**Jovan Zubović**[1]
**Aleksandar Zdravković**[2]
**Dejana Pavlović**[3]

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# Effects of regulation on youth unemployment: evidence from European countries[4]

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***Abstract:*** *Economic trends in recent years have led to rising unemployment across Europe. This trend is particularly evident among youth. At the same time, the negative demographic trends in many countries show that the number of young people is decreasing. Problems among young people are the reflection of the future state of the nation. Therefore there is a need to analyse whether the government can reduce youth unemployment rate using available regulatory tools. In this paper, the authors have analysed the impact of three groups of factors on the youth unemployment rate by using multiple regression analysis and controlling the long-term determinants of unemployment. The results show that the level of unemployment is largely impacted by a tax rate on low wages, primarily in the mid-term. Factors related to the general rate of unemployment, as well as the other demographic factors have showed no statistically significant impact on mid-term and long-term youth unemployment rate.*

***Keywords:*** *Youth unemployment, Demographic Factors, Labour Market Regulations*

[1] Institute of Economic Sciences, jovan.zubovic@ien.bg.ac.rs
[2] Institute of Economic Sciences
[3] Institute of Economic Sciences
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## Uticaj regulative na nezaposlenost mladih: pokazatelji iz Evropskih zemalja

***Apstrakt:*** *Privredna kretanja u poslednjih nekoliko godina su dovela do rasta nezaposlenosti širom Evrope. Taj trend je posebno izražen kod mladih. U isto vreme, negativni demografski trendovi u većem broju zemalja pokazuju da se broj mladih smanjuje. Problemi kod mladih predstavljaju refleksiju budućeg stanja nacije. Samim time se pojavljuje potreba da se analizira da li država preko raspoloživih mehanizama može da utiče na smanjenje nezaposlenosti mladih. U ovom radu autori su analizirali uticaj tri grupe faktora na stopu nezaposlenosti mladih primenom višestruke regresione analize uz kontrolu dugoročnih determinanti nezaposlenosti. Rezultati pokazuju da najveći uticaj na nivo nezaposlenosti ima poreska stopa na niske zarade, i to pre svega u srednjem roku. Faktori vezani za opštu stopu nezaposlenosti, kao ni ostali demografski faktori nisu pokazali statistički značajan uticaj na srednjoročnu i dugoročnu nezaposlenost mladih.*

***Ključne reči:*** *Nezaposlenost mladih, Demografski faktori, Regulativa na tržištu rada.*

## 1. Introduction

Young people's concerns reflect the future state of the nation. Their position in the society is crucial for country's development. They are in the most important period of their lives for gaining knowledge, and what they shall learn today will have a direct impact on their future attitudes and values. In numerous countries the number of young people is decreasing. In addition, the high rates of unemployment, particularly among young people, are one of the biggest issues in the world since the beginning of crisis in 2008. General high unemployment rates have a strong impact on difficulties for youth to find the first job.

A deterioration of the general economic conditions after the global economic crisis outbreak has had the multiple negative effects on chances of the youth to get jobs, especially in European countries that have been the most heavily hit by recession trends. On the one hand, private sector, burdened by the accumulated debt, has reduced job-creating investment activities while waiting for general improvement of global economic tendencies. On the other hand, overwhelmingly accepted austerity policy by majority of European countries impose significant reduction on fiscal space available to policymakers for employment-boosting

measures that require additional government spending, like direct subsidizing the job positions for youth or programs of vocational education.

According to our view, the policy tools still on the table of policy makers to fight youth unemployment, without reflection on additional government spending, can be changes in labour market regulations. The aim of this paper is to explore which market regulation factors had and to what extent an impact on unemployment rates among young people, after controlling for factors that cannot be changed in the short or mid run. We take into account three factors which define position of government and workers toward the corporate sector on labour market: overall tax rate on wages, tax rate on low wages directly inflicted by the government economic policy, and power of collective bargaining, on which government has only indirect influence throughout legislation. Empirical approach is based on regression analysis applied to a group of 41 European countries in the period 2003-2014.

The paper is organized in the following way. The first part of the paper begins with the section presenting overall problem background, followed by the overview of the relevant empirical literature. The second part of the work presents methodological approach and empirical strategy, accompanied by the results of the regression analysis. The concluding section presents summary of the results and policy recommendations.

