CAN OKUN's LAW EXPLAIN DECENT WORK DEFICIT FOR YOUNG PEOPLE IN EUROPE? A FOCUS ON THE ROMANIAN ECONOMY

Authors[*]*:*

Emiliano COLANTONIO,
Gianluigi NICO

Abstract: Due to the growing concern about the labour market situation of young people in Europe, this paper analysis the effective role played by real output growth in stimulating job creation. To reach this goal, one strand of this analysis empirically investigates the real output growth effects on the youth unemployment rate (15-24) by testing the difference version of the Okun's law. The most interesting result relates to the case of the Romanian economy whose Okun's law does not fit so well. We additionally test the Okun's law on a set of Decent Work Indicators in order to verify whether a Decent Work deficit exists among young workers within the European labour market.

Keywords: *decent work, decent work indicators, econometric models, labour market, Okun's law*

JEL Classification*: J01, J64, J28*

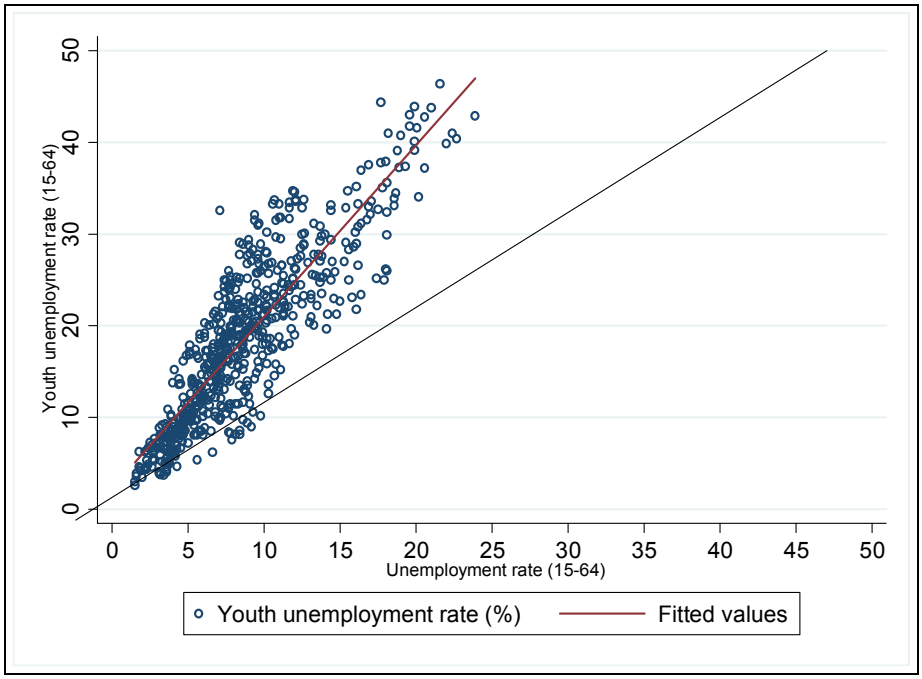
Introduction

The starting point of this study arises from a very simple consideration that may be inferred by looking at the scatter diagram in Figure 1 below. Over time (1981-2011) and across European countries (27), the youth unemployment rate (15-24), when comparing to the unemployment one, has been at least two times

[*] *Emiliano Colantonio, Ph.D., Professor, University of Chieti-Pescara e- mail: colantonio@unich.it; Gianluigi Nico, Ph.D student, University of Chieti-Pescara, e-mail: gianluigi.nico@unich.it*

higher, on average. In its "Global Employment Trends for Youth"(2013), the International Labour Organization (hereafter ILO) has highlighted that "*in comparison to adults, youth continue to face a disadvantageous labour market situation*"(ILO, 2013, p.7). It has also placed a greater emphasis on the ratio of youth to adult unemployment rates which is globally 2.7 times higher. In line with the main findings of the ILO, data pictured in figure 1 below shows that youth have been more than two times more likely than adults to be unemployed in the European Union (EU) in the period 1981 – 2011, on average.

Figure 1. Comparison between adults and youth unemployment rate



Source: authors' elaboration based on KILM, 7th edition.

The underlying weakness of the labour market conditions for young people is not only evident by looking at the youth unemployment rate but, especially, while taking into consideration the concept of DW. In the EU there are many reasons to believe that international commitment to youth employment must achieve significant outcomes especially in regards of DW creation for youth. It has been largely recognized by the ILO that youth entering the labour market for the first

time lack professional experiences and this may hamper their ability to quickly find a job. Moreover, youths are likely to be over-represented in precarious jobs (notably temporary and informal jobs) of short duration and limited stability. As a result, they are often the first to lose their jobs in times of adverse economic conditions and the last to be recruited during an economic expansion. Thus, if the above mentioned considerations are then considered as to be stylized facts, the mere job creation process could result a too reductionist strategy. The pathway to job creation for youth must go hand in hand with DW policies allowing youth not only to enter the labour market but also to get a "*decent and productive work, in conditions of freedom, equity, security and human dignity*" (ILO, 1999a, p.3).

From a very general perspective, economists, and especially the labour ones, are used to debate about job creation and real output growth. There is a plethora of studies showing that political interference and the presence of labour market institutions may lead to a disequilibrium in the labour market. Such an idea is strongly supported by the neoliberal experiments (at one time the Washington Consensus) according to which the quickest way to growth for a country would imply minimizing workers' protection. This preamble, of course, leads to the linkage between economic growth and job creation whose main framework of reference can be found in the Okun's law. Although we can even assume this relationship as to be a good one, we cannot forget that is needed to transform economic growth into a better quality life for workers: this is not always an obvious condition.

How can the issue be approached? by means of econometric techniques the following study intends to define an empirical basis to identify "whether" and "how" pure economic growth impacts on the youth unemployment rate as well as on a set of decent work indicators (DWIs) related to the youth dimension of the labour market. Answering these questions is central if the Okun's law, when applied to the concept of DW, is intended to be broadly detailed and monitored.

"Whether" implies that the investigation of the Okun's law can indeed be validated even for people aged 15-24. The way used to explore this link deals with the regression analysis in the form of random (RE) and fixed effects (FE) models.

"How" means that the way in which economic growth affects the youth dimension needs to be assessed. A simple analytical framework to examine the concept of DW includes the identification of the quantitative impacts of real output growth on 4 selected DWIs in the EU. This is done by using panel (longitudinal) data over a

period of 25 years or longer and for 27 European Countries. The employed variables (both dependent and independent), as well as data-source, are explained and detailed in separate paragraphs before introducing the econometric results. To estimate the effects of real output growth on our dependent variables (DWIs for youth), we both use a FE and a RE model and we later on run the Hausman test in order to decide which model (RE or FE) better adapts to our dataset.

Literature review

Not only work represents one of the most important ways through which income is provided to people, but it is also central for people's well-being. Starting off our discussion from a very general perspective, economists have developed several economic models and theories to support insights behind the job creation process as well as the way through which real output growth influence it. In 1962 Okun opened his own study by questioning how much output can a given economy produce under condition of full employment. The importance behind that question was actually much more political than economic. Okun argued that "*a target of full employment of labor needs to be linked to a corresponding target of full employment output, since policy measures designed to influence employment operate by affecting aggregate demand and production*"(Okun, 1963, p.1). Okun clearly linked his own study to the importance to generate enough employment opportunities and avoid massive unemployment by stimulating potential output and offering a kind of guide for policy makers. The broad and key concept linking output growth to the diminishing of unemployment was then operationalized by means of two empirical relationships generally accepted as a rule of thumb. The basic assumption behind the policy implications on the job creation process was quite simple: the more a given economy produces goods and services, the lower the unemployment rate. With this frame of reference, we, of course, do not object Okun's law and we are even aware that it can serve as a baseline regression for the implementation of employment policies. However, we point out that beyond job creation the productive work which entails decent wages and working conditions is a much more complex matter that does not inevitably result from output growth. In despite of several limitations that have to be considered while talking about the wide issue of job creation, economists are used to argue that economic growth is the main vehicle for generating it and a plethora of study has been examined in-depth to support this thesis. While the Okun's law can be considered as the milestone of the existing linkage between economic growth and job creation,

many authors have addressed this issue both at the sector level and at the policy one. The main findings of their studies have been different and strongly based on the typology of country taken into consideration (*i.e.* if it is a developing or developed country). However, the job creation effects of economic growth has not lead to an unanimous consensus yet.

