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THE IMPACT OF EDUCATION ON THE UNEMPLOYMENT RATE IN THE SOUTHERN EUROPEAN MODEL

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Abstract

In the current socio-economic context marked by high unemployment rates, the education is seen as an important pillar in the economic recovery process. The economic growth and competitiveness are supported by a highly qualified labour force and adapted to market requirements. By Agenda 2020 the European Union promotes and supports the education and the reducing of the school dropout. The countries from the Southern European Model have experienced in the last 10 years an upward trend in the unemployment rate, and two of the component countries (Greece and Spain) currently register the highest unemployment rates in the European Union. Given these issues in this paper I propose to analyse, through a model of panel data, the impact of educational attainment (by

the rate of early school leaving and the graduation of a tertiary education), the investments made in education, the Gross Domestic Product and the total population on the unemployment rate in the Southern European countries.

Keywords: unemployment, education, European model, panel data analysis

JEL classification: J64, I25, R11

1. Introduction

The economic crisis that broke out at the end of 2007 affected all the EU countries (EU), but the consequences for the evolution of the main economic indicators have been different from country to country. Clearly the most affected European countries were those in the Southern group (Mediterranean) - Spain, Portugal, Greece, Italy, Cyprus and Malta.

Considering the correlation between the labour market performance and the economic performance, it is noticed that in the Southern European countries the overall economic situation has largely depended on the labour market response to the economic crisis (Aceleanu, 2013).

Although lately, along with the gradual economic recovery, there is a slight decrease in the unemployment rate among the countries in the Southern European model, social developments still point to the persistence of certain divergences that encourage the risk of poverty, inequality and social exclusion.

In addition to lowering the GDP level, high budget deficits and worrying external debt, most Southern European countries also faced increased unemployment rates, especially among young people. Within these countries, the labour market has been greatly affected by the economic crisis and because of structural imbalances in this market, budgetary austerity in terms of public spending, the high level of immigration, the low level of internal labour mobility, and the unfair social policies and the reduced investments in education and continuous training.

Taking into account the objectives of the Europe 2020 strategy, the Southern European model countries have taken a number of measures in order to reform the education systems or to expand adult education and increase training opportunities. The investments in human capital have been targeted primarily at young people, but overall, in terms of increased budget deficits, expenditure on education has been reduced in most Southern European countries (Aiginger et al, 2011).

Clearly, reducing the unemployment rate has a major positive impact on poverty, but only when the new jobs provide enough income to ensure a decent living for the employee and for the family members in his/her care (Costain et al., 2010).

Education and training are essential to the economic and social progress of each economy. Within the Europe 2020 Strategy, the European Union has mainly focused on two major engines of the society to accelerate the exit from the economic crisis - the labour market and the education system. The European Union has realized that in an increasingly global and knowledge-based world economy it has to invest in education and workforce in order to remain competitive. Thus, by 2020, the EU aims to reduce unemployment by raising the average employment rate to 75%, to reduce the early leavers from education rates to below 10%, and increase the number of 30-34 year-old graduates from university by 40%.

An analysis run by the European Commission in 2015 showed that 20% of the EU's working population has deficiencies in reading, writing and primary mathematical calculus. In addition, there is a significant mismatch between the skills acquired in the education system and the demands of the labour market, and all these factors only increase the unemployment rate and limit the economic growth.

In this article I conducted an analysis at the level of the Southern European model countries in order to identify some factors of influence of unemployment as most countries in this model have faced very high rates of this indicator post-crisis.

In the panel analysis I have identified that the growth of the tertiary education population in the 30-34 age group, the increase of the public expenditures for education, the economic growth and the increase of the foreign direct investment level have a positive impact on the unemployment rate, leading to its decrease. Also it turned out that the high percentage of young people with the most lower secondary education (ISCED 0-2) and who were not in further education or training has a negative influence on unemployment (in terms of growth).

2. Methodology

In this paper the panel data model was estimated using *Eviews* software. A regression on panel data is different from a cross-sectional regression or one that uses time series by having a double index on its variables that indicate the cross-sectional dimension, respectively the temporal dimension (Baltagi, 2008). Thus, a panel analysis involves observations that have both cross-sectional identifiers and identifiers for their evolution over time.