## 2. Problem background

Official statistical data shows that number of young people is decreasing in many European countries. At national level, the youngest nations in the EU are Ireland, Cyprus, Slovakia and Poland, each with more than 24% of young people; in Denmark, Germany and Italy, on the other hand, young people account for less than 18% of the population. Both the young and the elder are facing two demographic challenges: ageing and the impending decline of the European population (Eurostat, 2014). According to the latest statistical data in 2014, the youth of Serbia makes around 12.6% of the total number of citizen, while 9.7% of the youth hold high degree (UNESCO, 2015), while the youth unemployment rate is 49.4% (ILO, 2014).

The crisis has shaken the whole world from 2008 onwards and had to a great extent a negative impact on the economic growth in developing countries. National economies are seriously affected by reduced foreign direct investments, high level of borrowings, impeded exports and public revenues. After 2008 crisis

shock, instead of prosperity, the transition has resulted in enormous social costs expressed in population growth, the rise of unemployment, increased inequality, deterioration of public services and polarization of their provision, the spread of diseases, the decrease of birth rate and the increase of mortality rate, depopulation, crime, the growth of corruption and armed conflicts. Some authors have discussed on companies' decisions on creating new jobs (Ognjenović, Branković 2013), as well as on the impact of structural changes in the transition period (Nikolić, Zubović, 2013). Adult unemployment has also ticked up after the crisis, but less so than youth unemployment (IMF, 2014). The World Bank data shows that South East European Countries are still poorly developing in comparison to the rest of the Europe. However, the position of young people at the labour market is ranked as lowest. In 2012, the average of 5.6 million unemployed people in EU aged 15 to 24 was on the market, out of 24.4 million people of that age group in the labour market. In the Balkans, the highest unemployment rate is recorded in the Former Republic of Macedonia, amounting to 29% in 2013, followed by Greece with about 27%. The labour market in Romania is stable; the latest data show the unemployment rate of about 7% (ILO, 2014). Financial crisis did not influence the unemployment rate in the Republic of Serbia prior to 2010. The highest unemployment rate ever recorded in Serbia was between 2009 and 2013, amounting to 23.9%. According to the Statistical Office of the Republic of Serbia, in the period between 2009 and 2013, the unemployment rate fluctuated from 16%, 19.2%, 23%, 23.9% and 22.1%, retroactively. Economic crises further decreased economic growth in developing countries.

High rates of unemployment, particularly among young people, are one of the biggest issues in the world. According to the empirical researchers, there are several groups of the young, such as: young people with poor school achievements, members of ethnic minorities; young people who left school; young immigrants (Klemencic, Rozman, Declara, 2007); young drug addicts (Bouilet, 2007); unemployed young population (Potocnik, Ilišin, 2008). Trying to explain the situation of the labour market, the author Ilisin (2008) shows trough the analysis of social status, problems and future of young people that young people have socio-economic problems, such as financial problems because of the low GDP in the country, lack of life perspective.

The young have stronger reaction than adults in accepting external problems and changes caused by financial crises. One way to overcome the emotional stress is to find a job or to continue education. Some developed countries introduced apprenticeship system. Young people can thus get practical experience during their education, and it leaves them more opportunities to find a better job after complet-

ing their studies. Countries such as Germany, Austria and Switzerland defined their apprenticeship system; these tree countries have established a professional system combining work experience, on-the-job training and classroom teaching. This form of vocational training is the main path of transition from school to work (Cahuc et al, 2013). Trained people thus faster enter the labour market (Parey, 2009). France established apprenticeship system. The number of young people getting apprenticeship has doubled over the last 20 years (Cahuc et al, 2013).

However, reform of the educational system toward creation of educational profiles that will match needs of employers require substantial expenditures and prolonged time period to take effects. Under the current unfavourable economic circumstances and austerity policy measures, European governments have limited the number of options to facilitate transition of young people from schooling to job market in the mid run. Of course, we recognize that unemployment of the youth is pre-determined by the general economic conditions and socio-demographic characteristics of the population, so change of labour market regulation can have only limited influence on boosting employment of young people. Our research objective is to explore whether and which of market regulation factors had an impact on unemployment rate among young people, after controlling for mentioned factors that can be changed only in the long run.

