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TEALM Workshop
"New challenges for the labour market: spatial and institutional perspectives"

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TEALM Workshop
"New challenges for the labour market: spatial and institutional perspectives"
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Introduction

Floro Ernesto Caroleo and Rita De Siano

This book collects selected essays presented at the Workshop on "*New Challenges for the Labour Market: Spatial and Institutional Perspectives*" held at the University of Naples Parthenope on 2014 as final part of the program of the Summer School on *"Theoretical and Empirical Approaches to the Labour Market. Roots, Effects and Policy Responses"* (TEALM).

The aim of the Conference was to promote a forum for stimulating scientific exchange in the field of labour economics in the light of the new spatial and institutional challenges.

The economic crisis, which began in most European countries in mid-2008, has had severe effects on labour markets. Although no country has been able to escape the crisis, the extent of output loss and the number of jobs lost, as well as the resulting rise in unemployment, vary considerably among countries and regions. Overall, the recession has not affected all workers in the same way: the low-educated young people and women have turned out to be the groups most vulnerable to the crisis.

Several explanations have been advanced to justify this evidence and, without claiming to be complete, we could mention: a) the role of structural change and the spatially asymmetric impact on local labour markets, b) the size and the speed of the labour market response to output shocks in different EU countries due to a different composition of labour market institutions and of labour market policies c) the impact of labour market institutions, and in particular those governing the school to work transitions, on youth labour-market performance, d) the structural factors determining the gender disparities in the labour market.

As the majority of scholars taking part in the workshop are also involved in the PIRSES (European project financing International Research Staff Exchange between European (mainly Italian) and Russian universities) research group on "The Political Economy of Youth Unemployment", the papers presented face most of these problems with two main focuses: youth labour market and a comparison between Italian and Russian economies.

The first three papers analyse the youth unemployment problem in the perspective of a comparison between countries. Parisi, Marelli and Demidova, *Labour Productivity of Young and Adult Temporary Workers and Youth Unemployment: a Cross-country Analysis*, analyses whether the introduction of new temporary contracts has had an impact on youth unemployment and labour productivity. They use macroeconomic data for countries within groups (former Euro zone countries, Euro-zone plus Russia, OECD, G7, G8) and give evidence that the link between youth unemployment and productivity seems to be mediated by a mechanism through which young unemployed people (re-entering) the labour market have a higher probability to become temporary workers. This causes a negative effect on the labour productivity as it is proved that the share of adult temporary workers clearly and negatively affects labour productivity, no matter the group of countries.

Pastore and Giuliani, *The Determinants of Youth Unemployment. A Panel Data Analysis*, wonder if the dramatic disparities in the working condition of young people in European countries depend on the different educational system and labour market institutions governing the school-to-work transition. Five country groups are detected: a) the North-European; b) the Continental European; c) the Anglo-Saxon; d) the South-European; e) the New Member States. For the first time, they provide a panel data analysis. The final specification is a dynamic model with control for endogenous variables to explain the role that different educational systems vis-à-vis labor market institutions have in affecting the youth absolute and relative disadvantage. The evidence is that the European Continental and the Anglo-Saxon system perform much better also after controlling for per capita GDP level and growth, as well as for labor market and educational institutions.

The paper of Marelli and Vakulenko, *YouthUunemployment in Italy and in Russia: Aggregate Trends and the Role of Individual Determinants*, analyses the determinants of youth unemployment comparing Italy and Russia. After having presented an overview of the aggregate trends in some EU countries and in Russia and of the academic debate about the economic and

institutional determinants of youth unemployment, they focus on the analysis of the role played by individual and family determinants, comparing Italy and Russia. Using Eurostat micro-level data EU-SILC for Italy and RLMS-HSE data set for Russia, they estimate the probability of being unemployed for young people in terms of their personal characteristics during the period 2004-2011. The results show that the two countries have quite different labour market institutions, besides having different levels of youth unemployment. However, most of the explanatory variables, such the disposable family income, age, marital status, regional unemployment and bad health, act in the same direction in augmenting/decreasing the unemployment risk of young people in both countries.

In the same comparative perspective the following two papers still analyse some specific features of the labour market. Destefanis and Mastromatteo, *The Beveridge Curve in the OECD Before and After the Crisis,* test the existence of a Beveridge Curve across the economies of nine OECD countries from 1980 to 2011 and if structural factors, such as technological progress, globalisation and oil prices produce a worsening of the unemployment-vacancies trade-off. They produce evidence that structural relationships seem to be stable enough in the 2008-2011 period, suggesting that the current crisis mainly implied moves along the Curve.

Baussola, Jenkins, Mussida and Penfold, *The Unemployment Gender Gap in a Comparative Perspective*, analyse the unemployment gender gap comparing Italy and UK that could be considered two diversified institutional contexts: one, typical of the so called Anglo-Saxon model, characterised by more flexible labour market legislations, and the continental model, which in contrast involves tighter legislative controls and more restrictive institutions. In a three-state labour market (Employment, Unemployment, Inactivity) framework, they measure the unemployment differentials between males and females by the different contribution to a single transition probability between states. In addition, they propose an econometric model in order to estimate the determinants (individual characteristics and other structural factors) of the unemployment gender gaps. The findings suggest that women and the young are disadvantaged in Italy. In contrasts in UK, women experience lower unemployment with respect to their male

counterparts and young people have higher probabilities of leaving the state of inactivity, both successfully and for unemployment.

The last three papers study the labour market features by analysing a single country. Vakulenko, *Does Migration Lead to Regional Convergence in Russia?,* uses a dynamic panel data model with spatial effects to estimate the influence of migration on the regional convergence of labor market indicators and per capita income in Russia. The data show that in the 2000s in Russia there was a significant decrease in regional differences in wages, income and unemployment rate. On the other hand, the net internal migration seems to have an insignificant impact on the unemployment rate and a negative relationship on both wages and income, which could be explained by the result of positive effect of the emigration and the negative effect of immigration on wages and income. However, the migration benefits are not big enough to make a difference on the Gini index across regions so that migration does not seem to affect the regional σ -convergence of economic indicators.

Bartolucci, Bashina, Bruno, Demidova and Signorelli, *Determinants of Job Satisfaction in Young Russian Workers,* estimate ordered logit models of job satisfaction with individual fixed effects for a panel data of Russian young workers, carrying out separate analyses for the general job satisfaction variable and three specific aspects of job satisfaction with respect to work condition, earning, and opportunity for professional growth. The estimates try to verify the compensating wage differentials hypothesis that predicts that if wages are adjusted to fully compensate workplace disamenities, it would be expected that differences in job satisfaction across individuals would not be systematically related to wage differentials, ceteris paribus. In the case of Russia the theory do not seem verified. In fact, for all but one of the samples considered there is at least one job satisfaction variable with a significantly positive wage effect. There is the remarkable exception, though, that compensating wage differentials do seem at work among the older subjects in the panel. The estimates also show strong gender and location effects.

Mazzotta and Parisi, *The effect of Employment on Leaving Home in Italy,* examine simultaneously the leaving home and the employment decision of young Italians (aged 18-34) using data

of the European Union Statistics on Income and Living Conditions (EU-SILC). With a bivariate probit model they estimate the probability of leaving home and being employed allowing the error terms to be correlated. Results show that employment is a key factor to escape from parental home. According to the existing literature, individuals from richer familyieshave higher probability of leaving home. As expected, the economic crisis has a negative effect on making such a decision, as after 2008 young Italians are less likely to leave parental home and to be employed.

1. **Labour Productivity of Young and Adult Temporary Workers and Youth Unemployment: a Cross-country Analysis**[*]

Maria Laura Parisi, Enrico Marelli and Olga Demidova

Abstract

The latest crisis has exacerbated two negative macroeconomic phenomena, particularly in Southern Europe. The size and persistence of youth unemployment has become unacceptable after 2010. Stagnation in labour productivity instead goes back to the '90s, but it has not improved since then and even worsen with the crisis. In this paper we analysed these two macroeconomic features, using aggregate data, in relation to labour market characteristics.
Reforms of regulation, in many countries over the past twenty years, introduced a set of newly designed job contracts that allowed the use of temporary work. At the same time, Employment Protection Regulation encompassed temporary workers too. The availability of new contracts and EPLT changed the incentives of firms to vary their labour needs, and to invest in new technology. Eventually, this should have an impact on labour productivity and unemployment. We distinguished between temporary young and adult workers and, conditional to the level of employment protection, we estimate their labour productivity and the correlation with the rate of youth unemployment. We use macroeconomic data for countries within groups (former Euro zone countries, Euro-zone plus Russia, OECD, G7, G8). Preliminary evidence shows that the share of adult temporary workers clearly and negatively affects labour productivity, no matter the group of countries.

JEL Classification: J24, J64, J41
Keywords: temporary work, labour productivity, youth unemployment

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Introduction

The latest crisis has exacerbated two negative macroeconomic phenomena, particularly in Southern Europe. The size and persistence of youth unemployment has become unacceptable after 2010. Stagnation in labour productivity instead goes back to the '90s, but it has not improved since then and even worsen with the crisis. In this paper we analysed these two macroeconomic features, using aggregate data, in relation to labour market characteristics.

Different labour market reforms at the end of the 1990s tried to solve the problem of high unemployment. European governments for instance introduced a set of newly designed job-contracts that allowed the extensive use of temporary work. At the same time, Employment Protection Legislation schemes encompassed temporary workers too, through further special rules (here called EPLT).[2]

These rules might have affected both the youngsters' ability to find a job and the productivity of firms. The most common path today is that unemployed young people may re-enter the labour market almost exclusively through signing a temporary contract. At the end of the period, if not renovated or hired on a permanent position, they fall back into unemployment (see Di Giorgio and Giannini, 2012, or De Graaf-Zijl, van den Berg and Heyma, 2011).

The entry of temporary workers (who are relatively inexperienced if young) likely lowered the productivity of firms because it reduced their capital-labor ratio and, being cheap work, it mostly substituted riskier ICT-enabled innovations (see for example Gordon and Dew-Becker (2008) or Daveri and Parisi, 2014).[3] Nonetheless, Cingano, Leonardi, Messina, Pica (2010) observed that partial EPL reforms via the introduction of temporary contracts resulted in mixed impacts: temporary contracts used as screening devices may lead to better matches and higher

[2] EPLT include regulation of types of work allowed and duration of fixed-term contracts as well as regulation governing the establishment and operations of temporary work agencies and agency workers' pay (OECD, 2013).

[3] Gordon and Dew-Becker (2008) made this point for Europe, showing that the labor market reforms that occurred in many European countries in the second half of the 1990s has been eventually detrimental to productivity growth.

productivity, but they may also lead to lower productivity if they provide weaker incentives for specific investments and less on-the-job learning.

We think that their conclusion is particularly serious for young people, who are more inexperienced and maybe have not accumulated enough skills and education yet. In this work, we estimated the impact of temporary work, and labour protection, on labour productivity, distinguishing the share of temporary young workers from adult workers.

We initially set up a general model encompassing labour productivity and youth unemployment, conditional on temporary work and other macroeconomic characteristics of each country.

Those characteristics are the presence of more or less strict regulations on employment protection, either in general form (EPLG) or for temporary workers only (EPLT), the share of employees with secondary or tertiary education, the size of R&D investments with respect to GDP (both Business R&D and Publicly-funded R&D), the trade balance and country-time effects.

The time interval of observed data is 1995-2011. We grouped countries within their known economic-institutional frameworks: former Euro-zone (excluding Luxembourg), OECD, G7, G8, current Euro-zone plus Russian Federation.[4] We ended up with an unbalanced panel for each group. We dealt with the most common caveats faced when analyzing the determinants of labour productivity and unemployment at the macroeconomic level (endogeneity, reverse causality, non-stationarity), by imposing different assumptions on the model and applying a set of appropriate estimators.

The paper is organized as follows. Section 1 discusses the existing differences in welfare systems and empirical evidence on the labour productivity-labour institutions relationship. Section 2 describes the data and the econometric framework to derive our model specification and assumptions. Section 3 reports tables of estimation results. Finally, section 4 concludes.

[4] Current Euro zone includes 28 countries, but we needed to exclude those adopting the euro after 2010, and those with too few observations on the variables as described in subsection 3.1. The number of countries of this group is therefore 16. In further research, we will apply our empirical analysis to countries grouped according to their welfare systems, as described in section 2.