In the agricultural sector, for instance, the thematic window on job creation effects of economic growth has been widely addressed by Crivelli et al. (2012) and Kapsos (2005). On the basis of the typology of sector taken into consideration, the different impact of GDP growth on employment has been especially emphasized by Kapsos (2005) who, as reported in a review paper, found "*that for every 1-percentage point of additional GDP growth, total employment has grown between 0.3 and 0.38 percentage points during the three periods between 1991 and 2003*" (Basnett and Sen, 2013 p. 12). On the contrary, a stronger and positive impact of GDP growth effects on employment has been seen in the Manufacturing (see, among others, Crivelli *et. al.,* 2013, McMillan and Rodrik, 2011, Mazumdar 2003, Kapsos 2005) and services sector (Crivelli *et. al.* 2013, Melamed *et. al.* 2011, Kapsos 2005).

In general, Basnett and Sen (2013) - in their literature review- argue that "*the services sector is one of the fastest growing and most dynamic in developing countries, and remains the key driver of job creation*"(Basnett and Sen, 2013 p.17).

Apart from this it is clearly evident that the linkage between output growth and employment depends on the political commitment for the transformation of economic growth into job creation. Nevertheless, controversial findings make difficult to orientate the actual debate on the effective role played by economic policies in generating employment. To give an example, the role of trade liberalization and labour market flexibility on employment creation still lack of an unanimous agreement (see Basnett and Sen, 2013 as the baseline for literature review and McMillan and Rodrik, 2011, Winters *et. al.*, 2003, Fu and Balasubramanyam, 2005, Milner and Wright, 1998, Rama, 1994, and Cazes and Verick 2010, for collecting more detailed information on trade reforms and labour market flexibility effects on employment). On the contrary, industrial and investment policy seems to have a positive impact on job creation as the extensive literature on the argument details (see, among other, McMillan and Rodrik, 2011 and Mazumdar, 2003). With this frame of reference, the state of arts about output growth effects on employment does not seem to provide us with enough, coherent and unanimous information and much work need still to be done. Nevertheless, we cannot deny that economic growth is the starting point for job creation.

Most important for job creation is also quality and dignity. In line with these economic theories many countries, in designing the policy processes, are highlighting the importance of economic growth as the main instrument towards job creation. However, the relationship generating economic growth and ensuring "quality" employment opportunities is much more important than the mere relationship between economic growth and job creation in itself. DW is in fact the main instrument for providing decent life to people or, at least, the starting point to the achievement of this objective. Despite many development policies, both at the national level and international one, focus on economic growth and its capacity to create working opportunities, economic growth does not necessarily provide and result in "decent" job. In the developing world, for instance, many poor people already have a job even though these jobs are not in line with the desirable labour standards provided by the ILO. Especially in developing economies the typology of available jobs seems not providing fair income, social protection, better prospects for social development as well as security in the work place and social integration. As a result, the lack of proper working conditions in the labour market of developing countries represents a serious constraint and reinforce the idea according to which "*economic growth does not inevitably result in a more and better job*" (Bell and Kirsten, 2010, p.3). According to the literature, a preliminary conclusion suggests us that the relationship between economic growth and job creation is not a solution in fighting poverty. In designing the policy process toward poverty eradication -in developing, as well as developed countries- policy makers should pay attention to translate economic growth in DW opportunities. This to say that the employment policy cycle has surely to start from economic growth but has also to encompass "*an ongoing need to ensure that opportunities from economic growth are then translated into a better quality of economic opportunities for the poor*" (Bell and Newitt, 2010, p. 5). This seems a necessary condition for poverty alleviation. Although this preamble has focused on economic growth and job creation, the interest here is about the relationship between DW creation and economic growth including, the youth dimension. Before conducting an analysis on how this relationship could be operationalized, it is therefore important to respond to the following question: *What does, in concrete terms, DW mean?*.

The ILO seeks to promote opportunities for women and men to obtain decent and productive work, in condition of freedom, equity, security and human dignity. Its mandate is mainly conceptualised within its "Decent Work Agenda" (DWA). The DWA of the ILO puts as central people's well-being. It recognizes employment as source of dignity and as the major route for escaping poverty. Such a kind of Agenda represents an alternative approach of the world of work.

In fact, within the framework of the ILO-DWA, the relationship between economic growth and job creation seems no longer being fundamental. In line with the ILO's mandate it is important to put at the top of the political agenda employment policies oriented to provide not only job creation but also decent, remunerative and permanent job condition: job creation is as important as its quality.

The main message emerging from the described DW scenario can be summed up as follows: we need to rethink the role of economic growth in favor of a new route starting from DW creation and leading to human development. The channel that link economic growth to job creation seems no longer being adequate in reducing poverty.

1. Data explanation

We present here several labour market outcomes as dependent or response variables and the real output growth as the explanatory one. One strand of this analysis develop the basic approach which is in line with Okun's law by using the difference in youth unemployment rate as the response variable and the real output growth as the independent one. Next, we turn to the question concerning the effects of real output growth on the DW dimension by using 4 DWIs. The database covers a period of 30 years (or even longer) for 27 European countries; all data employed in the analysis have been collected from the ILO's database, namely the Key Indicators of the Labour Market (KILM 7th edition) and have been disaggregated by age (15-24). More In detail, we have collected 5 main statistical indicators of the labour market and one macroeconomic indicator. The rationale behind the selection of these variable is based on the importance of responding to both quantitative implications of real output growth - on the labour market side - and to qualitative ones. The quantitative side is of course preliminary to DW creation since without generating jobs would not be possible to provide DW. The idea here is to consider the youth unemployment rate as a signal from a given economy (i.e. those in the EU) of underutilization of labour supply since it concretely reflects the inability of an economy to generate employment for those persons who want to work but are not doing so, even though they are available for employment and actively seeking work[1]. Although the analysis of the youth unemployment rate in the EU is a necessary conditions in the phasing of policy, this is, however, not sufficient. Measuring the labour

[1] *See "Decent Work Indicators Concepts and definitions" of the ILO. Also available at http:// www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/publication/wcms_183859.pdf*

market performance of young people, means to take into consideration all its relevant aspects. This is often a too complex task that needs to be broadly analysed.

The most important reason that justifies the need to research on job quality and, at a later stage, to provide policy actions coherent with DW, is the constant monitoring of working condition of youth. Measuring the labour market performance by means of the youth unemployment rate certainly allows to get a quantitative measure of the labour market situation; however, beyond the youth unemployment dimension, there would not be any perspective with regard to qualitative aspects. To reach this goal, the intent here is to employ four DWI which cover 2 out of the ten[13] substantive elements corresponding to the four strategic pillars of the DWA[2] (full and productive employment, rights at work, social protection and the promotion of social dialogue). Those used in this analysis especially cover both the decent working time condition and the labour market flexibility.

1.1. Testing Okun' s law on the youth unemployment rate: a cross-sectional time-series model for 27 European countries

From a merely quantitative point of view, an approach to analyse the effects of real output growth on changes in the youth unemployment rate with multiple observations draws heavily on FE and RE models.

With this frame of reference we can define a baseline regression for our study in equation (1).

$$\Delta u_{i,t} = \sum_{k=1}^{K} \Delta gdp_{k,i,t} \beta_{k,i,t} + \epsilon_{i,t}, \quad \text{and} \quad i = 1 \ldots N, t = 1 \ldots T \text{ and } k = 1 \ldots K \qquad \textbf{(1)}$$

---

[1] *(i) employment opportunities; (ii) adequate earnings and productive work; (iii) decent working time; (iv) combining work, family and personal life; (v) work that should be abolished; (vi) stability and security of work; (vii) equal opportunity and treatment in employment; (viii) safe work environment; (ix) social security; and(x) social dialogue, employers' and workers' representation.*

[2] *The Decent Work Agenda has been developed by the ILO for the community of work. As such, It aims to support member states by implementing Decent Work Country Programmes in coordination with its constituents (see also: http://www.ilo.org/global/about-the-ilo/decent-work-agenda/lang--en/index.htm).*

Where "*N"* is the number of countries and "*T"* is the number of periods.

Since the intent here is to control for omitted characteristics, including unobserved characteristics of countries, the development of a regression model must take into account both RE and FE[1] that may influence the outcome variable, *i.e.* changes in the youth unemployment rate. Further, by performing a series of statistical test will be possible to decide about that model which better adapts to data.