## 3. Previous research in the field of youth unemployment

Studies show that many factors, economic or socio-demographic, can affect the unemployment rate among young people. According to the Gorry (2013) the experience of employees and minimum wage in the country can have a major impact on the level of unemployment among young people. The model he used in the study led to the conclusion that an increase of wages in America, from 2007 to 2009, resulted in a rise in the unemployment rate among young people aged 15 to 24. Comparing the wages and labour costs in the United States and France, the results showed that if government reduced the level of payroll taxes it would have a considerable impact on reducing the level of unemployment among young people. The same opinion is shared a lot of the authors who believe that labour costs can be important barrier in the transition from school to work, in particular for low-qualified job seekers. In France, labour costs are characterized by a minimum wage level, but Germany applies a different approach. Minimum wages are negotiated as per industry and occupation among the social partners. Research from Taiwan concluded that in the period from 1973 to 2004, 10% increase in the minimum wage will increase the youth employment rate and the youth labour participation by 0.47% (Chuang, 2006). Table 1 shows the methods used in the previous research.

*Table 1. Previous research on youth unemployment*

| The topic of the paper | Author | Aim of research | Indicators | Model | Conclusion |
|---|---|---|---|---|---|
| Impact of the Great Recession on unemployed and NEET individuals labour market transitions in Ireland, 2015 | Elish Kellly, Seamus McGuinness (Kelly,McGuinness, 2015). | The paper is trying to show the impact of Great Recession on the unemployment rate and focused to the 3 groups of young people (unemployment youths, NEET youths and unemployed prime-aged individuals). | Sex; Age; Education; Educational attainment; Nationality; Geographic location | Binary probity models | The model authors used in the study led to the conclusion that education and nationality factors are important in finding a job in Ireland. |
| Youth unemployment in Romania: Post-Crisis Challenges, 2014 | Silvia Margimean Margineginean,2014) | This paper presents an overview of the development of the labour market in Romania, for the period from 2007 to 2013. | Migration; Education system; Macroeconomic factors; Demographic factors | Statistical analysis | In this paper, the authors came to the conclusion that the key factors that influence unemployment among youth migration and education. |
| Educational policies and youth unemployment, 2013 | Luca Refrigeri, Gabriela Aleandri | The aim of this paper is to present the main problems of youth unemployment in Europe. | Job vacancy; Experience; Education | Statistical analysis | Solving the problem of unemployment in European countries is possible with the new strategy of "policy mix". This strategy is aiming to facilitate young people entering to the labour market, at the same time to improve the education system and offer for training young people. |
| Minimum wages and youth unemployment, 2013 | Aspen Gorry | The aim of the paper is to explore effects of minimum wages on youth unemployment in France compared with to the USA. | Experience; Job finding; Job separation rate; Job loss rate; Payroll tax rate of minimum wage | A labour search model accounting for early life cycle changes in unemployment, based on Mortesena and Pissaridersa (1994). | Experience and minimum wages have a big impact on the level of unemployment among young people. The minimum wage increase in USA in the period from 2007 to 2009 resulted in an increase in unemployment among young people (15-24 years). If government in France will reduce the level of payroll taxes such as in America, it will have a significant impact on reducing the unemployment rate among young people. |

*Source: Author's literature review*

The search for suitable jobs and leaving the country is one of the factors affecting the level of unemployment among young people. Among the EU Member States, Spain, Austria and Germany recorded the highest shares of foreigners among the young population aged 15-29, representing respectively 15%, 14% and 12% (Eurostat, 2014). Research conducted in Romania, concluded that migration and education have a big impact on the unemployment rate among the young. According to the National Institute of Statistics of Romania in 2014, more than 5% of young people aged 15 to 24, left the country (more than 140,000) (Margimean, 2014). One typical solution to the young people's struggle to enter the labour market is to stay in school longer. The topic of unemployment rate is getting very popular among researchers.

## 4. Research methodology

In estimation of the empirical relationship between unemployment of the youth and its possible determinants, we follow the empirical strategy based on a distinction between three groups of factors, listed in descending ordered by our prior believes on magnitude of their explanatory power.

**The unemployment related factors.** In this group we include only the overall level of unemployment, being a generic unemployment measure that also coincides to the country-specific general economic conditions. Also, it is most likely highly correlated to our variable of interest, as it encompasses the youth unemployment as a component of the overall unemployment.