1. Labour Market Institutions, Productivity and Unemployment

1.1 Institutions across different countries

As said in the Introduction, labour market institutions are critical – together with some other institutional features, the structure of the economy and the more general economic policies – in shaping the performance of the labour markets. Almost two-thirds of non-cyclical unemployment changes over time are explained by changes in policies and institutions (OECD, 2006). Recent research has confirmed the importance of labour market institutions.[5] Notice that, although in some studies general employment protection legislation (EPL) has not been found significant in explaining the behaviour of total unemployment rates, this legislation appears more significant for young workers than older workers; in fact, EPL (especially lay-off regulations) affects the distribution and duration of unemployment by affecting worker turnover more than the unemployment level itself (OECD, 2006).[6]

Labour market institutions may interact with cyclical economic conditions raising the unemployment rate of young people. During economic crises, not only are the young who are already in the labour market generally among the first to lose their jobs, especially in countries with the highest EPL on "permanent contracts", but also school-leavers compete with more jobseekers for fewer vacancies; this leads to a risk of a "lost generation" (Scarpetta, Sonnet, Manfredi, 2010).

However, in addition to labour market flexibility, active and passive labour policies, the educational and training systems, the school-to-work transition processes play a key role for the youth labour market performance. As a matter of fact, the unsatisfactory experience of implementation of two-tier reforms has made the emphasis of the theoretical and empirical

[5] For example, Choudhry et al. (2013) have found that – in addition to economic growth and to a general index of "economic freedom" – labour market reforms, a high share of part time employment, and active labour market policies tend to reduce the unemployment rate.

[6] Also Bernal-Verdugo et al. (2012) found that hiring and firing regulations and hiring costs have the strongest effect on unemployment outcomes of young people.

studies shift away in recent research from the labour market flexibility as the key, or even unique, policy tool to fight youth unemployment (Pastore, 2014).

Labour market institutions widely differ across countries and over time. In general, they have become more "flexible" in the last twenty years; also because of the research carried out within international organisations (see e.g. OECD's Job Study, 1994). The trend has been especially clear in the Anglo-Saxon countries, while in the countries of Southern Europe the previous model of full protection provided to permanent workers has generally been preserved. An interesting approach has developed in the countries of Central-Northern Europe, such as Denmark and the Netherlands, i.e. the "flexicurity" approach. There, workers are protected "in the market" rather than "on the job", thanks to an efficient (and expensive for the public budget) integration between active and passive labour policies. Germany introduced greater flexibility in its labour market about ten years ago, due to the so-called "Hartz" reforms of 2003-2005. These reforms deal with some different issues such as cost of labour, unemployment benefits, deregulation, etc. According to the critics, these reforms were an overturn of the previous "neo-corporatist" model of industrial relations, where trade unions played a crucial role, but their supporters emphasize the definite labour market performance (Krebs and Scheffel, 2013).[7]

On the other hand, countries in Southern Europe have introduced some flexibility in their labour markets as well, but essentially in the form of new type of contracts – mainly temporary – with lower guarantees for new entrants. This, for example, happened in Spain and later in Italy, following the 1997 Treu reform and later the 2003 "Biagi" reform. Such reforms have indeed led to an increase in employment (about one million new jobs created in the new century until the 2008 crisis), but they were low-quality jobs, often held by unskilled workers and in many cases by immigrants (the overall productivity per worker has been almost stagnant in Italy even before the crisis). These partial reforms have led, according to Boeri (2011), to a new form of dualism in the labour market (see also European Commission, 2010, chapt. 3).

[7] In fact, even during the Great Recession, Germany is the only country where unemployment has decreased, despite a large fall in production in 2009, thanks to working-time adjustments and other labour hoarding practices.

If we want to group the European countries[8] in some specific categories according to their (labour) institutional framework, we can refer to the well-known classification of welfare systems by Esping-Andersen (1990). Then, we can add to this classification the Southern European countries and the new member states (NMS) of the EU; such modified classification has been adopted by many authors.[9,10] Thus we can identify the following five groups of countries, with specific features concerning labour market institutions and also the economic structure as a whole (including educational and welfare systems):

1. Continental countries: they are characterized by highly productive industries and by a "dual educational system"[11], that is probably the most effective setting in ensuring a smooth transition from schools and universities to the labour market. Germany introduced new flexible norms in the last decade (as specified above).
2. Northern (Scandinavian) countries (extending to Denmark and the Netherlands) adopt the "flexicurity" model. They make the best use of the welfare state, of the extensive Active Labour Market Policies (ALMP) and of the efficient system of employment services.
3. Anglo-Saxon countries (i.e. the "liberal" regime): the educational system is high-level; extreme labour market flexibility encourages job creation (but during great economic crises unemployment increases rapidly, although with a low degree of persistence).
4. Southern countries (France for many features should be included in this group): here the role of the family is significant (in many cases it is a substitute for the welfare state, thus young adults still live with their parents). The overall labour markets are still considered rigid, but there has been a significant diffusion of temporary work.

[8] Outside Europe, the US (and perhaps Australia) are the best examples of "flexible" labour markets, while Japan has some peculiar institutions, that only recently have become more flexible.

[9] See for example Vogel (2002), Caroleo and Pastore (2007), Pastore (2014), Bruno et al. (2013). In the latter study, differently from Caroleo and Pastore, France is included in the Continental group (instead of the Southern one) and Denmark in the Northern group (instead of the Continental one); furthermore, the NMS comprise all countries that joined the EU in 2004 and 2007, but Cyprus and Malta (added to the Southern regional group).

[10] A different grouping of EU countries, into four clusters of countries (not necessarily contiguous from a geographical point of view) is that of Eurofound (2012).

[11] It gives a key role to apprenticeship and implies that young people receive training while at school and not after school, as in the "sequential" system.

5. New Member States: they are mostly characterized by dynamic economic systems and catching-up processes; they are trying to build a modern welfare system, while keeping the previous tradition of high investment in human capital. Labour market flexibility varies across countries but is generally high.

As a first step, in this paper, we perform our estimations first by grouping countries according to their level of economic and monetary development. Therefore, we are able to enlarge the set of economies to analyse OECD and Russia, which clearly encompass heterogeneous countries from the point of view of labour market institutions. In later research, we will perform the analysis distinguishing the welfare categories above, therefore restricting the number of countries to the EU and the US.

1.2 Empirical evidence on institutions and productivity

Most research on the relationship between regulations, institutions and productivity relies on cross-industry analyses, mostly for circumventing econometric caveats. Bassanini, Nunziata, Venn (2009) studied the impact of regulations combination on the performance of industries in OECD countries in terms of Total Factor Productivity growth. Their main finding is that mandatory dismissal regulations have a depressing impact on TFP growth in industries where layoff restrictions are more likely to be binding. "[…] In countries with rigid dismissal regulations but lax legislation on the use of temporary contracts, firms can circumvent the constraints imposed by lay-off restrictions by opening fixed-term positions. Countries can therefore 'choose' different combinations of the two types of regulations and achieve similar degrees of 'aggregate flexibility' as regards job flows and employment levels" (cit. page 39). Regulatory choices might have different even opposing effects on productivity.

In a very similar spirit, Lisi (2013) exploited a panel of industry data for EU countries to find that the use of temporary contracts has a negative, even if small in magnitude, effect on labour

productivity. Furthermore, the analysis confirms that EPL for regular contracts reduce labour productivity growth more in those industries requiring a greater employment reallocation.

Cingano, Leonardi, Messina and Pica (2010) estimated the effect of EPL on capital per worker, investment per worker and labour productivity at the firm level, for financially constrained and unconstrained firms across different European countries. EPL reduces all of them in high reallocation sectors relative to low reallocation sectors, where EPL is more stringent and increases labour costs. The magnitude of the effect is economically not negligible and lies around 11.2%, 11.4% and 7% of the difference in, respectively, the capital-labour ratio, the intensive margin of investment per worker and labour productivity, of high relative to low reallocation industries. Moreover, firms with insufficient access to credit in high EPL environments are unable to substitute the relative expensive factor, labour, for capital. Consequently, the negative effect of EPL on productivity is reinforced among firms that are financially constrained.

In Italy, temporary job contracts have been the main channel to hire young workers under 29 years old, especially after 2001 (see e.g. Daveri and Parisi, 2014). Daveri and Parisi find that a higher share of temporary work has a detrimental effect on TFP long-run growth for both innovative and non-innovative firms.

Cappellari, Dell'Aringa and Leonardi (2012) evaluate the effect of two reforms of temporary contracts in the Italian labour market on capital-labour substitution and productivity, using micro level data in the 2000s. They find that reforming the use of fixed-term contracts (more flexibility) eventually reduced firm-level productivity because of the uncertainty in interpretation of the norms, while reforming the use of apprenticeship increased the turnover of workers and lowered employment adjustment costs for firms, inducing a higher growth in productivity.

With an eye on the supply side, and using individual workers data for Russian Federation, Karabchuk (2012) examined wage differentials between permanent/non-permanent and full-time/part-time employees. Her results show that non-permanent workers suffer a loss in wages, while part-timers earn more per hour than full-timers, but the wage gap diminishes substantially when controlling for observed and non-observed individual characteristics. It seems that the

theory of segmented labour markets is quite appropriate for explaining these differences in the Russian labour market.

2. Data and econometric framework

2.1 Data description

Macro data on permanent and temporary work, employment protection, R&D expenditure, Current Account, Youth Unemployment and Unemployment rates come from OECD databases.

Labour Productivity of each country is calculated as the ratio between GDP in millions of US$ - at constant prices, constant PPP – over total employment.

The share of young permanent and temporary workers in age 15-24 over total dependent workers (SHP1524 and SHT1524 respectively), the share of adult permanent and temporary workers over total dependent workers in age 25-54 (SHP2554 and SHT2554, respectively) are found in OECD.Stat "Employment by Permanency of the Job".

The OECD indicators of employment protection (EPL) are synthetic indicators of the strictness of regulation on dismissals and the use of temporary contracts (EPLT). For each year, indicators refer to regulation in force on the 1st of January.[12] The indicators are measured on a 0-6 scale. Low values of the index are associated to low protection.

The variables related to human capital are the percentage of adult population at tertiary education level (EDUTER); the percentage of population with secondary education (SECEDU) both from OECD IPPStat database; R&D personnel per thousand total employment (RDL, OECD Skills for innovation database).

General R&D expenditure (GERD), Business Expenditure on R&D (BERD), as a percentage of GDP, and Gross Domestic R&D Expenditure (RDT, measured in millions 2005 dollars, constant

[12] For more information and full methodology, see www.oecd.org/employment/protection. For download, OECD.Stat.

prices and PPP, total intramural, total funding), come from the "OECD main S&T indicators" database. Trade balance (NX) comes from the OECD Shot-term Economic Indicators and from IMF World Economic Indicators.

Unemployment rates and Youth Unemployment rates are those in IMF National Accounts.

Table 1 reports summary statistics of our variables of interest in different groups of countries. We exclude Luxembourg from all groups because of its outlier position in terms of per capita GDP and productivity, and because of its short series on EPLG and EPLT. That is why our first group (former Euro zone countries) includes 10 countries.[13] Average value of youth unemployment in Euro zone 10 is 16.6%, with standard deviation 7.8% in the period 1997-2010. Figure 2 shows youth unemployment differences across countries and over time. In the upper panel, we can distinguish a core group of "virtuous" countries with high levels of per capita GDP and low youth unemployment (Austria, Germany, Netherlands) in 1995, while Ireland joined the virtuous in 2000 and left in 2010, due to its increased level of youth unemployment. Finland and Spain performed badly in 1995, having above-average youth unemployment and below average per capita GDP. In 2000, France and Italy joined the latter and remained there, Portugal joined the group in 2010 due to its worsened condition for youth unemployment, and Finland left the bad group by reducing the percentage of unemployed youth. While it is evident a negative (partial) correlation between youth unemployment and per capita GDP, this is not so for labour productivity. The correlation between labour productivity and youth unemployment is illustrated in the lower panel of Figure 2 and in Table 2. Taking aggregate data as a whole for the countries we observe (OECD and Russia, excluding Luxembourg), simple correlations show a positive relationship between productivity and youth unemployment, productivity and young temporary workers, but there is a negative relationship between productivity and adult temporary work. In Figure 2, we condition the correlation between productivity and youth unemployment to selected years, before and after the big economic crisis. Belgium, France and Italy performed best in terms

[13] Former countries adopting Euro on January 1st, 1999 are Austria, Belgium, Germany, Spain, Finland, France, Ireland, Italy, Luxembourg, Netherlands, and Portugal. Greece entered the Euro zone in 2001. Slovenia in 2007, Cyprus and Malta in 2008. Slovakia in 2009 and Estonia in 2011.

of productivity in 1995, but poorly in terms of youth unemployment. Ireland had the second highest productivity in 2000 and the highest in 2005, with a very low level of youth unemployment. In 2010, Ireland's youth unemployment rate jumped 20 percentage points higher, even if it still had the best productivity performance.