The models that can be estimated using panel data tools can be written as follows:

$$Y_{it} = \alpha + \beta X_{it} + \delta_i + \gamma_t + \varepsilon_{it} \quad (1)$$

where: Y_{it} is the dependent variable; X_{it} is a dimensional *k* vector of regressions and ε_{it} are the innovations for the M cross-sectional units observed for T periods. The terms δ_i and γ_t represent

the specific effects (random or fixed) for cross-section units or for certain periods of time. The presence of specific cross-sectional or temporal effects can be captured and analysed using techniques for fixed effects (FE) and random effects (RE). One can specify the models that contain effects in one or both dimensions, for example a fixed effect in the cross-section dimension, a random effect in the dimension of the period or a fixed effect in the cross-section and a random effect in the dimension of the period. It should be pointed out that, however, those with random effects in both dimensions can be estimated only if the panel is balanced, so that each cross-section has the same set of temporal observations.

The specifications with fixed effects are tackled by using a simple approach that consists in eliminating the average of the cross-sectional or temporal dependent variable and then using a regression equation using the resulting data. The specifications with random effects imply that the corresponding effects δ_i and γ_t are realizations of independent random variables with zero average and finite variance. Most importantly, the based on random effects specification assumes that the specific effect is uncorrelated with the innovations of the equation. In *Eviews* we can process models with random effects using EGLS techniques.

In order to decide what panel model we can use - random effects (RE) or fixed effects (FE) - we have the possibility to perform certain tests, to take into account the model-related information and/or the analysis of the economic context. Baltagi (2008) states that all these methods should be taken into consideration so that we are able to estimate both models and, depending on the information criteria and the economic context, we can choose the best and most representative model.

Generally, when working with panel data, regardless of the type of model chosen, the errors are assumed to be independent and identically distributed (Cameron, 2009). Moreover, the errors must be homoscedastic and not auto-correlated. If heteroscedasticity is present, the standard estimation errors will be displaced and thus, the calculation of robust standard errors is required. The same happens for auto-correlation. In order to overcome these problems, a robust estimation of the regression model can be used (Drukker, 2003; Baum, 2001).

3. Data description

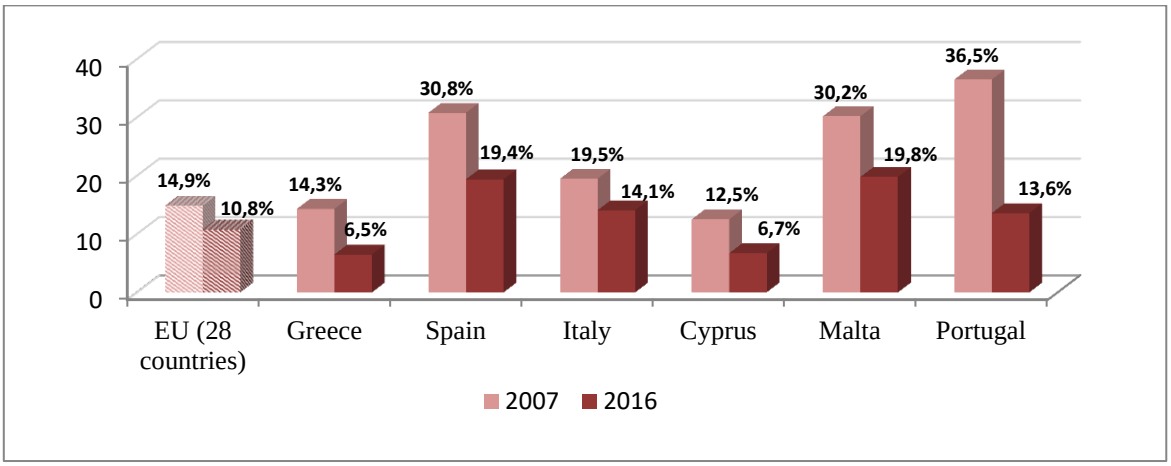
In the analysis, the econometric appliance was used for the estimation of the panel data models, aiming to identify some variables with an impact on the unemployment rate *(ru)* in the countries of the Southern European model. The influence variables entered into the model were: the percentage of the young population (18-24 years) with at most lower secondary education (ISCED 0-2) and who were not in further education or training *(leavers_edu)*; the percentage of the

population aged 30-34 who have completed tertiary studies (ISCED 5-8) *(tertiary_edu)*; the public expenditure on education expressed as a percentage of GDP *(exp_educ)*; the real GDP rate expressed as a percentage *(real_gdp)*; the foreign direct investments expressed as a percentage of GDP *(fdi)*.