**The population related factors.** We include in this group the factors that are closely related to the demographic and socio-economic characteristics of the population, more specifically working age population, labour force participation and share of young people not in education and not employed.

**The labour market regulation related factors.** We attach to this group the factors depicting the main characteristics of labour market regulation, more specifically a centralization of collective bargaining, tax rate on the lowest wages and tax rate on employees' wages.

As mentioned, we believe that the general rate of unemployment is a single factor which explains the majority of variations in the youth unemployment, while labour market regulation in total has the lowest explanatory power. Rationale behind it stems from the reasoning that unemployment of the youth is primarily related to unemployment and population factors that reflect the overall pre-determined eco-

nomic, demographic and social conditions in a country. Nevertheless, unemployment and population factors could be changed by the government policy tools only in the long run, while labour market regulations conditions can be altered by the active measures of the government policy from the short to mid run. If some of the labour market regulation factors are confirmed to be significant after controlling for pre-determined conditions, this finding can be useful for the policy recommendation purposes. Our research intentions within empirical strategy are to examine the following two research questions:

1. whether explanatory power for each group of factors are in line with our expectations;
2. whether labour market regulation factors brings about additional contribution in explaining variations of the youth unemployment, after controlling for other pre-determined unemployment conditions captured by other two groups of factors.

Our empirical estimation is based on the regression equation of the following form:

$$\mathrm{Y_{i,t}} = \alpha^{(j)} + \sum_{s=1}^{n^{(j)}} \beta_j X_{i,t;s}^{(j)} + \eta_i^{(j)} + e_{i,t}^{(j)} \quad (1)$$

Where:

$i$ is a country index;

$j$ is an index of factor group, $j = \{1,2,3\}$;

$n^{(j)}$ is a number of factors within group $j$, $n^{(1)}$=1, $n^{(2)} = 3$, $n^{(3)} = 3$;

$\mathrm{Y_{i,t}}$ is a variable of interest (youth unemployment or youth unemployment residuals);

$X_{i,t;s}^{(j)}$ is an *s*-factor of group $j$;

$\eta_i^{(j)}$ is a country fixed effect;

$e_{i,t}^{(j)}$ is a standard disturbance term.

It is important to notice that we opt for running the separate regressions for each factor group *j*, instead of running a single regression that include regressors from all three groups. Such approach allows getting explicit explanatory power for each group of factors, which is the first of our specified research objectives, but also enhances degrees of freedom and utilization of information contained in the sample. As explained in the next section, we use the sample of considerably unbalanced data, and putting all of them in a single regression would significantly reduce a number of observations.

In addition, we benefit from running the separate regressions in achieving our second research objective, by diminishing negative effects of possible between-the-group co-linearity effects - which are likely to occur, especially between the rate of unemployment and population-related factors. A presence of co-linearity may affect a precision and reliability of the estimated regression coefficients, if regression equation is expanded by gradual introduction of the new factor groups. To avoid this issue, we computed the residuals from the regressions for unemployment and population related factors separately, and then test whether the labour market regulation factors contribute in explaining variations in residuals.

## 5. Data and results

Our sample consists of 41 countries in total, including 38 European countries complemented with Turkey, Armenia and Israel, which economies are also tied to European economic area. A time span of the sample is the period 2003-2014, meaning the maximum number of 12 available observations per country. We collected data from the international data providers. Detailed explanation of variables' definition and data sourced is enclosed in Appendix.

However, availability of data across countries and variables is unevenly distributed. Table 2 illustrates differences in data coverage of our variable of interest, the youth unemployment. We also underline that data availability is quite larger for first two groups of factors, while data on third group of factors are mostly limited to the EU member countries and the recent period 2008-2014, significantly reducing number of observations on disposal for the regression analysis of the market labour regulation effects.

Basic descriptive statistics on the youth unemployment are presented in Table 2. The variations of the average youth unemployment across countries are very large, ranging from one-digit rates in developed countries like the Netherlands or Switzerland to above the 40% in some emerging economies like Serbia and Mac-

edonia. Macedonia is topping the list of the youth unemployment recorders, both on average value (55.5%) and single maximum value recorded in 2006 (59.7%). Yet, the youth unemployment average rates in the majority of EU member states are close to the grand mean of 22.1%.