The share of young (15-24 years old) temporary workers is equal to 45.5% in the period 1997-2010, as in Table 1. Austria, Belgium, Italy and Netherlands had below-average share in 1995, while Spain's share was more than 70% (see Figure 1). There appears to be a negative correlation over time between per capita GDP and the share of young temporary workers. Contrary to youth unemployment, there is a negative correlation between labour productivity and the share of temporary young workers, too, except in 1995. It is clear that countries performing better in terms of productivity and standard of living have lower shares of young workers under temporary contracts. We then extend the group of Euro zone countries to Greece, Slovenia, Slovakia, Estonia and Russian Federation. We exclude Cyprus and Malta from the regressions because of lack of information on their GDP in constant 2005 dollars, Employment, Youth unemployment and Net Exports, NX.[14] In this group of countries, per capita GDP and productivity are lower, on average, while average rate of youth unemployment is higher, 18.4%. Figure 3 - lower-panel - shows the relationship between productivity and youth unemployment. It has changed over time. In 1995, countries with high productivity were associated to high youth unemployment. In 2000, the relationship turned negative because of the worsening conditions of youth unemployed in Russia and Slovakia, and because we have observations for Cyprus and Malta, which showed low levels of unemployment associated to low levels of productivity. Moreover, Ireland performed better in 2000 in the two measures. The correlation became weakly negative in 2005 and weakly positive in 2010. The share of young temporary workers on average was 36.6%, five p.p. less than in the Euro zone countries. Now the relationship between productivity and the share of young temporary workers is positive over time (Figure 3, upper panel): the five "new" euro

[14] Slovenia and Estonia have only 3 observations for Education, EPLG, EPLT. Greece has only 3 observations on NX and RDE. Slovakia has 14 observations for all variables. Russia does not have data on education, while it has just 3 observations for EPLG, EPLT in 2008-2010.

countries (excluding Slovenia) as well as Russia show low levels of both productivity and temporary young work.

Then we extend the description to the member countries of OECD.[15] As before, we exclude Luxembourg. In the estimations we need to exclude Chile (because it does not have data on inflation), Israel and New Zealand because they do not have information on the share of young and adult temporary work. On average, youth unemployment rate is 15.6%, one p.p. lower than the rate for Euro zone 10. Its share of young temporary workers is 32.4%, about 9 p.p. lower that that of Euro zone 10. Its average per capita GDP is quite similar, instead, while the mean productivity is about 7 thousand dollars less, per employed person.

We also conduct the analysis on the G7 and G8 countries, the richest countries in the world.[16] As expected, G7 has the highest mean per capita GDP ($67653.3) and the highest mean level of productivity ($31790.1). It has also the lowest mean share of temporary work (31.8%) after G8 (30.5%). G7 and G8 have slightly lower mean youth unemployment rates (15.1%) than the rest of the countries. They have also the highest mean share of population with tertiary education (30.2%), lower index of employment protection (EPLG = 1.6 and 1.7, respectively, EPLT = 1.3 for both), and spend more of their GDP in R&D.

If we look at the time dimension, Figure 4 illustrates the series of labour productivity in the upper-panel and youth unemployment in the bottom-panel, for selected countries of each group, Denmark, France, Germany, Italy, Russia, Spain, and the UK. As discussed in Section 2.1, the chosen countries apply different welfare systems and they have different labour market institutions and performance. However, it is evident that their aggregate productivity tends to converge over time with a similar trend. In the 1990s, Italy was the best performer in terms of productivity, in the 2000s France scored better than the others were. Until 2008, Russia's productivity growth had been much faster than the others' had.

[15] OECD includes 34 countries: Australia, Austria, Belgium, Canada, Chile, Switzerland, Czech Republic, Germany, Denmark, Spain, Estonia, Finland, France, UK, Greece, Hungary, Ireland, Iceland, Israel, Italy, Luxembourg, Japan, South Korea, Mexico, Netherlands, Norway, New Zealand, Poland, Portugal, Slovakia, Slovenia, Sweden, Turkey, and USA.

[16] G7: Canada, Germany, France, UK, Italy, Japan, USA. Russian Federation is the 8th country in G8.

Figure 4 in the lower panel gives a completely different picture. The rate of youth unemployment did not tend converge over time, but fluctuated widely. Spain had the most worrisome situation after 2008, its rate growing to more that 50% already in 2012, while Italy's rate was about 35%.[17] Germany was the best performer in terms of low youth unemployment in the 1990s. In the 2000s, Russia performed best.

Figure 5 shows the shares of temporary workers in age class 15-24 (upper panel) and 25-54 (lower panel) for the same countries. Young temporary work series do not fluctuate much over time, in all countries apart from Spain. Germany and France have always had the highest values for this share, if we exclude Spain, both in the 1990s and 2000s. There is evidence of clusters in both 1990 and 2012: Germany, France and Denmark started at a higher level in 1990 (30-40%) than Italy and UK (about 10% each). In 2012, Italy jumped to the cluster of high shares (reaching Germany and France), while Denmark decreased to the British and Russian levels (around 12%). This evidence reflects the dynamics of labour market policies and institutions at the end of the 1990s.

The share of adult temporary work has a very different dynamics: all countries start at similar levels in 1990 (3%-6%, except for Spain, 24%). Then the series spread out over time and across countries, with Italy and France reaching 12% in 2012 and UK still at about 3% of total employment. Russian adult temporary work dropped from 12% in 2008 to about 7% in 2012.

We reproduce the graphs of temporary work for the groups we use in our regressions. Young temporary work series has a jump at the end of the 90s for the former Euro countries only, such that the rate of temporary young work goes above 40% after 1998, reaching almost 50% in 2011. For all other groups, the rate converges to 35-38% in 2010. The rate of adult temporary work follows a more spread out dynamics, but at lower levels. G7 and G8 have the same upward trend,

[17] In January 2014, Spain and Italy had the highest level of youth unemployment in Europe. Italy's rate reached 43.5%. In one year, Italy lost 100.000 occupations (-10%) for those less than 24 years old. About half of these people entered unemployment. The other half exit the labour force and contributed to increase the NEET (not engaged in education, employment or training) category. See Tito Boeri, www.lavoce.info March 2014.

reaching 9.5% in 2011. Euro 16+Russia group and OECD converge to 11% in 2012. Euro 10 group's rate has been above 12% since 2007.

Figure 7 shows aggregate labour productivity's dynamics for each group. The growth rate is very similar, but the levels are different. The level of productivity for Russia dropped suddenly in 1995, as we can see from the upper panel of the figure. G7 has the highest level of productivity over time, even during the big crisis. Finally, Figure 7 – lower panel – shows the dynamics of youth unemployment for each group. The countries of Euro area in general have experienced a decreasing rate of youth unemployment starting in 1994 until 2007. OECD and Russia's youth unemployment has been fluctuating most of the time. Starting in 2008, youth unemployment rate has increased steadily and rapidly everywhere, particularly in the Euro area.

Table 1. *Descriptive statistics over e-sample 1997-2010.*

	Euro zone 10		Euro zone 15 + Russia		OECD		G7		G8	
	Mean	st.dev.	mean	st.dev.	mean	st.dev.	Mean	st.dev.	mean	st.dev.
Y/L	66355.0	9677.0	57485.0	16475.3	57012.2	15870.5	67653.3	7062.3	62127.3	16166.0
Y/P	29821.2	4623.3	25621.8	7716.3	26426.6	9033.4	31790.1	4402.8	29180.6	8114.9
YU	16.6	7.8	18.4	8.0	15.6	7.7	15.1	6.4	15.5	6.3
$\Delta lnGDP$	2.2	2.8	2.7	3.5	2.7	3.1	1.7	2.2	2.0	2.8
inflation	2.0	1.2	3.9	6.8	3.9	7.9	1.6	1.0	3.8	9.1
$TShare_{1524}$	41.5	14.2	36.6	17.3	32.4	16.9	31.8	16.4	30.5	15.9
$TShare_{2554}$	11.1	7.0	10.0	6.5	10.2	6.7	8.1	2.5	8.2	2.6
L	13280.8	12255.2	13828.3	18001.0	16356.7	27253.2	49369.1	42799.8	51500.0	40429.1
HRS	1642.2	148.9	1724.8	191.4	1790.5	230.5	1688.1	146.3	1724.6	167.8
EDUTER	23.3	7.8	22.6	7.8	25.5	9.8	30.2	10.7	30.2	10.7
EPLG	2.5	0.7	2.5	0.7	2.1	0.7	1.6	0.9	1.7	0.9
EPLT	2.0	1.0	2.0	1.1	1.7	1.2	1.3	1.2	1.3	1.2
NX	0.13	4.8	-0.9	6.7	-0.6	6.5	0.0	2.9	0.5	3.5
RDE	10477.3	13259.0	7990.0	11825.5	16242.7	42129.3	61141.8	73411.3	54962.4	70569.2
RDE/Y	1.17	0.61	0.96	0.61	1.15	0.82	1.45	0.57	1.36	0.58
Obs.	min.137-max.140		min.177-max.210		min.400-max.462		min.93-max.98		min.97-max.112	

Y/L and *Y/P* are measured in US$ at constant prices and PPP. *YU* is youth unemployment rate. *TShare* is the share of workers on a temporary contract in a specific age group. *HRS* are the annual hours of work per employed person. *EDUTER* is the share of population with tertiary education. ITA, NLD, PRT have this information starting from 1998. Russia does not have education information. *EPLG*, *EPLT* are indexes assuming values in [0,6] interval. The lower the value, the lower protection is provided to workers. *NX* is the trade balance as a percentage of GDP. *RDE* is Expenditure on Enterprise R&D, constant prices, base year 2005, millions of US$. *RDE/Y* is *RDE* as a percentage of GDP. All groups exclude Luxembourg, because it has too short series on *EPLG* and *EPLT* and outliers in GDP per capita and labor productivity. The group "Euro zone 15 + Russia" excludes LUX, CYP, MLT.

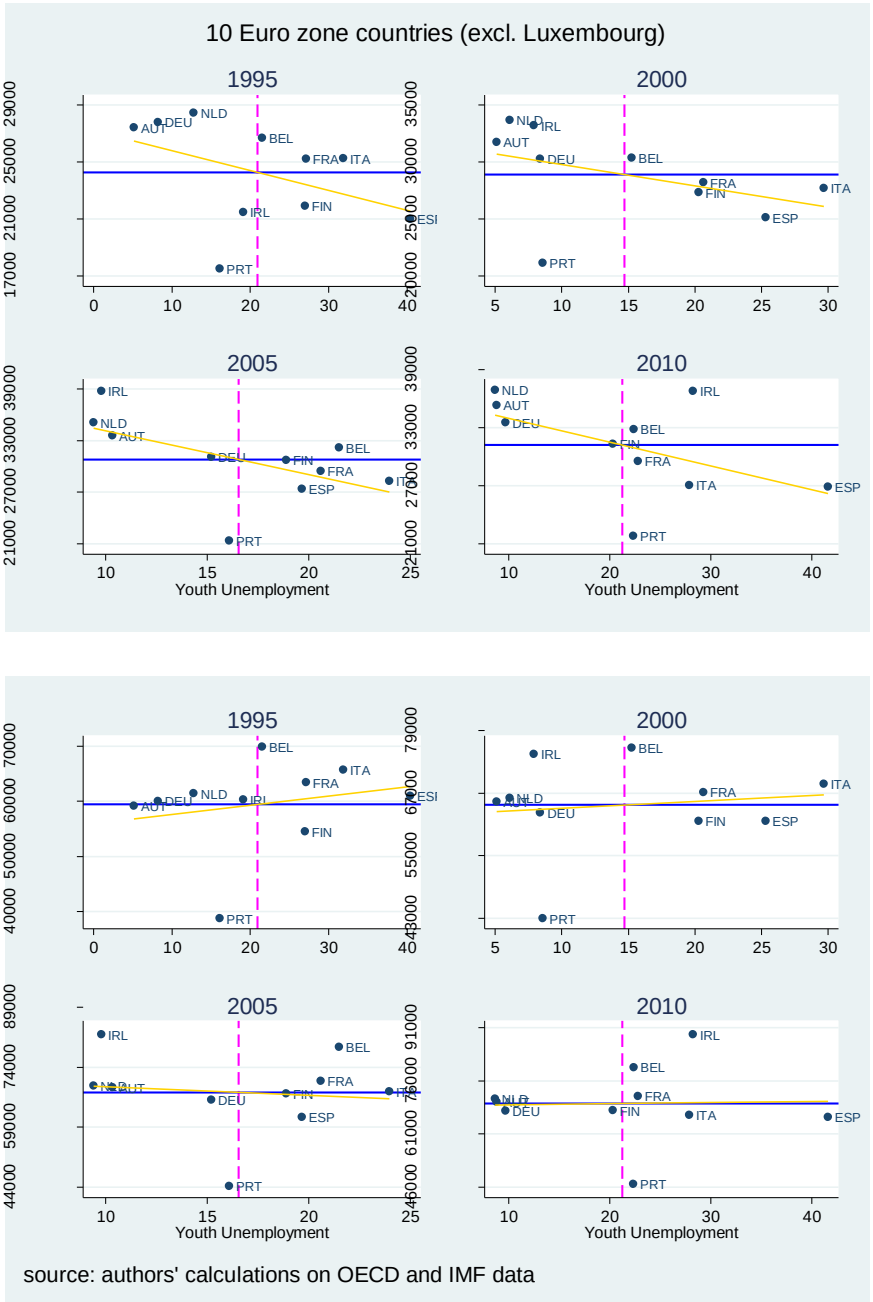
Table 2. *(Partial) Correlation matrix of main aggregates.*