In the analysis, I used annual data for the period 2007-2016 for the six Southern European countries - Portugal, Spain, Italy, Greece, Malta and Cyprus. The data source was the Eurostat database, with two exceptions due to data not being updated on this database – the FDIs that were adapted from the UNCTAD database and the public education expenditure adapted from UNESCO statistics.

Analysing the evolution of young people (18-24) who left school early, in the six Southern European countries, we notice the same tendency to reduce their percentage in 2016 as compared to 2007. However, we notice that at the level of 2016 four of the six countries analysed have a percentage of early leavers from education and training above the EU28 average of 10.8% of all young people with the age between 18 and 24. These countries are Malta (19.8%), Spain (19.4%), Italy (14.1%) and Portugal (13.6%). (Figure 1)

Figure 1. Early leavers from education and training (percent of the population aged 18-24)



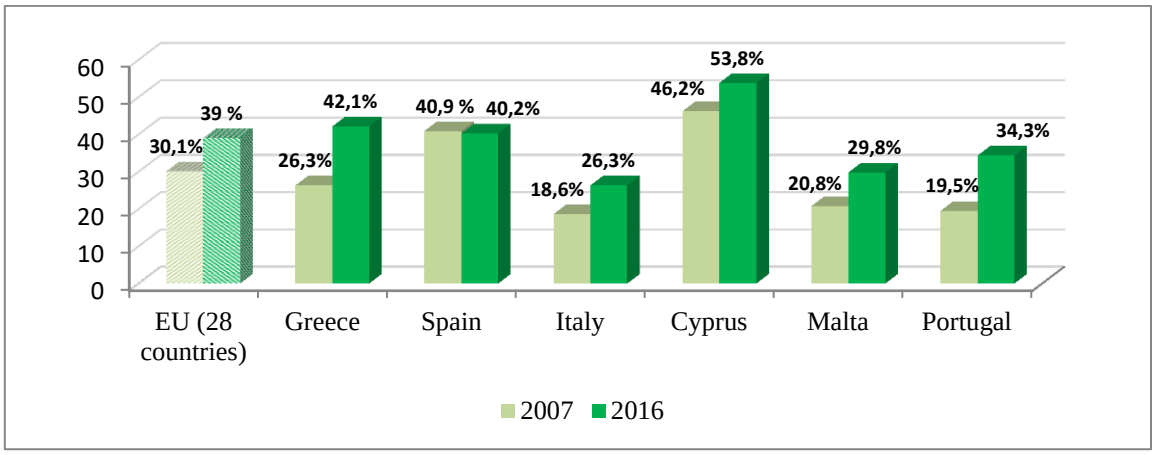
Source: Author's calculations based on Eurostat database

Young people who are early leavers from any form of education or training will face difficulties on the labour market, mainly in finding a job. For this reason, this category of people will be the main source of unemployment not only among young people but also among the long-term unemployed. The importance of this indicator is also given by the fact that it has been introduced as an objective within the Europe 2020 strategy and the national strategies, considering the set targets, have led to a reduction in the number of early school leavers. Even though the

Southern European model countries have registered a decline in this indicator in recent years, they still have a very high level and occupy the first positions in the EU 28 top.

For the South European model countries, we notice an increase in the number of people aged 30-34 who have completed a higher education (ISCED 5-8) in recent years. In 2016, the highest level was registered in Cyprus (53.8%), and the lowest in Italy, only 26.3%. (Figure 2) Encouraging people over the age of 30 to pursue and complete a form of higher education is also part of the Europe 2020 strategy and aims to facilitate the improvement of the skills of the workforce as well as to broaden the opportunities to find better jobs that are better paid.