According to Okun, we employ the "difference version" of his own law to verify how changes in the youth unemployment rate from one year to the next occurs with yearly growth in real output. We operationalize such an objective by means of equation (2) below:

$$\Delta u_{i,t} = \alpha + \beta_1 gdp\ growth_{i,t} + \gamma_t + c_i + \epsilon_{i,t} \quad \textbf{(2)}$$

Where index "*i"* denotes country and *"t"* denotes time[2] (from 1981 to 2010), "$\Delta u_{i,t}$"indicates changes in the youth unemployment rates from one year to the next for 27 European countries, " $gdp\ growth_{i,t}$" is the real output growth for the same set of countries (27), " γ_t" is a time effect," c_i "is a country effect and, finally, "$\epsilon_{i,t}$" is an error term. Both variables in our regression analysis are measured in percentage points. Data employed in this study has been gathered by the "Key Indicator of the labour Markets" (KILM 7th edition) and refers to 579 observations.

As for the youth unemployment rate there are two main reasons that tend to justify the use of this indicators in our analysis. The basic one deals with the capacity of this indicator to provide useful information with regard to the unutilized labour supply in a given country. Furthermore, due to a physiological reasons, unemployment rate of youth is higher than adults'. A number of factors can explain the higher rate of unemployment among young people. Youth entering the labour market for the first time lack professional experience and this may hamper their ability to quickly find a job. Moreover, youths are likely to be over-represented in precarious jobs (notably temporary and informal jobs) of short duration and limited stability. As a result, they are often the first to lose their jobs in times of adverse economic conditions and the last to be recruited during

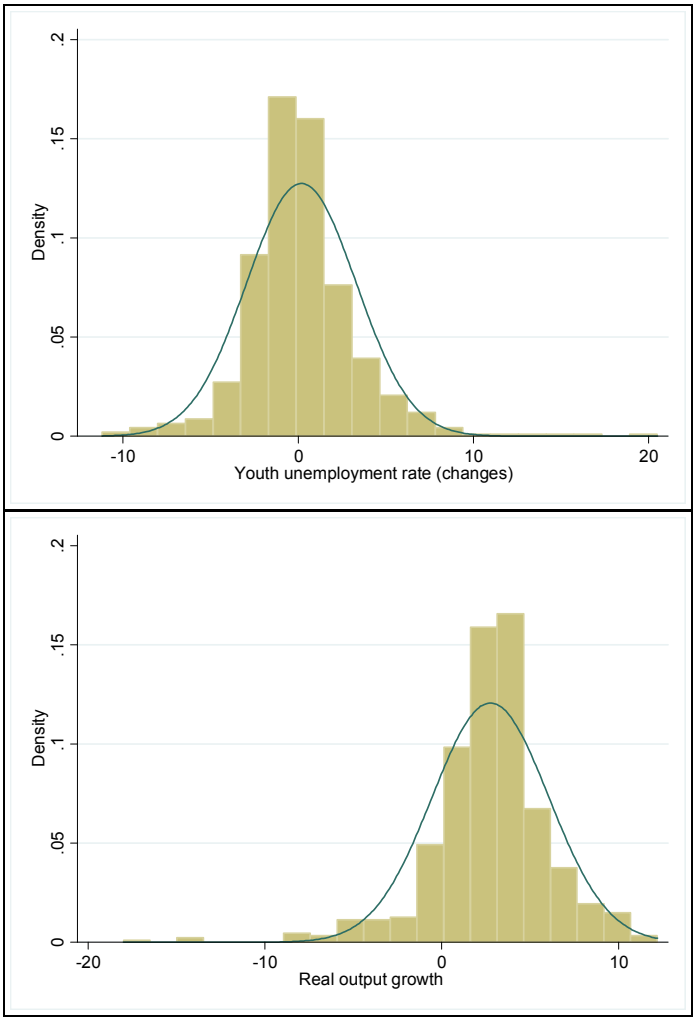
---

[1] *"The crucial distinction between a fixed and random effects is whether the unobserved individual effect embodies elements that are correlated with the regressor in the model, not whether these effects are stochastic or not." (Green, 2008, p.183)*

[2] *It is worth noting that our panel is strongly unbalanced.*

an economic expansion. In few words, the current economic downturn has clearly exacerbated the situation in the labour market especially for young people. All these facts have suggested us to take into account the youth unemployment rate instead of the unemployment one.

Figure 2. Normal distribution of the youth unemployment rate (graph on the left side) and real output growth (graph on the right side)



Source: authors' elaboration based on KILM 7th edition.

We follow Hutengs and Stadtmann (2013) to estimate Okun's coefficient in a panel least squares dummy variables model (LSDV) for each European country. Results are reported in Tables 3 and 4 with a special focus on the Romanian economy. The analytical equation used to estimate Okun's coefficient is contained in expression 3 below:

$$\Delta u_{i,t} = \beta_1 gdp\ growth_{it} + \delta_t + \sum_{i=1}^{27} \alpha_i A_i + \epsilon_{i,t} \quad (3)$$

In equation 3 we bring explicitly into the model the unobserved effect by defining a set of dummy variables (A_i) where " A_i " is equal to 1 in the case of an observation relating to country " i " and 0 otherwise. This is to say that the unobserved effect is now being treated as the coefficient with the country specific dummy variable, the" $\alpha_i A_i$" term, representing a FE on the dependent variable (Δu_t) for country "i ". Model (3) can be fitted using Ordinary least Square (OLS).

1.2. Econometric results: EU 27

Table 3 below reports the results of our baseline regression referring to both FE and RE models. Some preliminary observations are crucial in order to better understand the statistical implications of the two employed models. A first statistical test to be performed refers to the presence of heteroskedasticity in the FE model. Since the performed test[1] reported in table below (1) reveals us the presence of heteroskedasticity, we add cluster-robust standard errors to control for this when running the model.

Table 1. Testing heteroskedasticity

Ho: sigma (1)^2=sigma^2 for all "i"	
Chi^2(27)=	712.18
Prob>chi^2	0.000

Source: authors' s elaboration and calculation.

More, even though we show in table 3 both FE and RE models, the decision between the best model to be discussed will be done on the basis of the

[1] *Accepting the null hypothesis means to accept the presence of constant variance (or homoskedasticity). In our study we must reject such an hypothesis and conclude for the presence of heteroskedasticity. Such an evidence suggests to control for heteroskedasticity by adding cluster robust standard errors in our regression.*

Hausman test (see Table 2 below). This test allows us to make a decision between the preferred model by accepting the null hypothesis (namely the preferred model is the RE one) versus the alternative one (the preferred model is the FE one). As specified earlier, the crucial distinction between FE and RE model relates to the correlation of the errors with the regressors[1]. In table 2, the rejection of the null hypothesis after running the test (the probability > chi^2 is lower than 0.05), give us a prove to run the FE model.

Table 2. Hausman Test. Own elaboration and calculation

Hausman Fixed-Random				
	-Coefficients-			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fixed	Random	Difference	S.E.
Real output growth	-0.6505754	-0.5805706	-0.0700048	0.0073644
b=consistent under H0 and Ha				
B=Inconsistent under Ha, efficient under H0				
Test: H0: difference in coefficients not systematic				
chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B)				
=	90.36			
Prob.>chi2 =	0.000			

Source: authors's elaboration and calculation.

For the 27 European countries in our sample, Table 4 shows estimates of Okun's law. Since the results of Hausman test have suggested us the consistency of the FE model, the equation on which the more we should focus on becomes:

$$\Delta u_{i,t} = \alpha + \beta_1 gdp\ growth_{i,t} + c_i + e_{i,t} \quad \textbf{(4)}$$

Thus, the difference version of Okun's law to be applied to all European countries according to the estimated parameters in table 4 is:

$$\Delta u_{i,t} = \widehat{1.97}\ \% + \widehat{-(0.65)} gdp\ growth_{i,t} \quad \textbf{(5)}$$

[1] *From a statistical point of view, if the errors are correlated with the regressor then the employed model must be the FE. On the contrary, errors uncorrelated with the regressors suggest to employ a RE model.*

Before discussing the results of our regression analysis we need to make clear one things from the very beginning: while a high and negative Okun's coefficient might be interpreted as the capacity of a given economy to reduce the youth unemployment (in accordance with positive changes in real output growth), the same is also a signal of lack of social protection. Indeed, a higher Okun's coefficients also means that a negative change in real output growth results in a more accentuated change in the youth unemployment rate. With this frame of reference, the highest the Okun's coefficients, the most firms adjust (youth) unemployment in line with change in real output growth. At least at the level of idea the coefficient, if high, can signal freedom of firms to hire and fire without much political interference and on the basis of cyclical fluctuation.