	Y/L	$TShare_{1524}$	$TShare_{2554}$	YU
Y/L	1			
$TShare_{1524}$	0.136	1		
$TShare_{2554}$	-0.256	0.628	1	
YU	-0.232	0.141	0.211	1
NX	0.491	0.247	-0.127	-0.346
EDUTER	0.608	0.057	-0.028	-0.290
BERD	0.420	0.255	-0.096	-0.360
GERD	0.464	0.272	-0.096	-0.372
RDE	0.126	0.073	0.017	-0.236
RDL	0.606	0.267	-0.151	-0.187
RDT	0.142	0.087	0.024	-0.223
EPLG	-0.328	0.351	0.296	0.128
EPLT	-0.190	0.201	0.454	0.268
$\Delta lnGDP$	-0.094	-0.096	0.060	-0.010
Inflation	-0.431	-0.183	0.153	-0.001
Hours	-0.699	-0.273	0.288	0.178
Employees	-0.081	0.072	0.212	-0.149

See note to Table 1. Correlations based on 342 observations of all OECD countries, excluding Luxembourg, plus Russia. BERD =

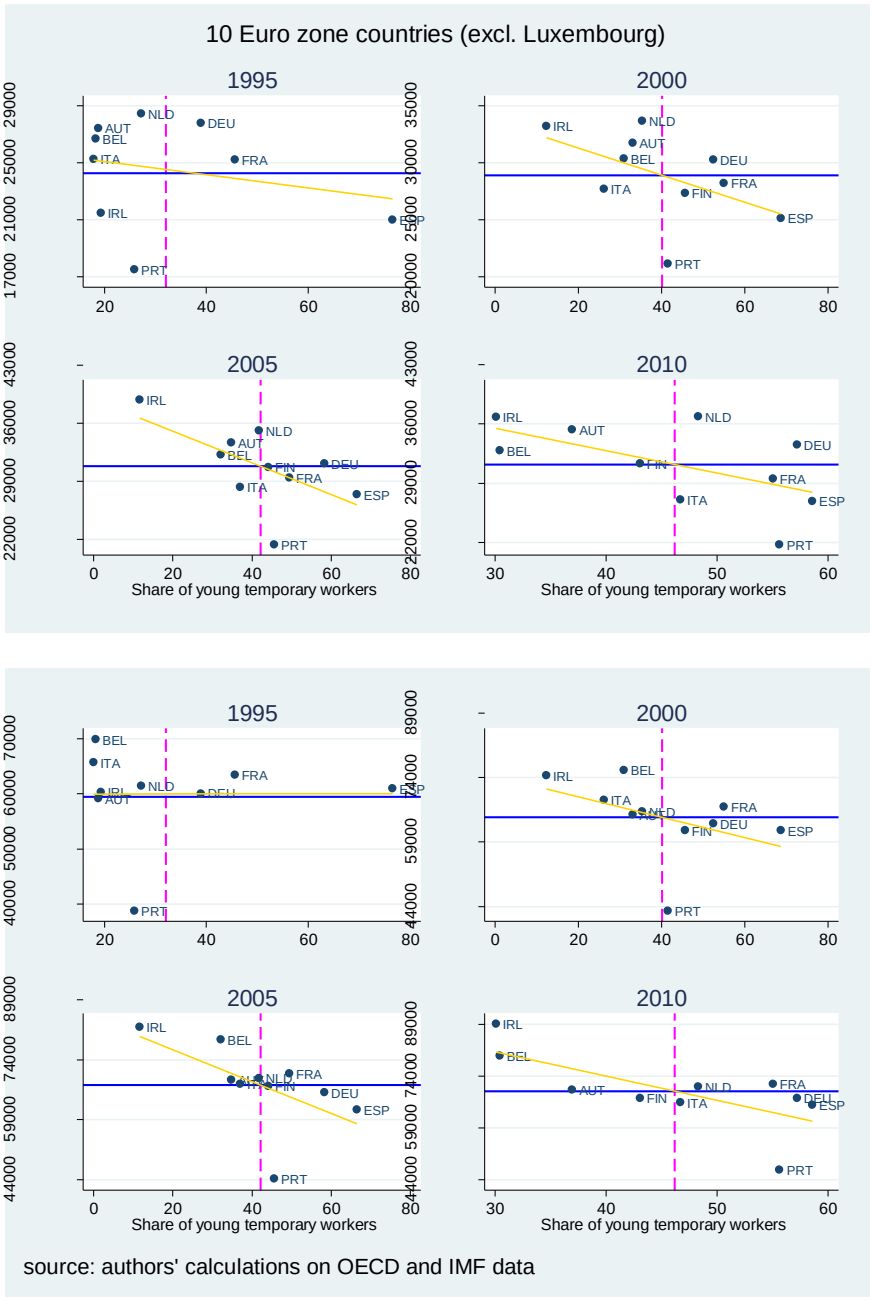
Business R&D expenditure as a percentage of GDP, GERD = General R&D expenditure as a percentage of GDP, RDL = R&D personnel per thousand of total employed, RDT = Gross Domestic R&D expenditure, total funding, intramural.

Figure 1. *Per capita GDP, productivity and youth unemployment*



note: Per capita GDP is the ratio between GDP (in US$, constant 2005 prices and PPP) and Population. Productivity is GDP per employed person (measured in US$, in constant 2005 prices and PPP). The blue solid line indicates average per capita GDP or average productivity, the red dashed line indicates average youth unemployment rate.

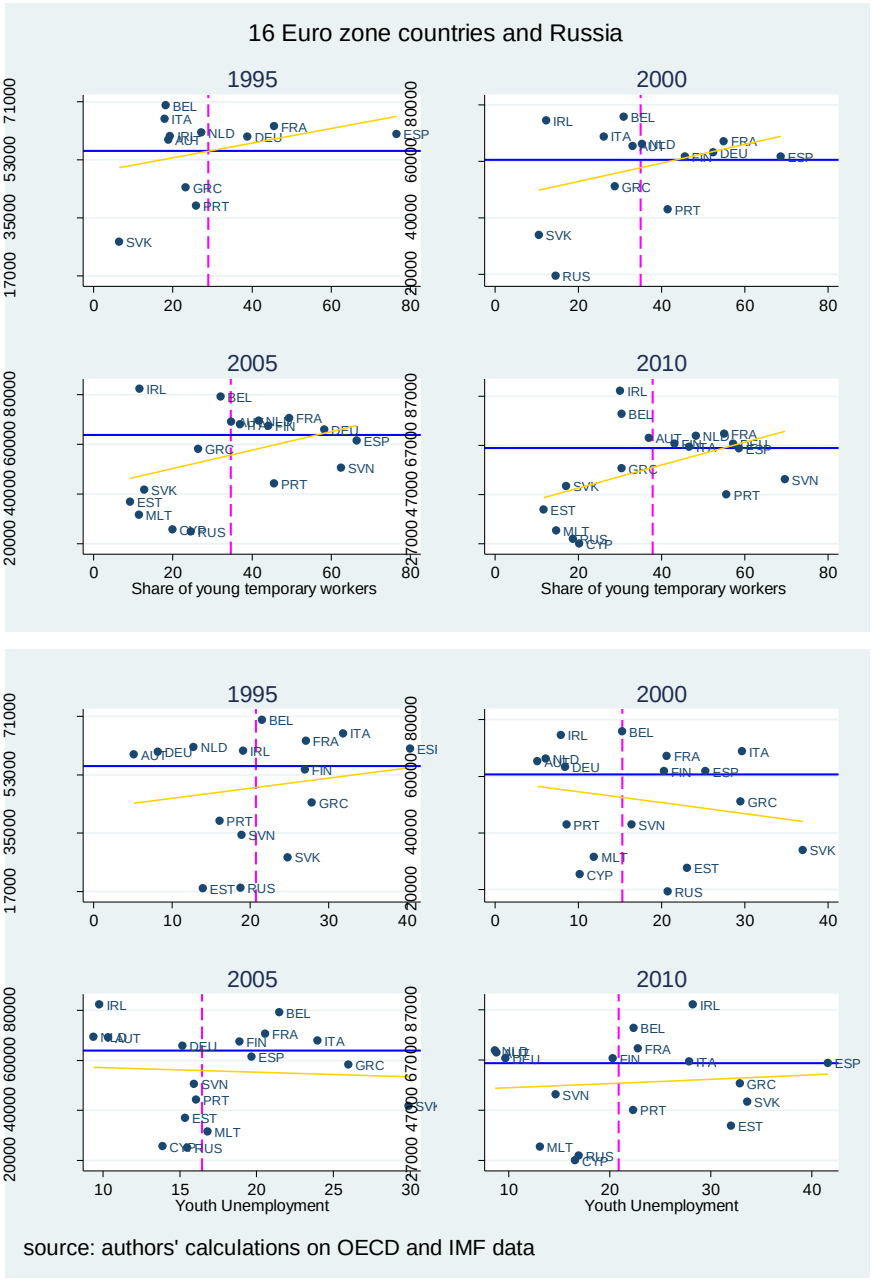
Figure 2. *Per capita GDP, productivity and the share of young temporary workers*



note: See note to Figure 1. Former 10 countries adopting euro in 1999. Luxembourg

is excluded because it is an outlier in terms of per capita GDP and productivity.

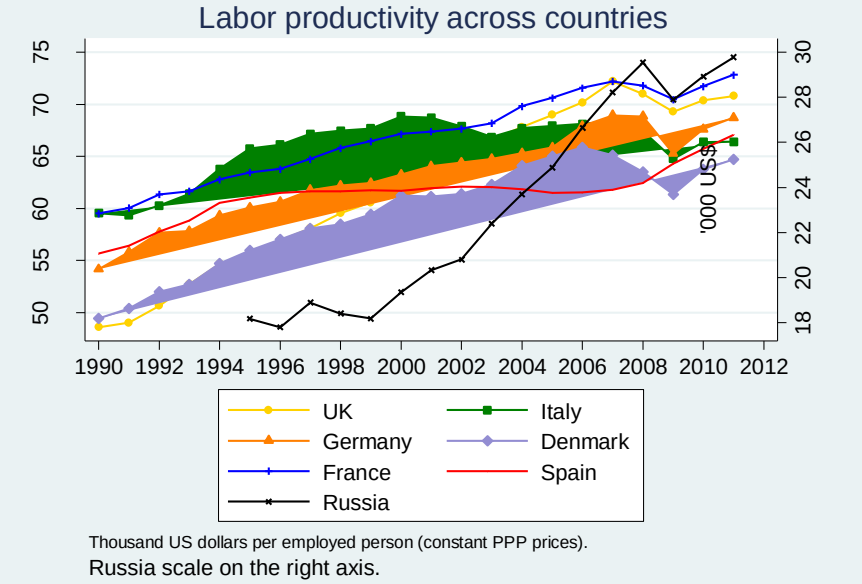
Figure 3. *Productivity, share of temporary young workers and youth unemployment*.



note: See notes to Figure 1 and Figure 2. Greece entered the Euro zone in 2001.

Slovenia entered in 2007. Cyprus and Malta in 2008, Slovakia in 2009, Estonia in 2011. The 18th country to enter the EU in 2014 is Latvia (excluded as well). Here we show the position of the Russian Federation as well.