*Table 2. Youth unemployment rates, descriptive statistics by country*

| country | av | sd | min | max | obs. | country | av | sd | min | max | obs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Albania | 27.3 | 2.6 | 23.9 | 30.2 | 4 | Lithuania | 21.7 | 8.8 | 8.4 | 35.7 | 12 |
| Armenia | 46.1 | 14.7 | 35.4 | 74.7 | 7 | Luxem- | 15.8 | 2.2 | 10.9 | 18.8 | 11 |
| Austria | 9.1 | 1.0 | 7.5 | 11.0 | 11 | Macedonia | 55.5 | 2.5 | 51.9 | 59.7 | 8 |
| Belarus | 21.1 | 2.3 | 18.0 | 23.7 | 7 | Malta | 14.6 | 2.0 | 11.7 | 18.3 | 11 |
| Belgium | 20.4 | 2.1 | 17.5 | 23.7 | 12 | Montene- | 40.5 | 4.9 | 37.0 | 44.0 | 2 |
| Bulgaria | 22.2 | 5.2 | 12.7 | 28.4 | 12 | Nether- | 7.6 | 1.7 | 5.3 | 11.0 | 11 |
| Croatia | 33.0 | 8.3 | 21.9 | 50.0 | 11 | Norway | 9.5 | 1.8 | 7.4 | 12.8 | 11 |
| Cyprus | 16.4 | 9.7 | 8.7 | 38.9 | 11 | Poland | 28.3 | 8.0 | 17.3 | 41.4 | 11 |
| Czech | 16.9 | 3.4 | 9.9 | 19.9 | 11 | Portugal | 23.2 | 9.5 | 13.5 | 38.1 | 12 |
| Denmark | 10.8 | 2.8 | 7.5 | 14.2 | 12 | Romania | 21.4 | 1.7 | 18.6 | 23.7 | 11 |
| Estonia | 20.4 | 7.5 | 10.1 | 32.9 | 11 | Russia | 15.9 | 1.6 | 13.8 | 18.7 | 11 |
| Finland | 20.8 | 3.8 | 16.5 | 27.8 | 11 | Serbia | 46.0 | 5.1 | 35.2 | 51.1 | 9 |
| France | 21.2 | 2.2 | 17.5 | 23.9 | 11 | Slovak | 29.4 | 5.5 | 19.0 | 34.0 | 11 |
| Germany | 10.7 | 2.5 | 7.7 | 15.5 | 12 | Slovenia | 15.1 | 3.5 | 10.1 | 21.6 | 11 |
| Greece | 33.1 | 13.3 | 21.9 | 58.3 | 11 | Spain | 34.3 | 15.0 | 17.9 | 55.5 | 12 |
| Hungary | 21.7 | 5.5 | 12.9 | 28.1 | 11 | Sweden | 21.5 | 3.1 | 14.3 | 25.0 | 12 |
| Iceland | 11.5 | 3.4 | 7.0 | 16.2 | 11 | Switzer- | 8.0 | 0.6 | 7.0 | 8.8 | 12 |
| Ireland | 17.6 | 9.8 | 8.1 | 30.4 | 11 | Turkey | 19.1 | 2.0 | 15.7 | 22.8 | 12 |
| Israel | 15.4 | 3.8 | 10.5 | 22.2 | 11 | Ukraine | 17.0 | 1.3 | 14.9 | 18.6 | 7 |
| Italy | 26.9 | 6.1 | 20.3 | 40.0 | 11 | United | 16.4 | 3.8 | 10.7 | 21.1 | 12 |
| Latvia | 22.5 | 8.8 | 10.6 | 36.2 | 11 | Total | 22.1 | 5.0 | 15.8 | 29.9 | 10.5 |

*Source: World Bank, ILO, Eurostat, authors' calculation*

Table 3 summarizes results of separate regressions for each factor group. The results confirm our prior believes on explanatory power, measured by R squared,

of factor groups. The unemployment rate, even as a single factor, explains 95% of the variations in the youth unemployment and estimated regression coefficient indicates that increase of the overall unemployment for one percentage point leads to increase in the youth unemployment for two percentage points. Every single factor related to population is found to be significant and positive, with overall explanatory power of 85%. Finally, the labour market regulation factors have the lowest overall explanatory power, with tax rate on low wages being the only one that is significant. Estimated regression coefficient for tax rate on low wages implies that rise in tax rate for one percentage points more than double incremental rise in the youth unemployment.