As a result, if there is zero GDP growth in a given year, then the increase in the youth unemployment rate in the same year would be of 1.97 percentage points. This is consistent with the idea that youth unemployment rate is higher than adults'[1]. A first basic result to be inferred from equation 4 relates to the ratio between youth unemployment rate and unemployment rate. Indeed, if we take into account the Okun's estimates, with no change in real output from one year to the next the youth unemployment rate in the European zone would be roughly 2.18 times higher than adults' (that is $\frac{1.97}{0.3 * (3)} = 2.18$[2]). If we had employed the RE model, the result would have been slightly different even though not so much. Indeed, with this model the ratio of youth unemployment rate to unemployment rate equals 1.97 (that is $\frac{1.78}{0.3 * (3)} = 1.97$).

To contemporaneously capture changes in the youth unemployment rate and real output growth we can look at the estimated coefficient associated to the real

---

[1] *Okun estimated that quarterly changes in the unemployment rate are related to quarterly percentage changes in real Gross National Products (GNP). According to his own estimate, the unemployment rate (15-64) will rise by 0.3 percentage points from one quarter to the next if there is no change in GNP growth.*

[2] *The reason why we have multiplied the Okun's estimate (0.3) by 3 deals with different time series employed by the author. While Okun used quarterly period time, in this analysis we have employed yearly changes for the variables of interest. Since Okun assumed an increase of 0.3 percent in the unemployment rate, from one quarter to the next, we can expect that the unemployment rate will rise of 0.9 percent by year if there is no change in real output growth. This allow us to get comparable measures of the youth unemployment rate and the overall one.*

output growth (see table 3). The parameter β_1 in equation 4 (also called the Okun's coefficient) tells us how the youth unemployment rate varies with changes in real output growth. The higher and negative the Okun's coefficient, the more a one percent change in real output growth positively affect youth unemployment (this is expected to decrease). As noted by Knotek (2007) the ratio "$\frac{\alpha}{\beta_1}$" reveals "*how quickly the economy would typically need to grow to maintain a given level of unemployment*" (Knotek, 2007, p.78). On the basis of the results for the European countries in our study (FE model) the rate of output growth consistent with stable[1] youth unemployment is 3.03 percent. This is to say that any additional percentage point of real output growth that is higher than 3.03%, is associated with a decrease of the youth unemployment rate of 0.65 percent. According to Okun, we argue that this rate[2] is at least necessary if the unemployment rate is intended to be kept constant from one year to the next. This is mainly due to both gains in productivity (from one year to the next) and growth in the labour force that push up the youth unemployment rate.

One could notice that our results are not fully in line with Okun's estimates since both the constant term "α" and the rate of real output "$\frac{\alpha}{\beta_1}$" (to maintain stable the youth unemployment rate) are different from Okuns' analysis. However, there are two main reasons that tend to justify our results. The first one deals with the fact that with no changes in real output growth the youth unemployment rate would rise more than the overall one. Indeed, in our analysis the increase in youth unemployment rate would be 1.97 percentage points, if no changes in real output growth occur. On the contrary Okun estimated that the unemployment rate will rise by "only" 0.3 percentage points from one quarter to the next (that are 0.9 percentage points if we consider one year period time) if real output growth is unchanged. The ILO tends to explain such an evidence according to key factual evidences: "*youth are more likely to have less work experience than adults. Assuming that employers seek employees with past experience, the youth who is entering the labor force for the first time will be at a disadvantage and have a harder time finding employment vis-à-vis an adult with a longer history of work*

---

[1] *We point out the the term "stable" does not coincide with "natural" or "desirable" rate of youth unemployment.It just refers to no changes in the youth unemployment rate from one year to the next.*

[2] *Actually Okun estimated that the real output growth consistent with stable unemployment was 4 percent.*

experience" (Salazar, Executive Director of the ILO, 2010, CNBC). This might be summed up as the "last-in, first-out" explanation.

With this frame of reference, one could argue that to maintain stable the youth unemployment rate over time, it is necessary a higher real output growth than that required to keep constant the unemployment rate. If we assume it as the true, then the results in our analysis would be strongly biased. However, if we reflect on the concepts and definitions of the two indicators, namely the unemployment rate and the youth unemployment one, we can find the rationale behind the results in Okun's study and this one. According to the ILO[1], the unemployment rate measures the inability of a given economy to generate employment for those persons who wish to work and are looking for a job but do not find it. Mathematically, it is defined as the percentage of unemployed persons in the labour force (usually aged 15-64). It is patently obvious that since the youth unemployment rate represents the same measure but just for a given fraction of the labour force, namely those aged 15-24[2], this measure is a share of the overall unemployed persons and therefore it is encompassed within the unemployment rate. Bearing in mind such concepts, it is worth noting that the reduction of 1 percentage point of the overall unemployment rate will require an higher real output growth (since it encompasses also the labour force 15-24) than that required to decrease the youth unemployment rate.

Table 3. RE and FE models estimates. Own elaboration based on KILM 7th edition

	Fixed Effects (within) regression						Random Effects GLS regression					
	Coef.	*Robust Std. Error*	*T*	*p>|t|*	*[95% conf. Interval]*		*Coef.*	*Robust Std. Error*	*T*	*P>|t|*	*[95% conf. Interval]*	
Real Output growth	**-.650574**	.0695408	-9.36	0.000	-.7935186	-.5076321	**-.5805706**	.06336371	-9.12	0.000	-.7082971	-.4558442
Const.	**1.976786**	.1918798	10.3	0.000	1.582372	2.371201	**1.783626**	.2363917	7.55	0.000	1.320307	2.246946
rho (fraction of variance)	.11762476						0.000					
F(1,26)	87.52						-					
Prob. > F	0.000						-					
Wald chi2 (1)	-						83.23					
Prob. > chi2	-						0.000					

Source: authors's elaboration and calculation.

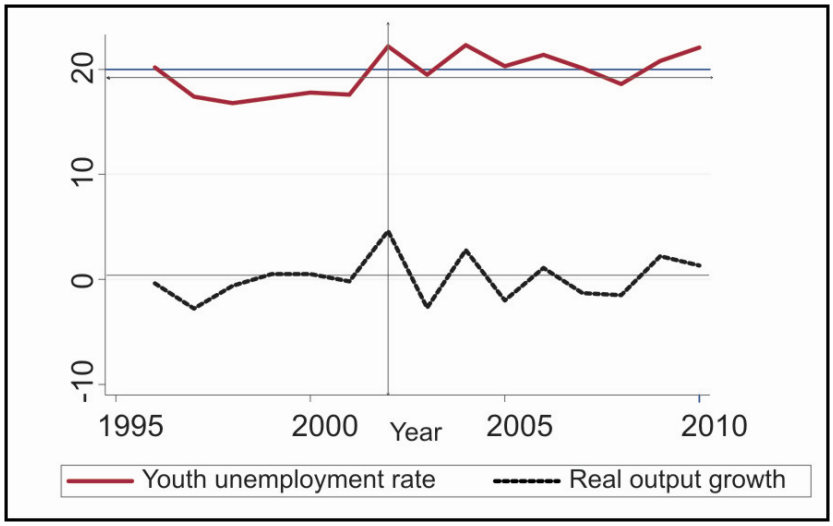
[1] *See Decent Work Indicator (ILO 2012), also available at http://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/publication/wcms_183859.pdf.*

[2] *This is obtained as the percentage of young people (15-24) who are looking for a job on the total number of youth (15-24) in the labour force.*

1.3. Country level estimates and the "strange case" of the Romanian economy

At the country level, the estimated coefficients related to equation 3 are contained in table 4 below. As we expected, all but one countries show a negative Okun's coefficient. This allow us to confirm the Okun's insight according to which a positive change in real output growth reflects in a reduction in the difference of the youth unemployment rate. There clearly are significant differences across almost all countries even though there is one common. 26 out of the 27 countries in our analysis have a higher Okun's coefficient among youth cohort than that estimated for the unemployment rate in other seminal work (Ball, Leigh and Loungani, 2012). We can gain same insight from the estimated parameters (see table 4); clearly, the most significant relates to cyclical movements of GDP growth which seems to expose much more young people than adults to GDP fluctuation. It is widely recongnized that the year by year accumulation of skills and experience leads to a more secure working environment. It is worth noting that Spain has the highest Okun's coefficients. Although Ball, Leigh and Loungani (2012) analyzed the unemployment rate (instead of the youth unemployment one), a basic explanation can however be inferred from their study. The authors found that the highest Okun's coefficient was mainly due to the unusually high incidence of temporary employment contracts. Indeed, since 1980s the Spanish government introduced a set of labour market reforms which made easier for employers to "*adjust employment when output changes raising the Okun coefficient*" (Ball, Leigh and Loungani, 2012 p.20). On the contrary the lowest coefficients have been found in Luxemburg (-0.16) and Germany (-0.31). As for the Germany's case, a key explanation might be deduced from the set of labour market reforms adopted by the government whose political commitment was based to guarantee workers even in period of economic instability. However, this fact should not be perceived as a positive one since the segmentation of the German labour market poses serious treats to workers' weel-being. Surely, our results confirm a more stable unemployment rate in accordance with economic fluctuation but they do not provide us with enough information of DW condition. Finally, with regard to Luxemburg a basic explanation for its lowest Okun's low refers to the high immigration flow: similarly to Switzerland (see Ball, Leigh and Loungani, 2012, p.21) migrants workers move in and out the country with rapid change in real output growth (economic fluctuations). This is to say that changes in the youth unemployment rates are adjusted by changes in the labour forces making the unemployment rate more stable.