Figure 4. *Time series of labour productivity and youth unemployment*



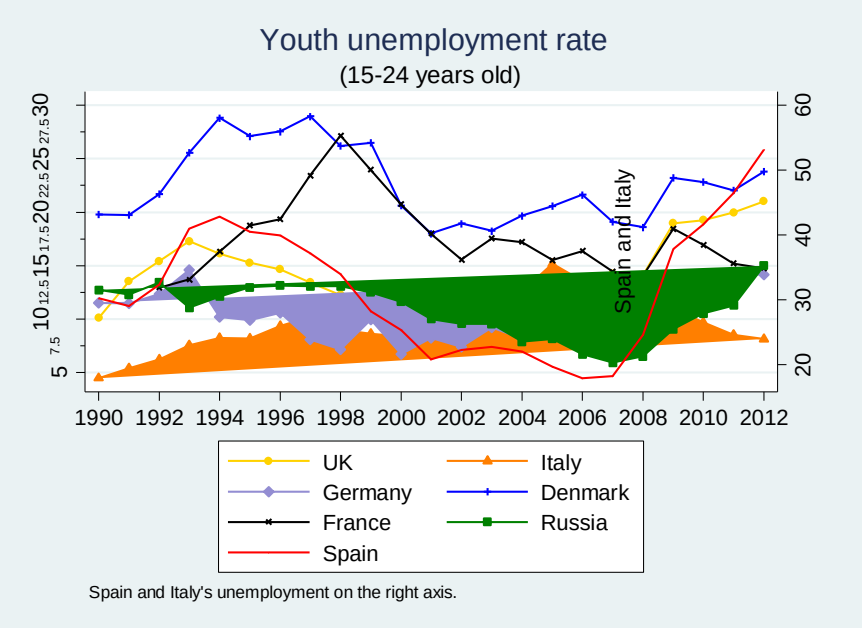
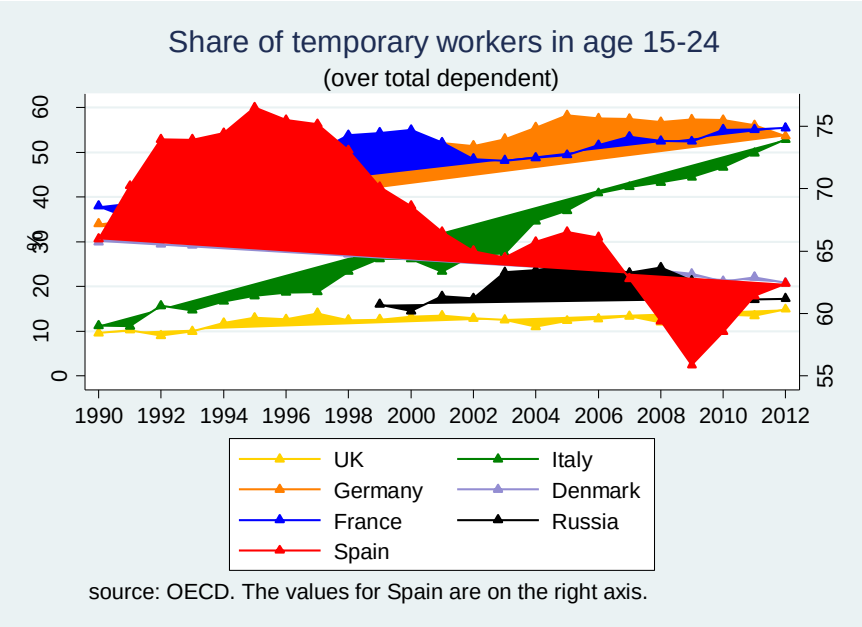


Figure 5. *Time series of the share of temporary young and adult workers*



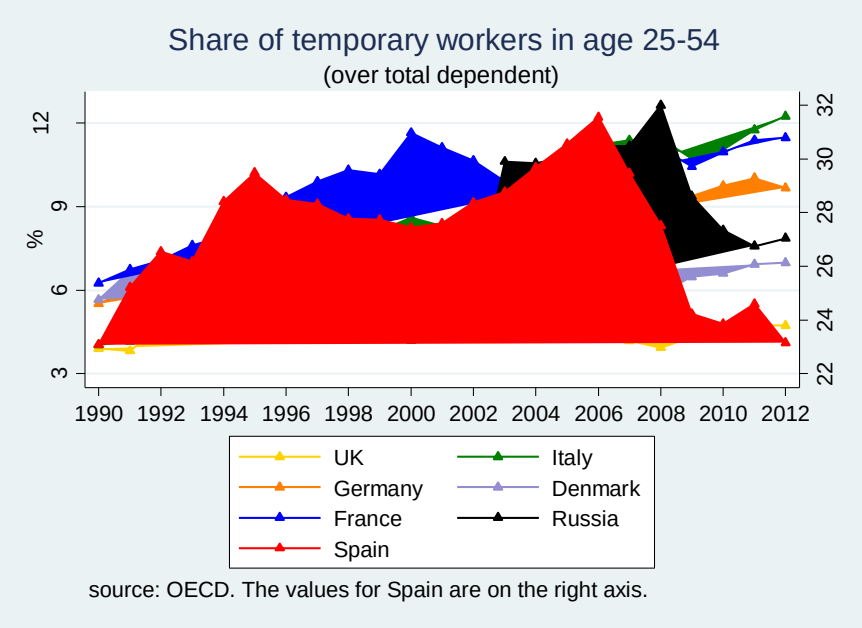
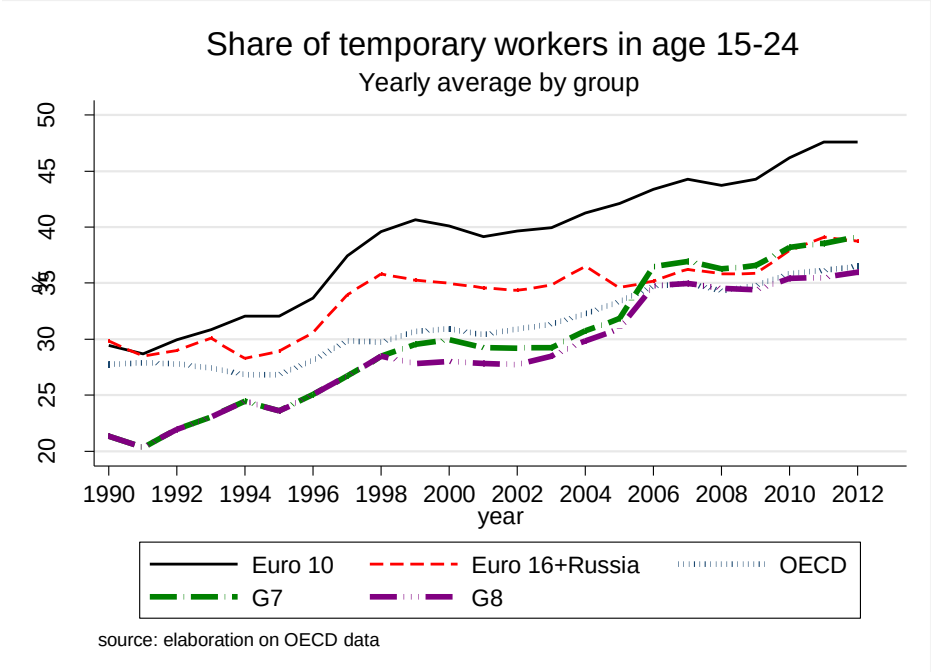


Figure 6. *Time series of the share of temporary young and adult workers, by group*



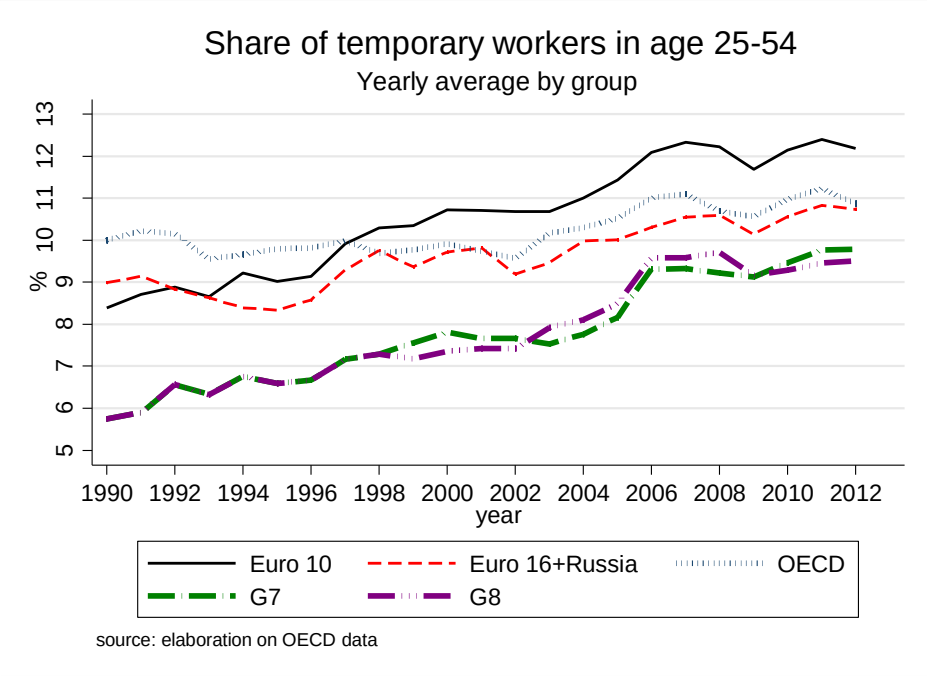
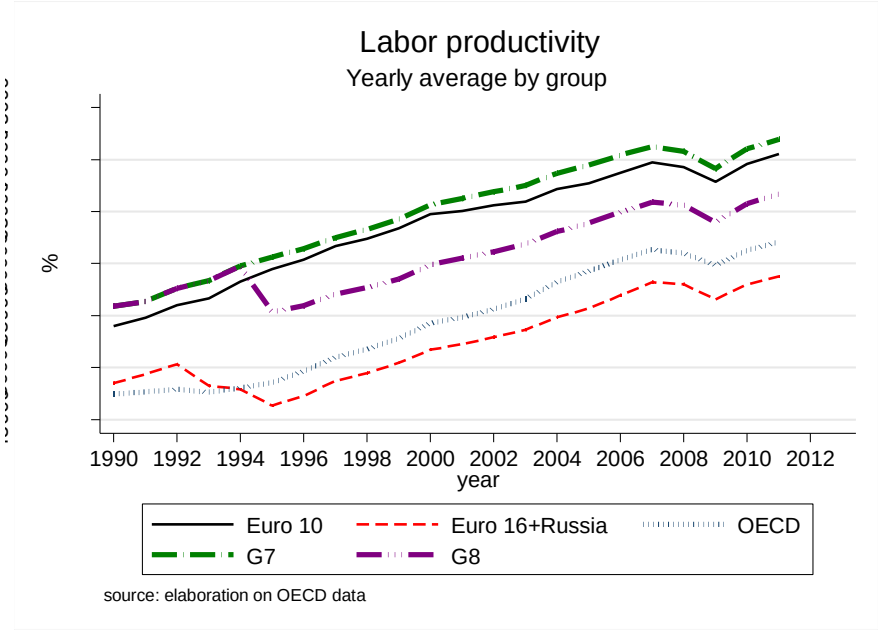
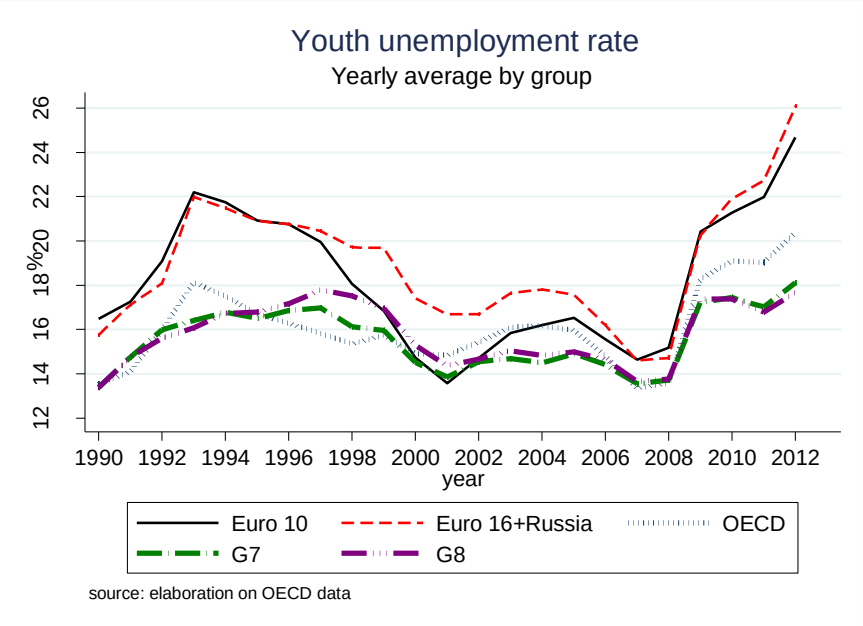


Figure 7. *Time series of labour productivity and youth unemployment*





2.2 Econometric framework

As said in the Introduction, the most common caveats on estimations of labour productivity determinants on the one hand and its relationship with unemployment on the other, at the macro level (i.e. using country level data), are reverse causality and endogeneity.