*Table 3. Regression analysis of youth unemployment, by factor groups*

| Factors 1 | | Factors 2 | | Factors 3 | |
|---|---|---|---|---|---|
| Variable | Coeff | Variable | Coeff | Variable | Coeff |
| unemp. rate | 2.058848*** (0.0467041) | working-age populations, log | 0.7328347*** (0.2040466) | centralized coll. bar-gaining | -0.7797608 (1.50489) |
| | | labour force participation | 29.28497*** (8.521393) | tax rate on low wages | 2.291638*** (0.5962828) |
| | | young not in ed. or empl. | 1.594445*** (0.107283) | tax rate | -0.186521 (.4412839) |
| R squared | 0.9555 | 0.847 | | 0.772 | |
| Observa- | 412 | 340 | | 140 | |

*Note: Dependent variable: youth unemployment rate*
*Standard errors in the parenthesis. Levels of significance: * p<0.1, ** p<0.05, *** p<0.01*

Eventually, we run the regressions that relate the youth unemployment residuals obtained from the regressions where unemployment and population related factors are explanatory variables. For the sake of comparison, we also regress population related factors to residuals from the regression of the overall unemployment rate to the youth unemployment. The results show that after controlling for predetermined conditions affecting the youth unemployment, tax rate on low wages remains to be significant factor in explaining residual variability. Estimated regression coefficient is positive and significant, but lower relative to its unconditional

estimation presented in Table 3. The centralization of collective bargaining[5] exhibits some significance, but not found to be robust. Even more important, R squared values indicate moderate explanatory power of the labour market regulation factors on the youth unemployment residuals (confirmed by F-statistics to be significant in both cases), which is not a case with factors from the second group. Although labour force participation and share of young people not in education or employed are particularly significant factors, overall explanatory power of population related factors after controlling for overall unemployment is low and insignificant.

*Table 4. Regression analysis of youth unemployment residuals, by factor groups*

| Residuals from factors 1 | | Residuals from factors 1 reg | | Residuals from factors 2 | |
|---|---|---|---|---|---|
| Variable | Coeff | Variable | Coeff | Variable | Coeff |
| working-age populations, log | 0.0939666 (0.0744783) | centralized coll. bargaining | -0.6005293* (0.35656) | centralized coll. bargaining | -0.250173 (1.023083) |
| labour force participation | 0.0004593* (0.000173) | tax rate on low wages | 0.327856** (0.140042) | tax rate on low wages | 1.517611*** (0.4053762) |
| young not in ed. or empl. | 0.0928808* (0.0382306) | tax rate | -0.098477 (0.1027112) | tax rate | -0.3193778 (0.3000019) |
| R squared | 0.0655 | 0.3491 | | 0.308 | |
| Observations | 329 | 135 | | 140 | |

*Note: Dependent variable: youth unemployment residuals*
*Standard errors in the parenthesis. Levels of significance: * p<0.1, ** p<0.05, *** p<0.01*

Results of the regression analysis clearly indicate that reduction of tax rate on low wages would reduce unemployment of the youth. The matter for possible concern is reflected in case that the tax rate on low wages is probably correlated to unemployment and population related factors and its change could affect the other determinants of the youth unemployment. Indeed, Pearson' correlation coefficients reveal some ex post correlation patterns between tax rate on low wages and other factors. For example, correlation between labour force participation and tax rate on low wages is around -0.4. Yet, correlation coefficients are not reliable

[5] This variable is measured in terms of ordinal scale, based on question from the Global Competitiveness Report survey: "Wages in your country are set by a centralized bargaining process (= 1) or up to each individual company (= 7)"

indicator of this issue, as they do not impose causality or count for country fixed effects. Even if country fixed effects are controlled, we firmly believe that ex post observed correlation among tax rate on low wages and other factors is not an issue to worry about. While in the long run change in tax rate on low wages would probably take effects on other youth unemployment determinants, it is reasonable to assume that in the short and mid run tax rate on low wages is quite orthogonal to other factors, especially to those population-related. In addition, decrease in tax rate on low wages may have contemporaneous effects on the overall unemployment, too, but this effect is arguably directed toward the reduction of unemployment.