Figure 3. Trend of the youth unemployemnt rate and real output grwoth in Romania (1996-2010)



Source: authors' elaboration based on KILM 7th Edition.

The strangest results of this analysis are clearly those related to the Romanian economy. We have seen that all but Romania have a well-fitting Okun law: the Okun's coefficient is not negative in the country. Indeed, the value obtained while estimating changes in the youth unemployment rate from one year to the next with yearly growth in real output is roughly 0. This is to say that the Romanian labour market would not seem being affected by macroeconomic fluctuations. This is also confirmed by the correlation index (0.04) whose value suggest that the two variables of interest do not vary together over time[1]. In addition, the youth unemployment rate[2] together with the real output growth follow a very atypical trend (figure 3 below). By and large, we can notice that the two functions pictured to delineate the trend in the youth unemployment rate and real output growth had the same path, from 1996 to 2010. At least at the level of idea, one could expect that with positive changes in real output growth, there will be a reduction in the youth unemployment rate since the

[1] *Of course, such a measure does not give us any information with regard to the causality link. However, the causality linkage between the effects of real output growth on changes in the youth unemployment rate is largely documented by several theories and empirical model.*

[2] *It should be noticed that in figure (x) is pictured the youth unemployment rate, not its difference.*

more a given economy grows, the lower the youth unemployment rate. In Romania, however, positive changes in real output growth did not positively affect the youth unemployment rate. To give an example, in 2002, to the highest increase in the real output growth (4.6 percent in 2002) coincided an increase in the youth employment rate from 17.6 in 2001 to 22.2 in 2002. More, to the drastically fall in real output growth in 2003 (-2.7 per cent) followed a reduction in the youth unemployment rate (from 22.2 in 2002 to 19.5 in 2003).

A basic explanation of this tendency relates to the employment protection legislation index (EPL). Technically speaking, this index consists of rules and procedures that define the limits to the faculty of firms to hire and fire workers in private employment relationships making the worker's status in the labour market safer but also more rigid. It is not by a chance that in 2009 the EPL was up to 2.8 ranking Romania among countries with the highest rigidity of the employment legislation among the EU countries (see Ciuca and alt., 2010). Since the EPL captures the social protection dimension, a higher value of the EPL should reduce the effects of macroeconomic fluctuations on the youth unemployment rate. Such an effect can be seen as the cause of the lack of causality and correlation between real output growth and the youth unemployment rate, on average. However, one could object that there actually exists movements of the youth unemployment rate which (even though they are uncorrelated to movements of GDP growth rate), in fact, cannot be explained by the high EPL. The insight we gain from our analysis derives from the response given to globalization and demographic transition (see Ciuca and alt., 2010). These two broad issues clearly push Romanian labour force up and therefore increase the overall youth unemployment rate during some period. Such fluctuations (related to the youth unemployment rate) do not depend on the real output growth. To sum-up, Romania has an high and stable youth unemployment rate (on average 19.6 percent from 1996 to 2010) that however does not respond to change in real output growth but seems to depend on the labour market structure. This step of the analysis does not allow us to give any value judgment on the Romanian labour market structure but only inform us about stylized facts that makes the Okun's coefficient different from the other European countries. Surely, prompt policy responses to the Romanian labour market are indeed necessary if economic growth is intended to be channeled into a rapid job creation process. A detailed analysis of the DW dimension will be developed in the next paragraph in order to understand how the job creation process might be supported.

Table 4. European Countries: Estimates of Okun's Law

$\Delta Youth\ unemployment\ rate = \alpha + \beta(gdp\ growth) + \varepsilon$

code	Country		estimated parameters	Real output growth for a stable youth unemployment rate	Standard error	P-value	Code	Country		estimated parameters	Real output growth for a stable youth unemployment rate	Standard error	P-value
1	Austria	Okun's coefficient	-0.2443744**	2.75	0.1008851	0.023	14	Italy	Okun's coefficient	-0.3752678**	1.34	0.1739868	0.04
		Constant	0.6723044**		0.2747085	0.021			Constant	0.5030784		0.4077437	0.228
2	Belgium	Okun's coefficient	-0.9500328**	2.01	0.2793987	0.002	15	Latvia	Okun's coefficient	-0.7318703**	4.70	0.146351	0
		Constant	1.907846**		0.7136678	0.013			Constant	3.442224**		1.295723	0.021
3	Bulgaria	Okun's coefficient	-0.9500328**	2.01	0.2793987	0.002	16	Lithuania	Okun's coefficient	-0.7290833**	5.28	0.2334778	0.01
		Constant	1.907846**		0.7136678	0.013			Constant	3.850443		1.791119	0.055
4	Cyprus	Okun's coefficient	-0.7968987	3.62	0.4145784	0.091	17	Luxembourg	Okun's coefficient	-0.162535	6.31	0.1218169	0.194
		Constant	2.887254		1.415286	0.076			Constant	1.025949		0.6911113	0.15
5	Czech Republic	Okun's coefficient	-0.7794084**	3.58	0.1751292	0	18	Malta	Okun's coefficient	-0.7641541**	1.90	0.1735786	0.002
		Constant	2.78762**		0.6969148	0.001			Constant	1.449628**		0.5524054	0.03
6	Denmark	Okun's coefficient	-0.7715503**	1.56	0.1407258	0	19	Netherlands	Okun's coefficient	-0.4668603**	1.75	0.1515637	0.006
		Constant	1.207309**		0.3898403	0.005			Constant	0.8170066		0.4668084	0.095
7	Estonia	Okun's coefficient	-0.6894329**	6.00	0.1842811	0.003	20	Poland	Okun's coefficient	-1.619869**	4.42	0.4521091	0.002
		Constant	4.135894**		1.483742	0.018			Constant	7.160626**		2.213565	0.005
8	Finland	Okun's coefficient	-0.7033344**	2.92	0.095571	0	21	Portugal	Okun's coefficient	-0.618407**	2.64	0.0807175	0
		Constant	2.054925**		0.381403	0			Constant	1.633432**		0.2753124	0
9	France	Okun's coefficient	-0.9303278**	2.00	0.2670491	0.002	22	Romania	Okun's coefficient	0.0182829	2.92	0.1056014	0.865
		Constant	1.858318**		0.6365758	0.007			Constant	0.0533176		0.6191702	0.933
10	Germany	Okun's coefficient	-0.3137013**	2.00	0.133285	0.031	23	Slovakia	Okun's coefficient	-1.118371**	4.83	0.1776145	0
		Constant	0.6258721		0.3117424	0.061			Constant	5.405448**		0.9983775	0
11	Greece	Okun's coefficient	-0.5895441**	2.98	0.1321109	0	24	Slovenia	Okun's coefficient	-0.4794358	1.24	0.211313	0.038
		Constant	1.75436**		0.4144374	0			Constant	0.5968821		0.9811978	0.552
12	Hungary	Okun's coefficient	-0.4667665**	3.10	0.188796	0.025	25	Spain	Okun's coefficient	-1.973587**	2.92	0.1362381	0
		Constant	1.444661**		0.65718	0.043			Constant	5.753604**		0.4515493	0
13	Ireland	Okun's coefficient	-0.6509553**	5.18	0.0721643	0	26	Sweden	Okun's coefficient	-0.8704496**	2.87	0.1659964	0
		Constant	3.37497**		0.4604545	0			Constant	2.495664**		0.5268392	0
							27	United Kingdom	Okun's coefficient	-0.6808386**	2.29	0.1065541	0
									Constant	1.563637**		0.3298348	0