We specify a sufficiently general system of two equations where we take into account, one by one, each problem. The level of labour productivity in country *i* in year *t* and the level of "youth" unemployment (*YU*) are modelled as follows:

$$(1)\quad \begin{cases} \ln\left(\frac{Y}{L}\right)_{it} = \alpha_1 + \beta_1 ShareT_{1524it} + \beta_2 ShareT_{2554it} + \rho_1 \ln\left(\frac{Y}{L}\right)_{it-1} + \gamma_1 YU_{it} + \varphi' X_{it} + c_i + \tau_t + \varepsilon_{1it} \\ YU_{it} = \alpha_2 + \gamma_2 YU_{it-1} + \rho_2 \ln\left(\frac{Y}{L}\right)_{it} + \delta \Delta \ln Y_{it} + \lambda \pi_{it} + c_i + \tau_t + \varepsilon_{2it} \end{cases}$$

We specify explicitly those variables of interest related to the labour market, while we encompass in the vector *X* all other variables related to macroeconomic and labour characteristics of each country. *Y* is the level of GDP, *L* the number of employees (adjusted by their hours of work), $ShareT_{1524}$ and $ShareT_{2554}$ are, respectively, the share of temporary employment in age 15-24 and the share of temporary employment in age 25-54, *YU* is the level of youth unemployment (in age 15-24). Vector *X* includes the share of population with tertiary education (when available), the level of Employment Protection either for general employment or for temporary contracts only (EPLG, EPLT), the Trade in goods and services balance (NX), and the level of Business R&D expenditure (RDE). $\Delta \ln Y$ is the growth rate of GDP, π is the inflation rate based on CPI index. We also add country (c_i) and time (τ_t) effects. Finally, the error terms of the system are assumed to follow a within-panel AR(1) process, with heterogeneous variance/covariance matrix. Errors are assumed uncorrelated across panels instead. This means that for example the disturbance term of youth unemployment can be specified as $\varepsilon_2 = \mu \varepsilon_{2,-1} + \nu$, which implies $(1-\mu L)\varepsilon_2 = \nu$ (a white noise term). This error term can be rewritten as an infinite sum of white noises $\varepsilon_2 = \sum_{j=0}^{\infty} \mu^j \nu_{-j}$, which has zero mean $E\varepsilon_2 = 0$ and constant variance $V(\varepsilon_2) = E\varepsilon_2^2 = \sum_{j=0}^{\infty} \mu^{2j} \sigma_i^2$.[18]

The cross-equation correlation is a free parameter: $E(\varepsilon_{ijt}\varepsilon_{ij't}) = \omega_{jj'}$. We start estimating these two equations for the panels of countries by imposing restrictions on the parameters, and then relaxing them one by one, adding robustness to our results, as follows.

[18] In Appendix 1, we show that the reduced form of the system implies cross-equation correlation of the error terms and we show how to identify the parameters of the system.

Case a): Static dependent variables with exogenous regressors and uncorrelated error terms (the most constrained system). We assume $\rho_1 = 0$, no reverse causality ($\rho_2 = 0$), and the reduced-form system covariance $\omega_{jj'} = 0$ (see Appendix 1). Therefore, we estimate the labour productivity equation separately, with *YU* as an exogenous variable.

Case b): we relax the hypothesis of exogenous *YU,* but no-reverse causality assumption remains. This means that we estimate the reduced-form system in Appendix 1 with $\omega_{jj'} \neq 0$, but still maintaining $\rho_2 = 0$.

Case c): we relax both hypotheses of exogenous *YU* and no reverse causality.

This means estimating the reduced form system with $Cov(\omega, \varepsilon_2) \neq 0$ and $\rho_2 \neq 0$.

Case d): dynamic equations. We introduce dynamics at this stage, with $\rho_1 \neq 0$, $\gamma_2 \neq 0$. This solves at least partially the problem of non stationarity (especially of the youth unemployment variable). In fact, as discussed above, unemployment has been found in the empirical literature to be non stationary (of fractional order [0.5-1]) and cointegrated with the growth rate of GDP and the rate of inflation, at least for half European countries (see Caporale and Gil-Alana, 2014). We test both dependent variables for unit root.

In the cases a) to c) we apply the fixed effects estimator for panel data and/or instrumental variable or GMM, where indicated. In case d) we apply the Arellano-Bond estimator for dynamic panels and fixed effects.

Case e): the whole system can be estimated also by the seemingly unrelated regression estimator 3SLS, with country dummies and time dummies on pooled data.

Our parameters of interest are $\beta_1, \beta_2, \gamma_1$, i.e. the effect of temporary employment of young and adult employees, and the impact of youth unemployment on labour productivity at the country level.

As seen in section 3.1, panels vary according to their economic development (Euro-zone countries, Euro-zone plus Russian Federation, OECD, G7 and G8 countries). Russian Federation has fewer data on the control variables in general, and no information about tertiary education of

its population, so we need to drop the education variable when Russia is included in the regressions.

3. Results

Case a): benchmark regressions, fully constrained parameters. We use an OLS estimate with panel corrected standard errors. Residuals follow a panel-specific AR(1) process and the covariance matrix heteroskedastic. We report the estimated elasticity of labour productivity with respect to the main variables in Table 2. The share of temporary adult workers has a negative impact in all groups, and statistically significant for the Euro 10, Euro 15+Russia and OECD groups. The elasticity with respect to young workers share is positive and statistically significant for the Euro 15+Russia and G8 groups, it is positive and non-significant for the Euro 10 and OECD groups, and negative and significant only in the G7 countries. Youth unemployment is positively correlated to labour productivity, in the Euro 10 and G7 groups, while it is not significant for the other groups. The percentage of population with higher education has positive effect, but significant only for the G7 countries. The existence of labour protection seems to have a dumping effect on productivity, except for the G8 group. Trade balance is positively correlated to productivity, except in the G8 case. Finally, the percentage of GDP devoted to R&D has a positive a significant effect only for the Euro 15+Russia group.

Case b): endogenous youth unemployment.

The previous results might suffer from inconsistency if youth unemployment is endogenous, i.e. whether shocks to labour productivity have an effect on unemployment as well. Table 3 reports the result of labour productivity estimates for this case. The test for endogeneity of youth unemployment rate cannot reject the hypothesis of exogenous *YU* for Euro 15+Russia, OECD and G7 groups. In column (1) and (5), the test for endogeneity reject the null, *YU* is strongly positively correlated to ln-productivity but temporary work is not. In general, the result that adult

temporary work is negatively or not correlated with productivity remains true. Young temporary work is either positive for Euro 15+Russia, null for Euro 10, OECD and G8, and negative and significant for G7. Notice that the standard variables used to instrument *YU* do not constitute valid instruments in the case of Euro 15+Russia, OECD, G7.

Case c) endogenous youth unemployment and reverse causality between labour productivity and youth unemployment allowed. We estimate the system with LIML robust estimation, with autoregressive residuals. The current ln-Labour productivity coefficient estimate ($\hat{\rho}_2$) is not significant in the youth unemployment equation, for all groups of countries. The coefficient estimates for labour productivity are very similar to case b) and not reported here.

Case d) dynamic equations with one-lagged dependent as a regressor and endogenous youth unemployment. Table 4 reports the results of 2-step GMM with AR(1) residuals and panel-heteroskedastic variance. It is evident that the dynamics of labour productivity depends on which group of countries we deal with. In the euro zone 10 countries, as well as in G8 countries, the coefficient of lagged productivity is not significant. The other groups' estimations suffer plausibly from non stationarity, therefore the estimates of coefficients are inconsistent and it would be better to specify a system in growth rates.

Case e) seemingly unrelated equations on pooled data, with country and time dummies.
Summarizing our results in Table 5, we find that the impact of temporary young work on labour productivity is mixed: it is zero for Euro zone 10 countries, it is positive for Euro zone 15 plus Russian Federation, it is zero or positive for OECD and G8 countries (according to which estimator we rely on) and it is negative for G7. These mixed results are compatible with the idea that temporary employees are mostly young people. Increased labour market flexibility, as the one observed especially in Europe in the past decades, created job opportunities for the youngsters, leading firms to face lower adjustment costs in the size of their workforce (avoiding

firing costs and lower wage bills), better monitoring, substitutions of permanent employees on leave, etc. Thus, it increased firms' productivity and competitiveness. However, flexibility means less protection on the job, higher unemployment risks, lower job tenure and sometimes poor working conditions, like access to social benefits or training. This reduces workers' incentives to invest in firm-specific human capital, lowering their productivity (Jahn, Riphahn, Schnabel, 2012). Therefore, the net effect is mixed in our evidence, according to the group of countries we rely on. The share of adults (25-54) employed under temporary contracts instead is always negatively related to labour productivity (or unrelated like in the G8 group). The negative impact of flexibility is dominant in the case of adult employees, throughout different labour markets structures.

As far as youth unemployment, our results indicate that there is no direct relationship between labour productivity and youth unemployment in the groups Euro 15+Russia and OECD, while there is a positive link for Euro 10 (as in Figure 2), G7 and G8 groups. Figure 2 shows that countries experiencing high youth unemployment (Italy, France, Belgium) were also surprisingly experiencing the highest levels of productivity, at least in the period 1995-2005. Most plausibly, the link between youth unemployment and productivity is mediated by a mechanism through which young unemployed people (re-)entering the labour market become temporary workers. The aim of this paper is estimating the labour productivity of temporary young workers. Italy and France, for example, introduced policies oriented towards temporary work only in the beginning of the 2000s.

Table 3. *Elasticity of Labor Productivity, Case a): most constrained system*

	(1) Euro10	(2) Euro15+RUS	(3) OECD	(4) G7	(5) G8
$ShareT_{15-24}$	0.0122	0.148***	0.0306	-0.0991***	0.0942**
	(0.0253)	(0.0271)	(0.0226)	(0.0211)	(0.0322)

$ShareT_{25-54}$	-0.0507*	-0.0664**	-0.0562*	-0.00175	-0.0107
	(0.0212)	(0.0238)	(0.0238)	(0.0248)	(0.0337)
Youth Unemployment	0.0387***	0.0200	0.00338	0.0356**	0.0270
	(0.0100)	(0.0151)	(0.00973)	(0.0114)	(0.0215)
Tertiary Education %	0.0612		0.0159	0.132***	
	(0.0387)		(0.0279)	(0.0394)	
EPLG index	-0.118**	-0.103*	-0.118***	-0.0188	0.0776
	(0.0419)	(0.0439)	(0.0269)	(0.0360)	(0.0793)
Trade Balance %	0.000204*	0.00203*	0.000165	0.000532*	-0.00113§
	(0.0000851)	(0.000987)	(0.000168)	(0.000265)	(0.000674)
GRD %	-0.0276	0.118***	-0.0654***	-0.0665§	0.0512
	(0.0245)	(0.0212)	(0.0187)	(0.0403)	(0.0567)
Observations	137	229	356	92	124
Time dummies	yes	yes	yes	yes	yes

OLS with country and time dummies. Panel corrected standard errors in parentheses: panel-specific AR(1) correlations in the residuals and panel-specific heteroskedasticity. § $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Russian Federation does not have data on tertiary education, so this variable has been dropped in regressions (2) and (5). ShareT are measured as percentage shares of total employment in the age group. Tertiary education as a % of total population. Trade balance and GRD as a percentage of GDP. EPLG index is included in [0,6] interval.

Table 4. *GMM estimated elasticity of Labor Productivity, case b): endogenous YU*

	(1) Euro10	(2) Euro15+RUS	(3) OECD	(4) G7	(5) G8
$ShareT_{15-24}$	-0.050588	0.2116***	0.0765	-0.0871***	0.0065
	(0.0327)	(0.0551)	(0.0481)	(0.0247)	(0.0440)
$ShareT_{25-54}$	-0.0151	-0.2067***	-0.1367**	0.0152	0.0538
	(0.0333)	(0.0432)	(0.0419)	(0.0332)	(0.0560)
Youth Unemployment	0.0757***	0.0338	0.0051	0.0857***	0.1294***
	(0.0218)	(0.0376)	(0.0223)	(0.0177)	(0.0361)
Tertiary education %	0.0893§		-0.0759	0.1358**	
	(0.0496)		(0.0550)	(0.0458)	
EPLG index	-0.1794**	-0.4872**	-0.3162***	-0.0241	-0.0363
	(0.0653)	(0.1471)	(0.0706)	(0.0430)	(0.1211)
Trade Balance %	0.000056	0.0023§	-0.0010	-0.0001	-0.00269
	(0.000037)	(0.0013)	(0.0008)	(0.0002)	(0.0024)
GRD %	-0.0422	0.0311	-0.0925**	-0.0671	0.0876
	(0.0285)	(0.0507)	(0.0315)	(0.0549)	(0.1289)
Observations	137	227	353	92	121
R^2	0.797	0.514	0.679	0.911	0.573
Time dummies	yes	yes	yes	yes	yes
Hansen-Sargan	0.858	14.08	24.09	17.97	2.018
H-S p-value	0.651	0.0009	0.0000	0.0001	0.365

Reported elasticities of IV-GMM estimator with FE. Panel corrected standard errors in parentheses. § $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Time dummies always included. Excluded instruments for youth unemployment are the annual growth rate of real GDP, the inflation rate and the lagged level of youth unemployment. Test for exogeneity of youth unemployment cannot reject the null for regressions (2), (3) and (4). ShareT are measured as percentage shares of total employment in the age group. Tertiary education as a % of total population. Trade balance and GRD as a percentage of GDP. EPLG index is included in [0,6] interval.

