variables column contains the variables that I mentioned earlier; FEMP and MEMP are the number of female and male old-age employed in the given country.

Table 1: Stata table - summary of the variables

Variable	Observations	Mean	Std. dev.	Min.	Max.
GDP	110	75457.95	97738.91	4867.2	410856.3
GOV	110	32851.08	42915.02	2056.5	173138.9
EUT	110	2135.477	3389.328	71.50755	17436.08
EMP	110	353.2636	484.3682	13	2316
INT	110	2.538182	2.247708	0.09	11.5
FEMP	110	144.9182	188.2878	3	949
MEMP	110	208.3455	297.5755	10	1367
INF	110	3.144545	2.547335	-1.2	15.3

7.2 Evaluation

Before running the regression, I checked the correlation between old-age employment at time t and t minus one, which was high, 0.83. The minimum values are usually the values of a small country, like Cyprus or Malta. The maximum values are usually those of Poland. After running the OLS regression of the first model I received the following equation with numbers:

$$Emp_t = -10.81 + 0.83\ Emp_{t-1} + 0.01\ EUT_t - 0.018\ GOV_t + 0.0016\ GDP + 0.68\ INT + 0.43INF_t$$

In order to get a better evaluation it is also good to see the p-values, confidence intervals, F statistics and the R squared values. This model has an F value of 10053, which means that the model as a whole is significant. The R squared is 0.999 which means that the data is close to the regression line, maybe too close. As mentioned earlier, I used the robust standard errors not to run into the problem of heteroskedasticity. The high R squared value might be suspicious and this may be due to the issue that some not observed factor is causing these results; this is the earlier mentioned spurious regression problem. In the following table I am going to summarize the standard errors, t and p values and the 95% confidence interval of the above variables.

Table 2: Stata output 1

Variable	Coeff	Std. err.	t	P>|t|	95% conf.	95% conf.
GDP_t	0.0016108	0.0003395	4.74	0.000	0.743667	0.9150408
EUT_t	0.0099035	0.0030444	3.25	0.002	0.0038578	0.0159492
GOV_t	-0.0159492	0.0006325	-2.83	0.006	-0.0030462	-0.0030462
INT_t	0.6757542	0.9319254	0.73	0.470	-1.174865	2.526373
INF_t	0.4732995	0.5429752	0.87	0.386	-0.6049416	1.551541
EMP_{t-1}	0.8293539	0.0431498	19.22	0.000	0.743667	0.9150408
CONS	-10.81366	2.12692	-5.08	0.000	-15.0373	-6.590018

As we can see from the table above, only the two variables inflation and interest rate are not significant. The GDP, earlier old-age employment and EU transfers have a significant positive effect on the current number of old-age employees. On the other hand, however, according to this estimation the government expenditures have a significant negative effect.

As mentioned earlier, in the above equation there might be the issue of spurious regression which means that another not observed is causing the relationship. A good way to solve this is to run the regression using the differences of the variables. Using this method we will be able to cancel out the other not observed effects. The following table is showing the result of the OLS regression used on the differences.

Table 3: Stata output 2

Variable	Coeff	Std. err.	t	P>|t|	95% conf.	95% conf.
ΔGDP	0.0023052	0.001575	1.46	0.147	-0.000822	0.0054324
ΔEUT	0.0370171	0.0105413	3.51	0.001	0.0160871	0.0579472
ΔGOV	-0.002369	0.0034891	-0.68	0.499	-0.0092967	0.0045587
ΔINT	-1.31718	2.28805	-0.58	0.566	-5.860158	3.225797
ΔINF	0.5307339	1.068211	0.50	0.620	-1.590223	2.651691
Cons	5.174878	2.48451	2.08	0.040	0.2418246	10.10793

As we can see from the table above, the only relevant variable, which we can say is different from zero, is the EU transfer. The change in the amount of EU subsidies has a statistically significant positive impact on the change of the number of old-age employed. This model has an F-statistics of 16.17, which means that the joint effect of these variables is significant and the R squared value dropped to 0.591. In this OLS regression I also used the robust standard errors, just as earlier. Using the differences also shows that the EU transfers are affecting the number of old-age employed in the 10 new member states. On the other hand, this model questions the impact of the GDP growth, interest rate, inflation and government

expenditure. According to these result, they are not statistically significant do not really help in increasing employment.

In the following part I am going to see if there is a difference between the EU transfers' impact on the male or female old-age employees. I am going to use the same model with the only difference that my dependent variable is going to be the number of female and male old-age employees. The independent variables are going to be the same as earlier and I am also using the robust standard errors. The following table is showing the results of the first model for males.