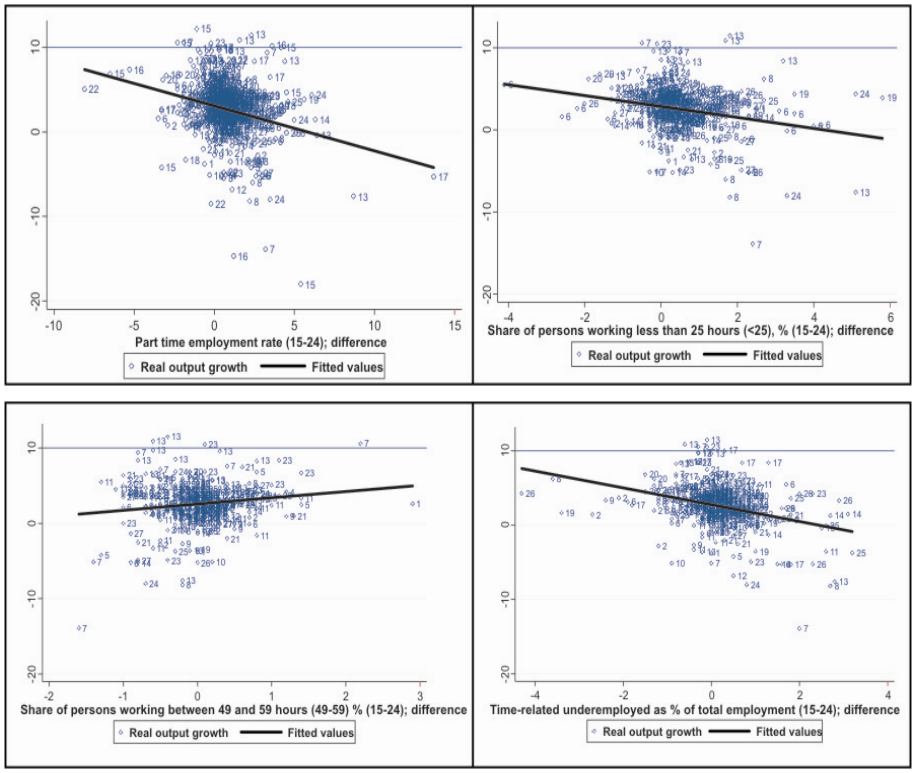
Source: authors' s elaboration and calculation.

Notes: Table reports estimated coefficients in percentage points and real output growth to maintain stable youth unemployment rate for 27 European countries. In addition, standard errors and p-value. "**" asterisks indicate statistical significance at the 5 percent level.

2. Testing Okun' s law on DWIs: a cross-sectional time-series model for 27 European countries

The econometric structure used to investigate Okun's law on the youth unemployment rate and presented in paragraph 1.2 may also be applied to some DWIs in order to determine the effects of changes in real output growth on DW. To reach this goal we take into account four DWIs, namely "part-time employment rate (15-24)", "share of persons working less than 25 hours per week (15-24)", "share of persons working between 49 and 59 hours per week (15-24)" and, finally, "time-related underemployment as percentage of total employment (15-24)".

Figura 4. Real output growth regression on 4 DWIs for 27 European countries



Source: authors's elaboration and calculation based on KILM 7th edition.

In line with the above specified model, the intent here is to estimate the effects of real output growth on the 4 DWIs for 27 European countries over time. Before running the best model to be adapted to our longitudinal data, we specify in equation 6 below the baseline regression encompassing both FE and RE models

$$\Delta DWI_{i,t} = \alpha + \beta_1 gdp\ growth_{i,t} + \gamma_t + c_i + \epsilon_{i,t} \quad \textbf{(6)}$$

Where "ΔDWI "is a set of 4 DWIs on which to assessment of the real output growth can be made operative. Each DWIs represents a given equation that will be regressed separately from one another while estimating the pure effect of real output growth on them.

More in detail the baseline regression related to the 4 DWIs are:

$$\Delta PTE_{i,t} = \alpha + \beta_1 gdp\ growth_{i,t} + \gamma_t + c_i + \epsilon_{i,t} \quad \textbf{(7)}$$

$$\Delta DH25_{i,t} = \alpha + \beta_1 gdp\ growth_{i,t} + \gamma_t + c_i + \epsilon_{i,t} \quad \textbf{(8)}$$

$$\Delta DH59_{i,t} = \alpha + \beta_1 gdp\ growth_{i,t} + \gamma_t + c_i + \epsilon_{i,t} \quad \textbf{(9)}$$

$$\Delta TRU_{i,t} = \alpha + \beta_1 gdp\ growth_{i,t} + \gamma_t + c_i + \epsilon_{i,t} \quad \textbf{(10)}$$

Where "ΔPTE " indicates changes in the share of part time workers from one year to the next, "$\Delta DH25$ " and "$\Delta DH59$ "in the share of persons working less than 25 hours and between 49 and 59 hours respectively, and "ΔTRU " is the change in the time-related underemployment as percentage of total employment.

2.1. Discussing the econometric results

We estimate equation 6 for each of the DWIs taken into consideration by means of a FE and RE panel model. Results of the estimations are presented in table 7. We also perform some statistical tests to both check for the presence of heteroskedasticity (see table 5) and decide about the best model to be discussed between the RE and the FE ones. The performed test for heteroskedasticity informs us to reject the null hypothesis (homoskedasticity or constant variance) and hence to control for heteroskedasticity by using robust cluster standard errors while regressing the effect of real output growth on the four DWIs.

Table 5. Testing the presence of heteroskedasticity

Ho: sigma (1)^2=sigma^2 for all "i" (Test for heteroskedasticity)							
Part-time employment rate (15-24)		**Share of persons working less than 25 hours per week (15-24)**		**Share of persons working between 49 and 59 hours per week (15-24)**		**time-related underemployment as percentage of total employment (15-24)**	
chi2 (27)=	3636.4	chi2 (27)=	10333.8	chi2 (27)=	2257	chi2 (27)=	1213.4
Prob>chi2=	0	Prob>chi2=	0	Prob>chi2=	0	Prob>chi2=	0

Source: Authors' elaboration and calculation.

On the basis of the Hausman test we will discuss the real output effects on DWIs by taking into consideration RE panel model while discussing equation 7, 8, and 9 and FE panel model in discussing equation 10 (see Table 6 below).

Table 6. Hausman FE and RE

Hausman Fixed-Random							
		- Coefficients -					
		(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))		
		Fixed	Random	Difference	S.E.	chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B)	
Equation 7: part-time employment rate (15-24)	**Real output growth**	-.1449341	-.143613	-.0013211	-.0050552	=	0.07
						Prob.>chi2 =	0.7938
Equation 8: share of persons working less than 25 hours per week (15-24	**Real output growth**	-.0942802	-.0944848	.0002046	.003646	=	0.00
						Prob.>chi2 =	0.9553
Equation 9: share of persons working between 49 and 59 hours per week (15-24)"	**Real output growth**	.0307942	.029948	.0008462	.0028431	=	0.09
						Prob.>chi2 =	0.7660
Equation 10: time-related underemployment as percentage of total employment (15-24)	**Real output growth**	-.1114634	-.0965981	-.0148653	.005292	=	7.89
						Prob.>chi2 =	0.0050

Source: Authors' elaboration and calculation.

The results of our analysis are finally reported in Table 7 below. We simply evaluate the impact of real output growth on 4 DWIs observing that all but one

coefficients are statistically significant. We now discuss each equation separately after introducing them in a mathematical way.

$$\Delta PTE_{i,t} = \widehat{1.019981} - \widehat{.143613}\, gdp\ growth_{i,t} + \gamma_t + \epsilon_{i,t} \quad \textbf{(11)}$$

Equation 11 reports the estimated coefficients related to the impact of real output growth on the share of part-time workers. As we expected, we observe that the coefficient is the highest and negative one among those estimated. This result implies that with no real output growth there is a tendency of the economy to generate an additional 1.01 percent of part-time workers.

The estimated parameter "β_1" in equation 7 tells us how the share of part-time workers varies with change in real output growth. From our analysis, a one percentage point increase in real output growth would reduce the share of part-time workers of 0.14 percentage points. Additionally, the ratio "α/β_1" would implies that the European economy, on average, need to growth 7.14 per cent per year. This is the rate of GDP growth consistent with stable part-time workers. Of course, since we are considering the European Union as a whole, the rate of economic growth consistent with a stable rate of part-time workers is apparently too high. Indeed, this finding is true when applied to our sample but might be misleading if considered as the proper path of growth for single European economy.