Table 5. *GMM estimated elasticity of Labour productivity, case d): dynamics*

	(1) Euro10	(2) Euro15+RUS	(3) OECD	(4) G7	(5) G8
$ShareT_{15-24}$	-0.0308	0.0035	0.0199	-0.0050	0.0040
	(0.0314)	(0.0225)	(0.0138)	(0.0216)	(0.0377)
$ShareT_{25-54}$	-0.0240	-0.0028	-0.0095	0.0046	0.0496
	(0.0271)	(0.0190)	(0.0169)	(0.0179)	(0.0485)
Youth unemployment	0.0608**	-0.0118§	-0.0054	0.0100	0.1084
	(0.0227)	(0.0062)	(0.006038)	(0.0134)	(0.1058)
Tertiary education %	0.0761§	-	0.0082	-0.0225	-
	(0.0410)		(0.0209)	(0.0319)	
EPLG index	-0.1415*	-0.0801	-0.0794§	-0.0062	-0.0455
	(0.0656)	(0.0587)	(0.0420)	(0.0325)	(0.1246)
Trade Balance	0.00004	-0.0004	-0.0003	-0.00001	-0.0020
	(0.00003)	(0.0003)	(0.0003)	(0.0001)	(0.0040)
GRD %	-0.0358	-0.0090	-0.0055	-0.0327	0.0664
	(0.0236)	(0.0099)	(0.0144)	(0.0351)	(0.1701)
Observations	137	227	353	92	121
R^2	0.876	0.976	0.952	0.971	0.693
Time dummies	yes	yes	yes	yes	yes
$lnLP_{t-1}$	0.2087	0.9783***	0.8674***	0.9058***	0.1607
p-value (H_0: $\rho_1 = 1$)	0.0002	0.8067	0.1985	0.5582	0.001
Hansen-Sargan	0.241	21.38	24.46	18.87	2.649
H-S p-value	0.624	0.000	0.000	0.000	0.104

Reported elasticities of IV-GMM estimator on FE. Panel corrected standard errors in parentheses. § $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. $lnLP_{t-1}$ shows the estimated coefficient of the lagged labor productivity in the main equation (ρ_1). We report the test that this coefficient is equal to 1. Time dummies are always included.

Table 6. *Marginal effects of labour productivity and estimated coefficients for YU with 3SLS-sure.*

			LP				YU		
			$ShareT_{15-24}$	$ShareT_{25-54}$	YU		ΔlnGDP	π	YU_{t-1}
E10	Case b		-0.0350	-0.0583*	0.0697***		-0.560***	-0.616***	0.796***
	Case c		-.0194	-0.0626***	0.069***		-0.405***	-0.572***	0.678***
E15+R	Case b		0.225***	-0.189***	0.012		-0.799***	-0.137§	0.864***
	Case c		0.224***	-0.189***	0.013		-0.800***	-0.134	0.862***
OECD	Case b		0.066*	-0.117***	0.005		-0.531***	-0.044**	0.862***
	Case c		0.072*	-0.128***	-0.002		-0.541***	-0.035	0.858***
G7	Case b		-0.062**	-0.0698**	0.078***		-0.160	0.087	0.849***
	Case c		-0.059**	-0.053*	0.075***		-0.305*	-0.322	0.708***
G8	Case b		0.032	0.012	0.113***		-0.206*	0.182	0.858***
	Case c		0.007	0.047	0.117***		-0.224*	0.169	0.895***

Time dummies are included.

4. Conclusions

In light of the most recent and worrisome data about youth unemployment and advanced (especially European) economies growth rates, in this paper we estimate the relationship between labour productivity and youth unemployment at the country level. Moreover, we want to link labour productivity and labour market characteristics and institutions, like temporary work, employment protection, and skills.

We face the most common caveats raised in the empirical literature on these topics with aggregate data, and show how estimates change (or do not) when we introduce one by one assumptions on endogeneity, reverse causality and dynamics of productivity and youth unemployment.

It turns out that the correlation between youth unemployment and labour productivity is different according to what group of countries we refer. It is positive and significant for Euro zone 10 countries, G7 and G8 countries. It appears to be not significant across Euro zone 15 + Russia and OECD countries. Most plausibly, the link between youth unemployment and productivity is mediated by a mechanism through which young unemployed people (re-)entering the labour market become temporary workers. The final aim of this paper is estimating the labour productivity of temporary young workers.

The most robust result we obtain is that temporary work share over total employment does have an effect on labour productivity for most countries. The effect is particularly strong when "adult" workers are on a temporary contract. The effect of young labour on a temporary contract have mixed effects: either null, like in the case of Euro zone 10 and G8 countries, or positive, like in the Euro zone 15 + Russia and in the OECD countries taken as a whole. It is negative for the G7 countries.

References

Bassanini, A., Nunziata, L. and D. Venn (2009): "Job protection legislation and productivity growth in OECD countries", *Economic Policy*, pp.349-402.

Boeri, T. (2011): "Institutional Reforms and Dualism in European Labour Markets", in: O. Ashenfelter & D. Card (ed.), *Handbook of Labour Economics*, Elsevier, v.4, n.5.

Bruno, G.S.F., Marelli, E. and M. Signorelli (2013): "Young People in Crisis: NEETs and Unemployed in EU Regions", ERSA Congress Palermo, October 27-31; a slightly modified version presented at 54th Riunione Scientifica annuale SIE, Bologna, October 24-26.

Caporale, G.M. and L. Gil-Alana (2014): "Youth Unemployment in Europe: Persistence and Macroeconomic Determinants", *CES*ifo Working Paper n.4696.

Cappellari, L., Dell'Aringa, C. and M. Leonardi (2012): "Temporary Employment, Job Flows and Productivity: A Tale of Two Reforms", *The Economic Journal*, v.122, pp.F188-F225, August, DOI 10.1111/j.1468-0297.2012.02535.x.

Caroleo, F.E. and F. Pastore (2007): "The Youth experience gap: explaining differences across countries", *Quaderni del Dipartimento di Economia, Finanza e Statistica*, n. 41, Università di Perugia.

Choudhry, M.T., Marelli, E. and M. Signorelli (2013): "Youth and the total unemployment rate: The impact of policies and institutions", *Rivista internazionale di Scienze Sociali*, v.121, n.1, pp.63-86.

Cingano, F., Leonardi, M., Messina, J. and G. Pica (2010): "Employment Protection and Investment", *Economic Policy*, pp.117-163.

Daveri, F. and M.L. Parisi (2010): "Experience, Innovation and Productivity. Empirical evidence from Italy's slowdown", *CES*ifo Working Paper n.3123.

De Graaf-Zijl, M., van den Berg, G.J. and A. Heyma (2011): "Stepping Stones fort he Unemployed: The Effect of Temporary Jobs on the Duration until (Regular) Work", *Journal of Population Economics*, v.24, n.1, pp.107-139.

Di Giorgio, C. and M. Giannini (2012): "A Comparison of the Beveridge Curve Dynamics in Italy and USA", *Empirical Economics*, v.43, n.3, pp.945-983.

Esping-Andersen, G. (1990): *The Three Worlds of Welfare Capitalism*, Cambridge: Polity Press.

Eurofound (2012): *NEETs – Young people not in employment, education or training: Characteristics, costs and policy responses in Europe*, Publications Office of the European Union, Luxembourg.

European Commission (2010): *Employment in Europe 2010*, Brussels.

Jahn, E.J., Riphahn, R.T. and C. Schnabel (2012): "Feature: Flexible Forms of Employment: Boon and Bane", *The Economic Journal*, v.122, pp.F115-F124, August, DOI 10.1111/j.1468-0297.2012.02535.x.

Karabchuk, T. (2012): "Part-time and Temporary Workers in Russia: Winners or Losers?" ZAF (The *Journal of Labour Market Research*), v.45, pp.23-39.

Krebs, T. and M. Scheffel (2013): "Macroeconomic Evaluation of Labor Market Reform in Germany", IMF Working Paper, n.13/42.

Lisi, D. (2013): "The Impact of Temporary Employment and Employment Protection on Labour Productivity: Evidence from an Industry-level Panel of EU countries", the *Journal of Labour Market Research*, DOI: 10.1007/s12651-013-0127-0.

OECD (1994): *The OECD Jobs Study*, OECD Publishing, Paris.

OECD (2006): *Employment Outlook,* OECD Publishing, ISBN: 92-64-02384-4.

OECD (2013): *OECD Employment Outlook 2013*, Chapter 2, OECD Publishing, http://dx.doi.org/10.1787/empl_outlook-2013-en.

Pastore, F. (2014): "The Youth Experience Gap. A classification of school-to-work transition regimes", mimeo, Seconda Università di Napoli and IZA Bonn.

Scarpetta, S., Sonnet, A. and T. Manfredi (2010): "Rising Youth Unemployment During the Crisis: How to Prevent Negative Long-term Consequences on a Generation?", *OECD Social, Employment and Migration Working Papers*, n.6.

Vogel, J. (2002): "European Welfare Regimes and the Transition to Adulthood: A Comparative and Longitudinal Perspective", *Social Indicators Research*, v.59, n.3, pp.275-29.

2. The Determinants of Youth Unemployment. A panel data Analysis*

Francesco Pastore , Luca Giuliani

Abstract

The school-to-work transition represents a long dark tunnel for too many young people all over the world. Nonetheless, cross-country differences are striking: in Germany, young people fare no worse than their adult counterparts, while in the South- and Eastern-European Union countries young people fare from 3 to 4 times worse than their adult counterparts. This essay points to the youth experience gap as a key concept: countries dramatically differ in their strategies to cover the youth experience gap, which remains high even in a time of ever increasing education attainment. Five different country groups are detected whose outcomes in terms of youth unemployment are dramatically different: a) the North-European; b) the Continental European; c) the Anglo-Saxon; d) the South-European; e) the New Member States. For the first time, this essay provide evidence based on panel data analysis. Our final specification is a dynamic model with control for endogenous variables to explain the role that different educational systems vis-à-vis labor market institutions have in affecting the youth absolute and relative disadvantage. We find that the European Continental and the Anglo-Saxon system perform much better also after controlling for per capita GDP level and growth, as well as for labor market and educational institutions.

JEL Classification: H31, H52, I2, J13, J24, J68,
Keywords: Youth Unemployment, Youth Experience Gap, School-to-Work Transition Regimes, Dynamic Panel Data Analysis; System GMM.

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Introduction

This paper is in the spirit of some enquiries of the role of different labor market institutions in explaining the gap in the aggregate unemployment rate across countries (Nickell, 1997; Nickell, Nunziata and Ochel, 2005; and Bassanini, Nunziata and Venn, 2009). These studies invariably emphasize the role of labor market institutions and especially of the employment protection legislation.

However, we focus on young people and therefore on the factors which affect their specific performance in national labor markets. The school-to-work transition (SWT) represents a dark long tunnel for many young people all over the world. Nonetheless, it is not the same problem in every country. In some countries, such as Germany, young people have the same probability to be employed as the adults have while, on the contrary, in Mediterranean countries this probability is lower. The disadvantage of young people raises above all from their "experience gap".

As noted in Pastore (2015), the "youth experience gap" is the gap in work experience existing between young and adult workers. Countries follow a different path as to the ways of reducing this gap throughout the educational system and the ensuing school-to-work transition. There are countries that in order to reduce this gap sooner use the dual education principle (DES), that ensures many high school students to have at the same time general education *and* formal training within the apprenticeship system. This educational system is designed so to reduce the above-mentioned "youth experience gap" already while at school.

The red line of this paper is using econometric analysis in order to empirically test the hypothesis that the DES is the best school-to-work transition regime (SWTR) to reduce the youth unemployment rate (YUR). The YUR is the dependent variable and SWTRs are independent variables, together with a number of macroeconomic and institutional control variables. We consider 5 SWT regimes: a) North-European (Finland, Sweden); b) Continental European (Belgium, Germany, Austria, Netherlands, Denmark, France, Slovenia); c) Anglo-Saxon (UK, Ireland); d) South-European (Greece, Italy, Portugal, Spain); e) New EU Member States (Poland, Slovakia, Hungary, Estonia and Czech Republic). The hypothesis behind this dummy variable approach may be questionable because our SWTR dummies might catch

other relevant factors, which the other control variable are unable to catch. Unfortunately, as discussed in detail in the methodological section, there are no national level data on the main features of a SWTR, which prevents us from measuring their specific role.