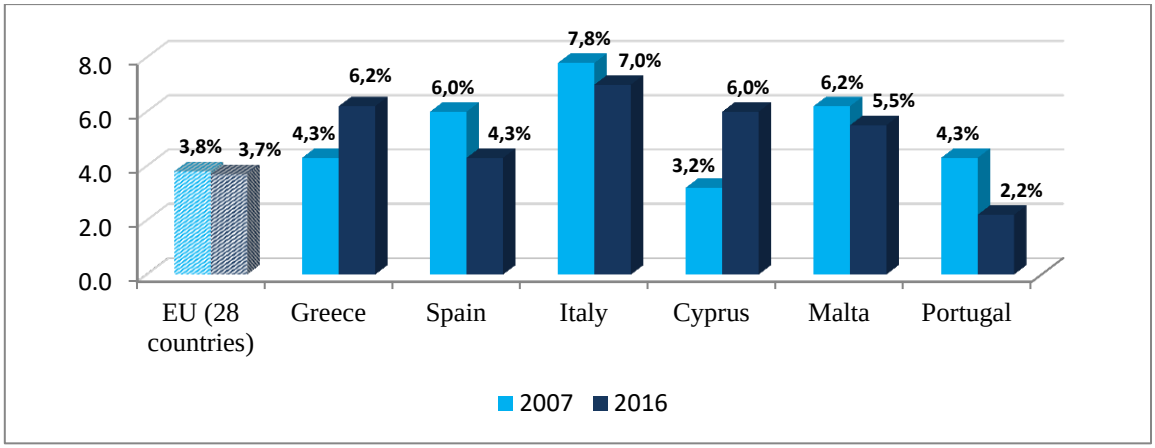
Figure 2. Tertiary educational attainment age group 30-34 (percent of the population aged 30-34)



Source: Author's calculations based on Eurostat database

Considering the economic problems that they faced in the post-crisis period, the Southern European countries have attempted to adopt some national strategies to improve the transition from school to the workplace and to reduce the unemployment rate, especially among the young people. The first results became visible with the drop in the share of young people not professionally employed and who do not attend any education or training program. Of the six Southern European countries, only two, Cyprus and Greece have a higher NEET percentage in 2016 as compared to 2007. In 2016, with the exception of Portugal, all the other countries analysed had NEET percentages above the EU28 average of 3.7 % - Italy - 7%, Greece - 6.2%, Cyprus - 6%, Malta - 5.5% and Spain - 4.3%. (Figure 3) The young people who do not attend any education nor do they have a job are also a source of high unemployment rates in the Southern European countries.

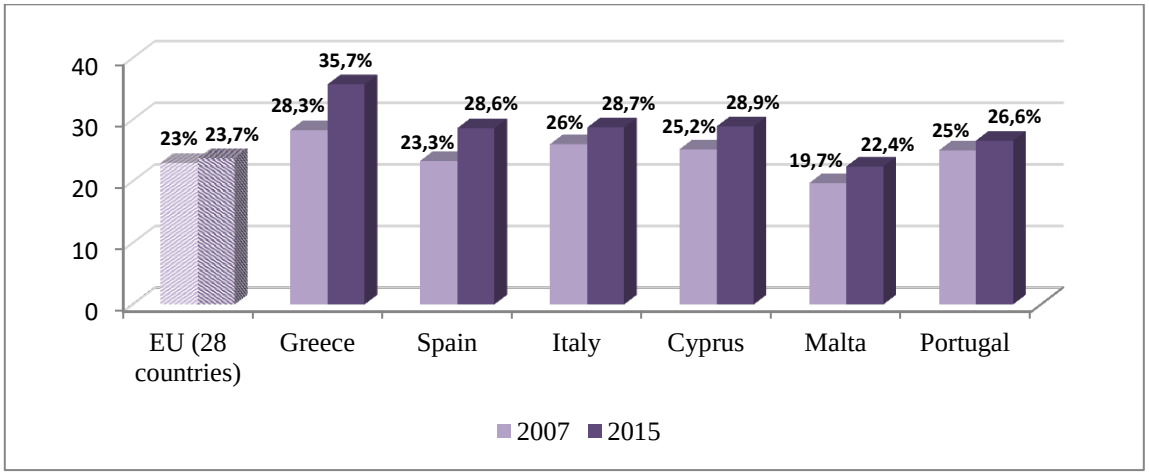
Figure 3. Young people neither in employment nor in education and training - NEET (percent of the population aged 15-19)



Source: Author's calculations based on Eurostat database

People at risk of poverty and/or social exclusion are a priority for all European countries, all the more so, since their number has increased in most EU countries in recent years. The Europe 2020 strategy promotes social inclusion by reducing poverty so that at least 20 million EU citizens are no longer at risk of social exclusion. As expected, given the post-crisis economic path, most Southern European countries have the rates of people at risk of poverty and/or social exclusion above the European average. The highest level is registered in Greece where, in 2016, 35.7% of the total population was at risk of poverty and/or social exclusion. In Spain, Italy and Cyprus, about 28% of the total population was confronted with the same problems. (Figure 4)