Next, we jointly discuss the results of our regression analysis by considering the pure effects of growth on the share of persons working less than 25 hours and between 49 and 59 hours per week.

$$\Delta DH25_{i,t} = \widehat{.6951219} - \widehat{.0944848} gdp\ growth_{i,t} + \gamma_t + \epsilon_{i,t} \quad \textbf{(12)}$$

$$\Delta DH59_{i,t} = -\widehat{.0955462} + \widehat{.029948} gdp\ growth_{i,t} + \gamma_t + \epsilon_{i,t} \quad \textbf{(13)}$$

The estimated parameters show an opposite sign and also the intensity of a reduction (increase) in the share of persons working less than 25 hours per week (or between 49 and 59 hours per week) is significantly different from one another. More, the coefficient "β_1" in equation 13 is not statistically significant. The opposite effects of real output growth on the two DWIs in equation 12 and 13 can be inferred by looking at the constant term. Indeed, with no GDP growth in a given year, there would be an increase of those persons working less than 25 hours per week and, on the contrary, a reduction in the share of persons who work between 49 and 59 hours per week. Furthermore, a one percentage point increase in GDP growth, from one year to the next,

generates an opposite and symmetric results with a different intensity. *Ceteris paribus* (let us consider one percentage point of GDP growth), the share of persons working less than 25 hours would decrease of 0.09 percent jointly with an increase in the share of over-utilized workforce (0.02 percent, on average). From an economic perspective, adjustments, in response to an increase in the aggregate demand, lead the workforce to shift from being under-utilized (those working less than 25 hours) to over-utilized (those working between 49 and 59). This figure can be summed-up as follows: the higher the aggregate demand, the more workers have to be productive. There is a clear need to intervene in the European labour market to avoid that excessive hours of work impact on the health and well-being of workers and, symmetrically, insufficient working situation hampers the ability to get an adequate level of earnings.

We now discuss the pure effects of GDP growth on time-related underemployment using a FE panel model. Results of empirical estimation are reported in equation below:

$$\Delta TRU_{i,t} = \widehat{.4074724} - \widehat{.1114634}\, gdp\ growth_{i,t} + c_i + \epsilon_{i,t} \quad \textbf{(14)}$$

Both coefficients are statistically significant. Comparison of time-related underemployment and the share of persons working less than 25 hours per week is extremely interesting. Time-related underemployment captures the dimension of working time that is considered insufficient in relation to an alternative employment situation in which the person is willing and available to engage. Persons encompasses in such a category are therefore willing to work additional hours. There clearly exists a strong linkage between this indicator and that related to the share of under-utilized workforce. This is also confirmed by the estimated parameters in equation 12 and 14 which are not different so much one to another. Indeed, while a one percentage point of GDP growth reduces the portion of persons in time-related underemployment of 0.11 percentage points, it also impacts on the share of persons working less than 25 hours whose reduction is roughly 0.09 percentage points (see above).

The discussion on empirical estimation results has suggested us that the impact (sign) and magnitude of the coefficients is different and strongly depends on the typology of DWI considered while analyzing the youth labour market dimension. A key result of this analysis surely implies that real output growth enables to reduce DW deficit. However, pure economic growth leads to a greater instability within the labour market of youth since the more it fluctuates (see, for instance, the ratio " α/β_1 " in equation 11, 12, 13 and 14), the higher the probability that young people either get out from the labour market or they remain stuck in

not-decent work. Immediate social protection policies are therefore necessary to mitigate DW deficit.

Table 7: Real output growth effects on DWIs: econometric results

	Fixed Effects (within) regression				Random Effects GLS regression			
	Part-time employment rate (15-24)	Share of persons working less than 25 hours per week (15-24)	Share of persons working between 49 and 59 hours per week (15-24)	Time-related underemployment as percentage of total employment (15-24)	Part-time employment rate (15-24)	Share of persons working less than 25 hours per week (15-24)	Share of persons working between 49 and 59 hours per week (15-24)	Time-related underemployment as percentage of total employment (15-24)
	Coeff.	*Coeff.*	*Coeff.*	*Coeff.*	*Coeff.*	*Coeff.*	*Coeff.*	*Coeff.*
Real Output growth	-.1449341** (.025299)	-.0942802** (.0179522)	.0307942 (.0182928)	-.1114634** (.0191536)	-.143613** (.0228442)	-.0944848** (.0179309)	.029948 (.0179332)	-.0965981** (.0179564)
Const.	1.024917** (.06969)	.6908076** (.045647)	-.1052878 ** (.0464562)	.4074724** (.0501674)	1.019981** (.1442501)	.6951219 (.1137839)	-.0955462 ** (.0531546)	.368537** (.0672335)
rho (fraction of variance)	.12027869	.18079776	.21540376	.0645268	.07080287	.10489666	.13470668	0
F(1,26)	32.82	27.58	2.83	.0645268	-	-	-	-
Prob. > F	0	0	0.1078	0.0000	-	-	-	-
Wald chi2 (1)	-	-	-	-	39.52	27.77	2.79	28.94
Prob. > chi2	-	-	-	-	0	0	0.0949	0.0000

Source: Authors' elaboration and calculation.

2.2 What about real output growth effects on DWIs in Romania?

We have seen in paragraph 2.1 that Romania is the only one country that does not have a well-fitting Okun's law. Indeed, the Okun's coefficient is not negative in the country. Such an evidence suggests to deeply investigate the country's effects of real output growth on a set of DWIs. Unluckily, the lack of data does not allow us to regress the GDP growth on the same set of DWIs (as we have done for the EU). Nevertheless, we have found reliable data related to both part-time workers (aged 15-24) and long-term unemployed (aged 15-24). Of course we also need to change the econometric techniques since we are going to work with time series data related to the Romanian labour market from 1997 to 2012. With this frame of reference, the best model to be adapted to our analysis is the autoregressive one that can be formulated as follows:

$$\Delta PTW_t = \alpha_1 + \delta_1 t + \Phi_{11}\Delta PTW_{t-1} + \cdots + \Delta PTW_{1p}Y_{t-p} + \beta_{11}gdp_{t-1} + \cdots + \beta_{1q}gdp_{t-q} + \varepsilon_{1t} \quad (15)$$

$$\Delta LTU_t = \alpha_1 + \delta_1 t + \Phi_{11}\Delta LTU + \cdots + \Phi_{1p}\Delta LTU + \beta_{11}gdp_{t-1} + \cdots + \beta_{1q}gdp_{t-1} + \varepsilon_{1t} \quad (16)$$

Where "PTW" is the variable related to part-time workers (in difference), LTU that related to long-term unemployment (in difference) and "gdp" is the real output growth (in percentage points).

Before running equation 15 and 16 we need to perform a few of statistical tests in order to determine both if the three variable of interest have a unit roots and the lag order. The rationale behind the model here presented is to understand whether lagged values of real output produce an effect on the two DWIs taken into consideration. In doing so we report in Table 8 below the result of the Dickey-Fuller test that controls for the presence of a unit root.

Table 8. Dickey-fuller test for unit root with critical values at 1% (*), 5%(**) AND 10% (***).

Variable		*Test statistic*	*1% critical value*	*5% critical value*	*10% critical value*
Part-time workers	**1st difference**	-3.623**	-3.75	-3	-2.63
Long-term unemployment	**1st difference**	-3.851**	-3.75	-3	-2.63
Gdp growth	**1st difference**	-2.512	-3.75	-3	-2.63
	2nd difference	**-4.591***	-3.75	-3	-2.63

Source: Authors' elaboration and calculation.

While DWIs have been found to be stationary at their first difference, real output growth shows the presence of a unit root. Therefore, we have made it stationary by taking its second difference. The last test to be performed concerns the lag order to be included in equation 15 and 16. To this aim, the most common approach to select and pre-estimate the lag order deals with the use of "*information criterion".* We highlight the optimal lag order as labeled by asterisk "*" in table (10) below.

Table 9. Information criterion FOR lag length selection. Statistical significance at critical value of 5 percent

Preestimation Tests				
Lag	Variable	**AIC**	**HQIC**	**SBIC**
0	Part-time workers			
1				
…				
4		-185.939*	-186.691*	-184.745*
0	Long.term unemployment			
1				
…				
4		-185.939*	-186.691*	-184.745*
0	Gdp growth			6.29739*
1				
…				
4		6.19042*	6.07642*	

Source: authors' elaboration and calculation.

On the basis of the above exercises we now test the effects of real output growth on selected DWIs for the case of Romania (in accordance with available statistics).