Table 4: Stata output 3

	Coeff	Std. err.	t	P>|t|	95% conf.	95% conf.
GDP_t	0.0012313	0.0003024	4.07	0.000	0.0006308	0.0018318
EUT_t	0.0018318	0.0016651	1.86	0.066	-.000207	0.0064061
GOV_t	-0.0012956	0.0004836	-2.68	0.009	-0.0022559	-0.0003352
INT_t	0.6909451	0.6792505	1.02	0.312	-0.6579119	2.039802
INF_t	-0.1342512	0.3545487	-0.38	0.706	-0.8383146	0.5698122
$MEMP_{t-1}$	0.8026436	0.0557765	14.39	0.000	0.6918825	0.9134048
CONS	-9.006599	1.790428	-5.03	0.000	-12.56203	-5.451164

The variable MEMP is the number of male old-age employees and the other variables are the same as before. According to these results one might say that the EU funds are not very helping the old-age male employees, but here we are likely facing the same spurious regression problems as earlier as this model has an R squared value of 0.999 and an F value of 9616.53. Using differences we are able to overcome this problem. In the following table I will use the same model but I will take the differences between time t and t plus one.

Table 5: Stata output 4

	Coeff	Std. err.	t	P>|t|	95% conf.	95% conf.
ΔGDP	0.0013581	0.0008681	1.56	0.121	-0.0003655	0.0030817
ΔEUT	0.0197163	0.0061339	3.21	0.002	0.0075373	0.0318953
ΔGOV	-0.0009331	0.0018805	-0.50	0.621	-0.004667	0.0028007
ΔINT	-1.165213	1.297014	-0.90	0.371	-3.740464	1.410038
ΔINF	0.4134859	0.6293816	0.66	0.513	-0.836166	1.663138
Cons	1.519792	1.52978	0.99	0.323	-1.517622	4.557206

In this model we can see that the only statistically significant variable is the EU transfer. This evaluation has an F statistics of 18.87 and an R squared of 0.62. According to these results, the other variables are not statistically significant as they have high p values. Now I am going to make the same evaluation but for females.

Table 6: Stata output 5

	Coeff	Std. err.	t	P>|t|	95% conf.	95% conf.
GDP_t	0.0004255	0.0001841	2.31	0.023	0.0000599	0.0007911
EUT_t	0.0064476	0.0015735	4.10	0.000	0.0033231	0.0095722
GOV_t	-0.0005361	0.000378	-1.42	0.159	-0.0012869	0.0002146
INT_t	-0.1014275	0.406235	-0.25	0.803	-0.9081297	0.7052747
INF_t	0.5902049	0.2916804	2.02	0.046	0.0109854	0.5698122
$FEMP_{t-1}$	0.8026436	0.0557765	14.39	0.000	0.6918825	1.169424
CONS	-2.338299	0.7916405	-2.95	0.004	-3.91034	-0.7662583

The variable FEMP is the number of old age female employees and the other variables are the same as defined earlier. Once again this model has a high R squared value (0.998) and F statistics as well (6906.6). According to these results, the variables EU funds, inflation and the number of old age female employees in the previous year have a statistically significant effect on the number of current period old age female employees. Just as earlier I am going to use the

differences to see how these results change. The following table is showing the same regression but with the differences of the variables.

Table 7:Stata output 6

	Coeff	Std. err.	t	P>|t|	95% conf.	95% conf.
ΔGDP	0.0009471	0.0007911	1.20	0.234	-0.0006237	0.0025179
ΔEUT	0.0173008	0.0050678	3.41	0.001	0.0072386	0.0273631
ΔGOV	-0.0014359	0.0017967	-0.80	0.426	-0.0050032	0.0021314
ΔINT	-0.1519674	1.327464	-0.11	0.909	-2.787677	2.483743
ΔINF	0.117248	0.4801505	0.24	0.808	-0.8361021	1.070598
Cons	3.655086	1.179868	3.10	0.003	1.31243	5.997741

Here once again we can see, just as earlier, that using the differences method the independent variable EU transfers is once again statistically significant but the other explanatory variables are not. This model also has a lower R squared value 0.48 and also lowers F statistics (4.43). These results show that for both gender groups the EU transfers helped successfully to boost the old age employment.

8. Conclusion and summary

This thesis was focusing on the impact of EU transfers on old age employment in the ten new member states which joined the EU in 2004. This issue is more and more relevant due to the ageing population in Europe. In the beginning chapters I showed the importance of this topic and discussed the earlier evaluation methods and their results. Later I introduced the common funds which provide financial support to the member states. One of the aims of these transfers is to boost employment, especially of the vulnerable groups.

As hundreds of million euros are being spent yearly through these funds, it is of an interest to see how successful or unsuccessful they are. The exact measurement of these financial instruments is also not an easy task. In this thesis I used econometric methods in order to correctly estimate these effects. My model tried to estimate the old age employment at a given time using the old age employment from the previous period, macroeconomic and labor market variables.

Using OLS regressions with robust standard errors I was able to show that EU funds have indeed statistically significant effects on the number of old age employed in these countries. In order to eliminate potential third factors not included in my model which might seriously affect the employment and cause these results, I was taking differences of the variables and I was running OLS regression on these differences which once again showed that indeed these funds have a statistically significant positive effect. Running the same regressions but separately for men and women showed that these funds have statistically significant positive effect on both groups, however, the effects are higher for the males.

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