Figure 4. People at risk of poverty or social exclusion (percent of the total population)

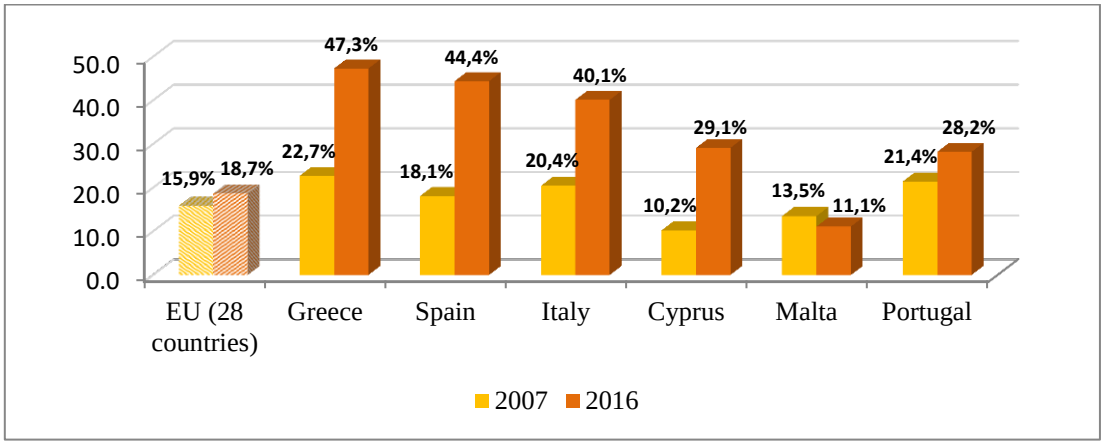


Source: Author's calculations based on Eurostat database

Even though the labour market situation in several Southern European countries has been stable or improving lately, it is noticed that social status indicators are not improving. The unemployed are at the greatest risk of poverty and social exclusion. Thus, we can say that reducing the unemployment rate will help to reduce poverty levels, but European statistics show that "only half of the poor who find a job are out of poverty" (European Commission, 2016).

Youth unemployment is a major problem in all EU countries, but the most affected are Southern European countries. We can notice the significant increases in this indicator in the post-crisis period, even by more than 25 percentage points in countries such as Greece (47.3% in 2016 compared to 22.7% in 2007) and Spain (44.4% in 2016 compared to 18.1% in 2007). Malta is the only country in the group of the six countries analysed which registered a drop in the unemployment rate among young people in 2016 (11.1%) compared to 2007 (13.5%). (Figure 5)

Figure 5. Unemployment rate - less than 25 years (percent of active population)



Source: Author's calculations based on Eurostat database

Even if the youth unemployment rate in the EU has recently started to decline, the decrease is not the same in all countries, with considerable differences between states. Obviously, youth unemployment has proven to be more sensitive to the economic environment created by the 2008 crisis. In Spain, Italy and Greece, there is also a correlation between the high rate of early leavers from school and the high unemployment rate among young people, also indicating a poor link between labour training and labour market requirements.

4. Econometric results

Within the econometric analysis I decided to use a data panel model in order to capture a particular individual heterogeneity (Hsiao, 2003) and for a more efficient analysis, given that the data panel offers the possibility to identify and measure effects that could not be observed through a cross-sectional analysis or a time series analysis.

To begin with, in order to build a valid model, I conducted the Hausman test in order to choose the optimal estimate using either the fixed-effect model or the random-effect model. Based on the result obtained using the *Eviews* software, I chose to use a panel model with random effects, especially as it offers even more degrees of freedom in estimation.

The probability value of the Hausman test is 0.1353 (13.53%) greater than 5%, which led me to choose the panel analysis with random effects (see Appendix 1).

In order to test the error auto-correlation I used the Breusch-Godfrey test, and the probability obtained was greater than 5%, which indicated that the errors were not auto-correlated. In order to test the error homoscedasticity (error variance to be constant) I applied the Breusch-Pagan test, and the result showed that errors are homoscedastic and thus I do not need other specific operations to remove the heteroscedasticity.

In the model, I also tested the multicollinearity of the variables that can occur when a group of exogenous variables are strongly correlated and show dependence on each other. As a result, the estimation coefficient and the dispersions of the estimated coefficients are overestimated, which may distort the interpretation of the model. In order to test the multicollinearity, I applied the VIF (Variance Inflation Factors test, and the fact that none of the coefficients of variance exceeded the value 1, showed that the model is functional without multicollinearity.