Table 10. Autoregressive model: econometric results

Dep. Variable:	**Part-time workers**				
	Lag	*Coef.*	*Std.Err.*	*z*	*P>z*
Part-time workers	1	-0.78155	0.096316	-8.11	0
Part-time workers	2	-0.5156	0.085721	-6.01	0
Part-time workers	3	-0.27148	0.080997	-3.35	0.001
Part-time workers	4	-0.34738	0.082633	-4.2	0
Real output growth	1	-0.0865	0.049653	-1.74	0.082
Real output growth	2	-0.19839	0.055784	-3.56	0
Real output growth	3	0.122596	0.050097	2.45	0.014
Real output growth	4	0.671826	0.065155	10.31	0

Dep. Variable:	**Long-term unemployment**				
	Lag	*Coef.*	*Std.Err.*	*z*	*P>z*
long-term unemployment	1	-0.51811	0.107294	-4.83	0
long-term unemployment	2	0.071706	0.116201	0.62	0.537
long-term unemployment	3	0.461204	0.140818	3.28	0.001
long-term unemployment	4	0.402712	0.135252	2.98	0.003
Real output growth	1	-0.23769	0.050826	-4.68	0
Real output growth	2	-0.32554	0.052992	-6.14	0
Real output growth	3	-0.11084	0.043885	-2.53	0.012
Real output growth	4	-0.29955	0.042753	-7.01	0

Source: authors' elaboration and calculation.

As for the relationship between changes in the share of part-time workers and real output growth, our analysis predicts that after two lag orders, there is a reduction of 0.19 percent on the share of part-time workers. More in detail, a one percent increase (decrease) of real output growth would lead to a decrease (increases) in the share of part-time workers of 0.08 percent (with one lag order) while, the magnitude of changes in part-time workers would become more than double after two lag orders (0.018). It is patently obvious that real output growth does not have a strong impact on the labour market structure in Romania (as it does in other European countries): changes in the labour market structure seems to occur mainly due to labour market reforms and they do not follow the economic cycle.

Another key issue in the analysis of DW for youth is the spell of unemployment. This has been captured by the long-term unemployment rate of youth. Indeed, as the unemployment spell increases, it becomes more and more difficult for youth to get in the labour market especially due to skills deterioration. The longer the unemployment spell, the more it influences the probability to find a decent job. Such an aspect can be found by looking at the coefficients associated to the long-term unemployment (15-24) with one lag time. There seems to be a tendency to an increase of long term unemployment of 0.5 percentage point in period "t" if the long term unemployment rate increased of percentage point in period "t-1". With regard to the effects of real output growth on long-term unemployment, our time series regression suggests that the strongest reduction in long term unemployment is caused by 1 percent increase in real output growth two periods time before. Concretely, any additional percentage point increase

(decrease) of real output growth in the period (t-2) is associated with a 0.32 percent decrease (increase) in long term unemployment at the time "t".

Although we are aware that this dynamic to investigate real output growth effects on DWIs is somewhat reductionist (due to the lack of indicators that would have allowed us to inferred on the DW dimension, as a whole), we have found empirical evidence of a weak correlation and causality between real output growth and labour market indicators in Romania. In order to provide a broader framework on this link, it is important to further analyse such an aspect. However, this requires more reliable and consistent DWIs to be linked to output fluctuation over the business cycle.

Conclusion

Throughout this paper it has been highlighted the importance of strengthening employment policies aimed at stimulating job creation for youth. Our analysis has started off from a very basic consideration: many researchers have shown that economic growth does not necessary go hand in hand with DW creation even though the job creation process is generally stimulated by real output growth. Bearing in mind such an assumption we have found out an explanation of the linkage between economic growth and job creation, form one side, and economic growth and DW creation, on the other side.

Empirical investigation of available data shows a growing concern about the situation of young people in the European labour market. This is clearly a reflecting signal of the economic and financial crisis that have hit hard the labour market structure in the European area. The political process is currently trying to stimulate job creation especially by means of economic growth. The operationalization of such policies is being done by putting at the core of the political commitment the relationship between economic growth and job creation. With this frame of reference, the discussion of this paper has started by the analysis of the Okun's law which can be interpreted as a kind of rule of thumb by many macroeconomic textbooks. When applied to the European context we see empirical evidence of this relationship: as we expected, all but one countries show a negative Okun's coefficient. The regression analysis has therefore confirmed the Okun's insight according to which a positive change in real output growth reduces the youth unemployment rate. In despite of this, we have found significant differences across countries which are mainly ascribable to the magnitude of the estimated coefficients. Nevertheless, there is one common feature which characterize all European countries: the Okun's coefficient among

youth cohort is definitely higher than that estimated for the overall unemployment rate in other seminal works. However, when applied to the Romanian economy, the estimated coefficients does not have a well-fitting Okun's law: the Okun's coefficient is not negative in the country. This is to say that the Romanian labour market would not seem being affected by macroeconomic fluctuations over time and changes in the youth unemployment rate might not depends on real output growth. A basic explanation might be found in the rigidity that characterizes the labour market structure in Romania.

We then turn to the key question of this study: does economic growth stimulate DW creation?. Answering to this question is central if the topic of DW is intended to be put at the core of the political commitment. Empirical estimations of the existing linkage between real output growth and DW has suggested that the impact and magnitude of the coefficients is different and strongly depends on the typology of DWIs considered while analyzing the youth labour market dimension. A key result of this analysis surely implies that real output growth enables to reduce DW deficit. However, pure economic growth leads to a greater instability within the labour market thus making political interventions necessary to mediate between pure economic growth and DW. Political commitment is a key prerogative to ensure the proper pathway for DW creation.

References

Ball, L., Leigh, D. and P. Loungani, (2012) "Okun's Law: Fit at 50? Working paper, 13th Jacques Polak Annual Reasearch Conference, 8-9 September, 2012.

Basnett, Y. & Sen. R. (2013)."What Do Empirical Studies Say about Wconomic Growth and Job Creation in Developing Countries?" Overseas Development Institute.

Bell S. and Newitt K., (2010), "Decent work and poverty eradication: literature review and two-country studies". A study for the Decent Work and Labour Standards Forum, January 2010.

Cazes, S. and Verick, S. (2010). "What role for labour market policies and institutions in development? Enhancing security in developing countries and emerging economies". *Employment Working Paper* No. 67. Geneva: International Labour Organisation.

Ciuca, V. and Lincaru, C. (2010), "Strategic Development Prospects for the Labor Market in Romania, as Introduced by the Europe 2020 Strategy", *Journal for Economic Forecasting*. - Institutul de Prognoza Economica. - 2010, 5, p. 100-119.

Crivelli, E., Furceri, D., and Toujas-Bernaté, J. (2012). "Can policies affect employment intensity of growth? : A cross-country analysis", *IMF Working Paper* WP/12/218, Washington D.C.

Fu, X. and Balasubramanyam, V.N. (2005). "Exports, foreign direct investment and employment: The case of China", *World Economy*, 28(4): 607-625.

Ghai, D. (2003), "Decent work: Concept and indicators". *International Labour Review*, Vol. 142 (2003), No. 2 p. 113-145, 2003

ILO, (2013), "Global Employment Trends for Youth 2013". A generation at risk / International Labour Office – Geneva: ILO, 2013.

Kapsos, S. (2005). "The employment intensity of growth: trends and macroeconomic determinants", Employment Strategy Paper 2005/12. Geneva: International Labour Office (ILO).

Knotek, E.S. (2007), "How useful is Okun's Law". Federal Reserve Bank of Kansans City.

Mazumdar, D. (2003). "Trends in employment and the employment elasticity in manufacturing, 1971-92: An international comparison". *Cambridge Journal of Economics* 27:563-582 (2003).

McMillan, M. & Rodrik, D. (2011). 'Globalization, Structural Change and Productivity Growth', *NBER Working Papers* 17143

Melamed, C., Hartwig, R. and Grant, U. (2011). "Jobs, Growth and Poverty: What Do We Know, What Don't We Know, What Should We Know?" Background Paper. London: Overseas Development Institute.

Milner, C. and Wright, P. (1998). "Modelling Labour Market Adjustment to Trade Liberalisation in an Industrialising Economy", *The Economic Journal*, 108(447): 509-528.

Okun A.M. (1962), "Potential GNP: Its Measurement and Significance" Proceedings of the Business and Economics Statistics Section of the American Statistical Association, p. 98-104

Rama, M. (1994) The labour market and trade reform in manufacturing. In M. Connolly. and J. de Melo (eds.): "Effects of Protectionism on a Small Country: The Case of Uruguay". Washington, DC: World Bank.

Winters, L A., T Walmsley, Z.K. Wang and R Grynberg. (2003). "Liberalising Temporary Movement of Natural Persons: An Agenda for the Development Round", *The World Economy* 26 (8): 1137-1162.