We recognize that reduction of tax rate on low wages is not a policy measure without any cost. Even though it does not tackle expenditure side of public finance, it will contemporaneously affect revenue side and government balance due to reduction of tax revenues. However, we believe that this reduction will be most likely compensated in the mid run throughout two channels, increase of tax revenue from newly employed workers and decrease in social transfers to unemployed.

## 6. Conclusion

Youth unemployment is very important issue for national economies. Many European countries such as Balkan countries are facing high rate of youth unemployment. There is no doubt that the bad position is directly linked with negative effects of financial crisis. Macroeconomics factors are affecting the most on the unemployment rate.

Unemployment is more evidenced among young than adults. The whole situation diminishes the wish of the young people for a financial independence or their decision to continue education. The group of the people aged 15 to 24 is in an extremely vulnerable situation, and therefore the countries have been dealing with the problems of increased number of young delinquents, drug addicts, brain drain, low number of graduates.

In this paper we provide an empirical analysis of the effects of the labour market regulation factors on the youth unemployment, after controlling for long-term determinants of the unemployment rate. As expected, the factors related to unemployment and socio-demographic characteristics of the population exhibit high explanatory power in explaining variations of the youth unemployment. However, the results of our analysis show that the labour market regulation factors have the

significant impact on the youth unemployment even after controlling for effects of other factors, more particularly tax rate on low wages is found to have robust and negative effect. We propose reconsidering the policy of tax rates on low wages, as their reduction may be a simulative measure for boosting employment of the youth in the mid run, and an efficient policy tool, which does not require substantial increase in government spending.

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# Appendix

| Variable | Definition | Source |
|---|---|---|
| Working-age population by sex, age and education (Thousands) | The working age population comprises all persons above a specified minimum age threshold for which an inquiry on economic activity is made. For purposes of international comparability, the work-ing age population is commonly defined as per-sons aged 15 years and older, but this varies from country to country.. | ILO Statistics, http://www.ilo.org/ilostat/faces/help_home/data_by_subject/subject-details/indicator-details-by-subject |
| Labour force participation rate by sex and age % | The labour force participation rate is calculated as the labour force during a given reference period given as a percent of the working age population in the same reference period. | ILO Statistics, http://www.ilo.org/ilostat/faces/help_home/data_by_subject/subject-details/indicator-details-by-subject |
| Unemploy-ment rate % | The unemployment rate is calculated as the num-ber of persons who are unemployed during the reference period given as a percent of the total number of employed and unemployed persons (i.e., the labour force) in the same reference peri-od. | ILO Statistics, http://www.ilo.org/ilostat/faces/help_home/data_by_subject/subject-details/indicator-details-by-subject |
| Unemploy-ment rate for young from 15-24, % | The unemployment rate is calculated as the num-ber of persons ages between 15-24, who are unemployed during the reference period given as a percent of the total number of employed and unemployed persons (i.e., the labour force) in the same reference period. | ILO Statistics, http://www.ilo.org/ilostat/faces/help_home/data_by_subject/subject-details/indicator-details-by-subject |
| Share of young people not in educa-tion and no employment % | For statistical purposes, the United Nations defines youth as those persons between the ages of 15 and 24 years (inclusive). In practice however, many national statistics offices apply definitions of youth which differ from the international standard. | ILO Statistics, http://www.ilo.org/ilostat/faces/help_home/data_by_subject/subject-details/indicator-details-by-subject |
| Tax rate on low wage earners: tax wage on labour costs | Tax wage on labour costs, defined as income tax on gross wage earnings plus the employee's and the employer's social security contributions, ex-pressed as a percentage of the total labour costs of the earner. | Eurostat Statistics, http://ec.europa.eu/eurostat/web/labour-market/earnings/database |
| Tax rate | Tax rate, defined as the income tax on gross wage earnings plus the employee's social security con-tributions less universal cash benefits, expressed as a percentage of gross wage earnings; | Eurostat Statistics, http://ec.europa.eu/eurostat/web/labour-market/earnings/database |
| Centralized Collective Bargaining | Ordinal scale, based on question from the Global Competitiveness Report survey: “Wages in your country are set by a centralized bargaining process (= 1) or up to each individual company (= 7)” | Gwartney, J., Lawson, R., Hall, J. (2014) 2014 Economic Freedom Dataset, published in Economic Freedom of the World: 2014 Annual Report, Fraser Institute. http://www.freetheworld.com/datasets_efw.html |