In order to verify if any significant structural changes took place during the analysis period, I tested the stability of the model coefficients. For this purpose, I used the CUSUM procedure, which is one of the most well-known stability tests in the literature (Brown, 1975).

The trend of the model tested does not go beyond the critical band corresponding to a statistically significant level of 5% (see Appendix 2). Therefore, at this significant level, the hypothesis of coefficient stability cannot be rejected. This result offers an extra validation to the model used. More specifically, the result suggests that during the period analysed there were no regime changes to significantly alter the model parameters.

I considered estimating an equation that has the following general form:

$$ru_{it}=c+\beta_1\, leavers\_educ_{it}+\beta_2\, tertiary\_edu_{it}+\beta_3\, exp\_edu_{it}+\beta_4 real\_gdp_{it}+\beta_5 fdi_{it}+\varepsilon_{it} \qquad (2)$$

where:

ru_{it} - represents the unemployment rate for each country in year t-1, expressed as a percentage;

$leavers\_edu_{it}$ – represents the percentage of the young population (18-24 years) with at most lower secondary education (ISCED 0-2) and who were not in further education or training for each country in year t-1;

$tertiary\_edu_{it}$ – represents the percentage of the population aged 30-34 who have completed tertiary studies (ISCED 5-8) for each country in year t-1;

exp_educ_{it} – represents the public expenditure on education for each country in year t-1, expressed as a percentage of GDP;

$real\_gdp_{it}$– represents the real GDP rate for each country in year t-1,expressed as a percentage;

fdi_{it}– represents the foreign direct investments for each country in year t, expressed as a percentage of GDP;

ε – model error

The result for the unemployment equation is shown below:

$$\mathbf{ru_{it} = -2.0879 + 0.1606*leavers\_educ_{it}(-1) - 0.5447*tertiary\_edu_{it}(-1) - 0.4911*exp\_edu_{it}(-1)}$$
$$\mathbf{\textit{(1.61)**} \quad \textit{(0.05)*} \quad \textit{(0.05)*} \quad \textit{(0.04)**}}$$
$$\mathbf{-0.6614*real\_gdp_{it}(-1) - 0.3473*fdi_{it}}$$
$$\mathbf{\textit{(0.04)*} \quad \textit{(0.07)*}} \qquad (3)$$

*where between brackets are the standard errors and the *, **, *** stands for 1%, 5% and 10% significance.*

The econometric results indicated that the level of economic growth in the previous year, expressed by the real GDP rate, has the greatest influence on the unemployment rate in the six Southern European countries (associated coefficient - 0.6614). As a matter of fact, we can say that the high level of unemployment registered in most of the Southern European model countries is mainly determined by the economic downturn due to the effects of the global economic crisis. However, we can see that there are also other factors that have a rather significant influence on unemployment.

The level of public expenditure on education shows a lag 1 (coefficient -0.4911) negative influence on the unemployment rate. Unemployment is one of the costs of insufficient investment in

education. It should also be noted that many of the countries analysed have experienced significant budget deficits in the post-crisis period, and this has led to budget cuts in education. The money allocated to education goes mainly to the primary and secondary levels of education and less to the tertiary level. That is why it is obvious that the uneducated or undereducated individuals find it harder to find a job.

This is also supported by other indicators that have been shown to have an impact on the unemployment rate - the share of the 30-34-year-old population with higher education and the share of early leavers from education. The econometric results indicate that the unemployment rate is decreasing as a result of the increase in the number of those completing a tertiary education level in the previous year (associated coefficient -0.5447), and the young people who are early leavers from any form of education or training present a much higher risk of unemployment and, implicitly, social exclusion (associated coefficient +0.1606) in the next period.

The unemployment rate is also influenced by the level of foreign investment (associated coefficient - 0.3473) in the sense that a higher level of foreign investment determines, as expected, the reduction of unemployment. In the post-crisis period, the Southern European countries have experienced a lower level of FDI inflow compared to the Western countries, which has led to either the non-creation of jobs or restructuring of those already created, all of which have supported unemployment and the pressures on the social insurance budget (see Appendix 3).

5. Conclusions

Unemployment is one of the main priorities of society and, in this respect, the economic and social structures of any state will have to make every effort to reduce it.

At the EU level, the labour market was affected differently by the economic crisis at the end of 2007. The negative effects of the post-crisis period on the labour market have depended both on the reforms adopted and on the characteristics of each economy. Within the countries of the Southern European model, we can identify a number of labour market specificities that have made the effects of the crisis more prominent. Thus, in most Mediterranean countries, we can see a segmented labour market governed by rigid legislation with a low labour force flexibility, with wage rigidity and high social protection costs.

The statistical analysis of the main indicators influencing unemployment indicated the existence of some sensitive aspects in the countries in the Southern European model. Thus, in Greece, there is a critical situation at the level of most of the indicators analysed. Unemployment among young people and the share of people at risk of poverty indicate worrying trends, while the rate of young people who are not professionally trained and do not attend any education or training

program, although slightly decreasing, is still at a high level. In Malta and Portugal, youth unemployment is still quite high, but it has been improving lately. These positive changes, however, have not yet made their effects in the social sphere, as the risk of poverty and social exclusion rates, as well as indicators of income inequalities are still at significant levels. In Spain, Italy and Cyprus, developments in unemployment rates and young people who are not professionally trained and do not attend any education or training program have seen a slight improvement (from very high levels), while the unemployment situation among young people, poverty and income inequality remain a challenge.

The econometric analysis highlighted the right macroeconomic aspects at the level of the Southern European model. Thus, during the analysed period (2007-2016) it was demonstrated that the increased unemployment rate among the Mediterranean countries was determined by several factors, mainly educational. Besides the level of the FDI and the real GDP growth, I have also identified the level of public spending on education and tertiary education graduation rate (30-34 years) as factors that can lead to the reduction of the unemployment rate. At the same time the early leaving from school of young people will make it difficult for them to find a job and thus they will join the unemployed, and even worse, the long-term unemployed.

Even though lately, the Southern European countries have developed strategies and adopted a series of reforms to resuscitate the labour market and enable social inclusion, they have not made their effects entirely felt and thus the economic and social recovery policies need to continue. It is necessary for the economy as a whole, and the state in particular, to make more efforts to stimulate economic growth and, implicitly, the creation of new jobs.

Further implementation of country-specific strategies and measures as well as focus on the structural reforms will be essential for the sustainable improvement of the situations existing on the labour market in all EU member countries and, implicitly, the countries in the Southern European model.

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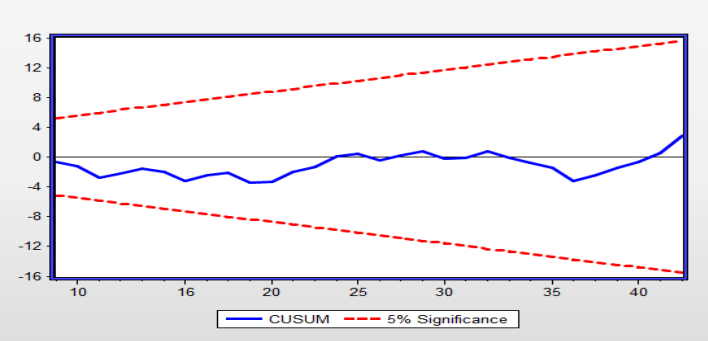
Appendix 1. The result for the Hausman test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	8.403745	5	0.1353

Appendix 2.The result for the CUSUM test



Appendix 3.The results for the unemployment equation

Dependent Variable: unemployment rate
Method: Panel EGLS (Cross-section random effects)
Sample (adjusted): 2007 2016
Periods included: 10
Cross-sections included: 10
Total panel (balanced) observations: 54
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
leavers_edu(-1)	0.160603	0.053181	3.019909	0.0051
tertiary_edu(-1)	-0.544787	0.057129	9.536046	0.0000
exp_edu(-1)	-0.491149	0.045610	-1.210889	0.0354
real_GDP(-1)	-0.661439	0.040626	-4.703523	0.0001
FDI	-0.347313	0.071807	-6.928303	0.0000
C	-2.087924	1.614351	-0.798639	0.0308

Effects Specification	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	2.248919	1.0000

Weighted Statistics

R-squared	0.842216	Mean dependent var	10.55000
Adjusted R-squared	0.815919	S.D. dependent var	5.531029
S.E. of regression	2.373071	Sum squared resid	168.9440
F-statistic	32.02668	Durbin-Watson stat	1.424827
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.842216	Mean dependent var	10.55000
Sum squared resid	168.9440	Durbin-Watson stat	1.424827