We control for different confounding factors, which, if not adequately taken into account, could represent explanations of the YUR gap across countries, which are alternative to SWTRs. The expected betas per capita GDP level and growth are similarly negative, although for different reasons. The share of Youth and Active Youth population may generate a bottleneck effect therefore reducing the chances of employment. An increased share of secondary and tertiary education attainment might partly explain the YUR gap across countries, because education should give to young people the skills necessary to deal with the world of work. PLMP and ALMP are expected to have a negative and positive beta, respectively, since the former should increase the employability of young people and the latter increase their reservation wage. The Employment Protection Index (EPI since now) is expected to yield a positive beta by reducing the tendency of firms to hire new workers, rather than increasing the effort of the hired ones.

To our knowledge, this is the first empirical investigation to test the above theoretical hypothesis within the context of panel data analysis. We collected longitudinal aggregate data relative to 21 countries observed over a period of 10 years (from 2001 till 2011), for a total number of 231 observations. Information was collected on around 97 variables relative to the youth labor market, although due to many missing observations, some countries and variables could not be used.

The relationship between SWTRs and the YUR is going to be investigated in the context of static as well as dynamic panel estimates. We use the LSDV (Least Square Dummy Variable) estimator since the Hausman (1978) specification test confirms that the fixed effect model is to be preferred to the random effect model. Expected results include: SWTRs have a ceteris paribus statistically significant impact on the YUR. In particular, the dummy relative to the Dual Educational System (DES since now), relative to continental European countries, is expected to be the one which presents a statistically significant and negative beta, meaning that ceteris paribus DES is the best educational system as compared to the others in reducing the YUR. In fact, we are expecting a negative beta of the dummy for dual system countries,

greater than the one for the Anglo-Saxon countries. The worst performing countries are expected to be those belonging to the Mediterranean and East European educational system, with the Scandinavian countries being in the middle.

According to Roodman (2006; 2009) with a small T and a large N, a linear functional relationship, single left hand side variable that is dynamic (depending on his own past realizations), fixed individual effect and some independent variable strictly exogenous the "persistence" over time the GMM estimator can be used in order to conduct the analysis. The estimation model to use is the Arellano-Bond dynamic panel, confirming the statistical significance of the results, also in a dynamic context. The results of system GMM estimates allow stating the causal nature of the relationship considered. In fact, all GMM beta's coincide in sign with the previous findings obtained from LSDV estimation. Moreover, looking at the hysteresis of the YUR, the system GMM estimation tells us that the higher was the YUR in the past year, the higher will be the YUR in the present.

The paper is structured as follows. Section one presents some stylized facts regarding the YUR across SWTRs. Section two brings to the fore the our theoretical framework and defines the hypotheses to be tested in the empirical analysis. Section three illustrates the methodology and section four discusses the data used. Section four presents the results of descriptive as well as static and dynamic panel data analysis. Some concluding remarks follow in section five.

1. Key stylized facts

The discrepancies in YUR across countries are, in large part, due to the educational and training system and, moreover, to active labor policies in the various countries.

The Scandinavian countries (Finland, Sweden, Norway), for example, have a sequential system of education, whose mission is only to provide general education, while work experience should be made after school. Thanks to pro-active schemes on a large scale, given within four months from the beginning of the unemployment spell, the state helps young people to build their skills at the end of their school career.

In contrast, in continental European countries (Germany, Austria, Switzerland, Denmark, Holland, France), the education system is dual. It takes as its mission not only to generate general education, but also on-the-job professional training, to be carried out during the course of study and not after, as is the case instead in sequential educational systems. This implies that, just after graduation, young people are ready to enter the labor market. Not surprisingly, these countries have always had a low unemployment rate and a very low relative disadvantage.

Anglo-Saxon countries (Canada, New Zealand, UK, USA, Australia, Ireland) have a (sequential) system of education of high quality. The flexible labor market provides labor contracts with a low firing cost for firms; this allows companies to hire workers more easily, without worrying for the long run prospect, and therefore allows young people to develop work-related skills. In these countries, the youth unemployment rate is relatively low while the relative disadvantage of young people is high, but weighs less, since it corresponds to low average unemployment rates, except during the crisis.

Mediterranean countries (Portugal, Spain, Greece, Italy) have an inflexible and sequential education system. The reforms at the margin have made the labor market more flexible, reinforcing the strong segmentation between insiders and outsiders. Often, the most effective way to find work is recurring to the individuals' informal network of family and friends, since the labor market infrastructure is underdeveloped (public and private employment agencies, schools and universities) or declining (public competitions). As always, the youth unemployment rate is very high and also the relative disadvantage.

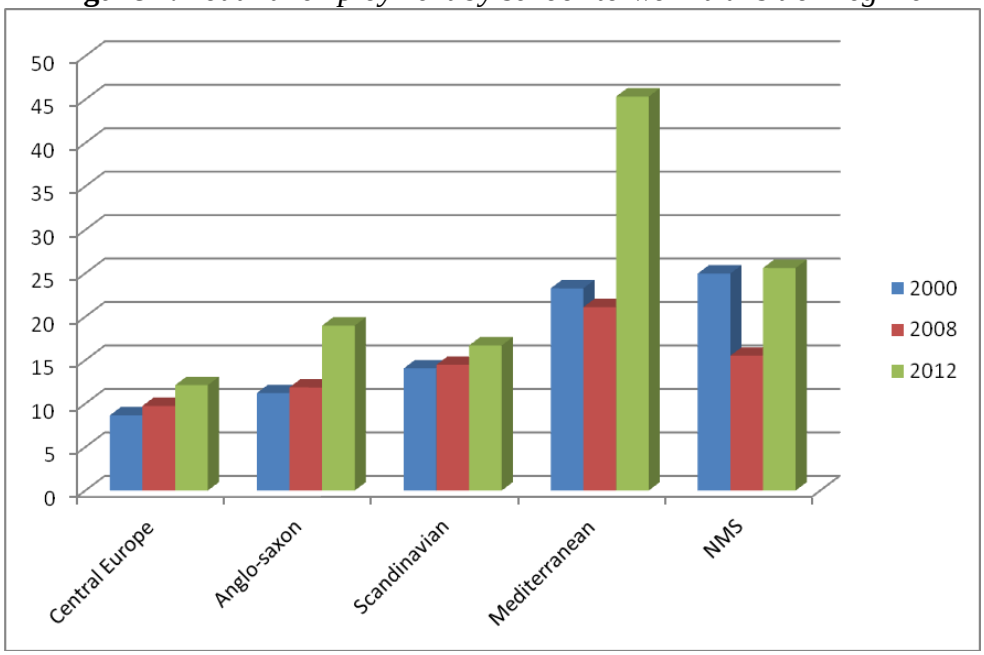
Finally, the new European Union member states (Poland, Slovakia, Hungary, Estonia, Czech Republic) have increasingly flexible labor markets and growing levels of spending on active and passive labor market policies. The youth unemployment rate is still high.

Which of these groups of countries faced the crisis better? To answer this question, we compare the absolute (unemployment rate), and "relative" (ratio of unemployment among young people and adults) disadvantage of young people in the different regimes before and after the crisis.

The Central European, Anglo-Saxon and Scandinavian countries have seen relatively low youth unemployment rates in 2000. With the crisis, though, unemployment has increased

while in the Mediterranean countries and the new member states, youth unemployment seems to be, at least initially (2008) slightly decreased. The reason is that the reforms at the margin carried out recently had increased temporary employment. 2012 is a critical year for everyone, but with important differences. The most flexible countries did worse than others. This is the case of both the countries belonging to the liberal tradition, such as the Anglo-Saxon countries, and the Southern and Eastern European countries, which had adopted the so-called reforms at the margin, reducing the costs of hiring and firing only for the new hires.

Figure 1. *Youth unemployment by school-to-work transition regime*



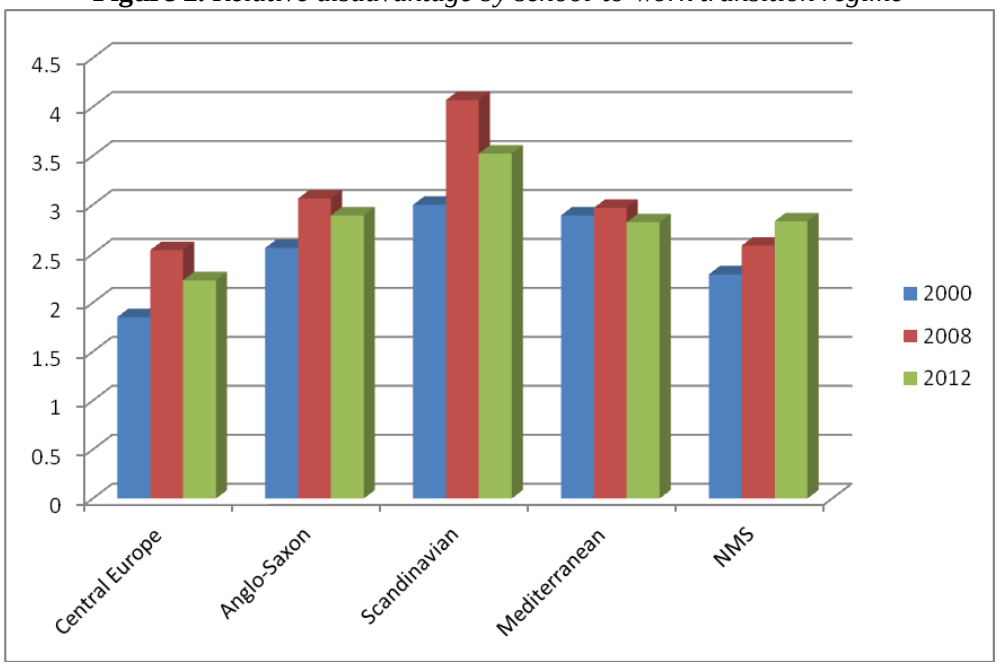
Source: our elaboration on OECD data.

In terms of "relative disadvantage", young people in Central European and Anglo-Saxon countries seem to be doing better than their peers in the other groups of countries. It should be noted also that in 2012 there is an improvement in the ratio as compared to 2008, caused by the relatively higher unemployment rate of the adults. Still the ratio remains above the starting level of 2000, though.

The reduction in the relative youth disadvantage is apparently surprising to those accustomed to consider the cyclical nature of youth unemployment. Typically, in fact,

companies adopt the last-in-first-out principle, firing the last to arrive, namely the youngest workers. However, when the crisis is deep and prolonged like the current one is, firms are forced to fire also the adults, which reduces the relative disadvantage.

Figure 2. *Relative disadvantage by school-to-work transition regime*



Source: our elaboration on OECD data.

In the long term, in order to reduce youth unemployment in the Mediterranean countries, far-reaching reforms of education systems should be carried out to introduce the dual principle. In recent times, something is moving in this direction. For instance, France has adopted a dual system of education. In Italy, the reform of apprenticeship was implemented in 2011.

In the short term, however, the program called Youth Guarantee should allow countries that have youth unemployment rates higher than 25% to obtain funds for active employment policies; apprenticeship, training, and paid internships in the company for the under-25. If well implemented, this program could help to reduce the disadvantage of young people, but there are many conditions to be met. One of them is a relaxation of the Maastricht criteria per

public deficit that is able to foster economic growth. Another one is a dramatic reform of the public and private employment services in Southern and Eastern European countries.

2. The "Youth Experience Gap"[19]

"An overriding reason for young being held back is a lack of skills relevant to the workplace" (McKinsey 2014, p. 1). Of the large number of firms which were surveyed by the McKinsey Center for Governament, 61% "*were not confident they could find enough youth applicants with the right skills to meet their business needs"* (McKinsey 2014, p1). According to Gomez-Salvador and Leiner-Killinger (2008) one of the major determinants of youth unemployment is the gap between youth's qualification and the work skills required. This gap that young people have to fill is one of the main reasons of their hardship in finding the right job for them. In the literature, it is called the "youth experience gap" because the gap can be filled in only through a work experience able to develop the basic human capital that young people have accumulated with in education (Ryan, 2001; O'Higgins, 2001; Quintini et al. 2007; Pastore, 2015).

The youth experience gap is the gap in work experience existing between young and adults workers. Young workers have a level of human capital and therefore of productivity that is lower than that of the adult which, ceteris paribus, makes employers prefer the adult people to young people. The gap between young people and adults is even greater if we focus on two components of human capital, namely generic and job-specific work experience.

Young people, who understand their negative gap, have the goal to reduce it, through work experience. For this reason they move from a job to another in order to find the job that best fit their skills and abilities, namely the "best job-worker match". That is why in and outflows from unemployment for young people are higher than for adults, as of Clark and Summers (1982) found for the first time. To be more precise labour market flows change because: a) young people are in search for their best job-worker match; b) and often they go back to education and training after an employment or unemployment spell; c) this is

[19] The theoretical framework laid down in this section is a summary of Pastore (2015).

especially true for low skill young people; d) employers are also in search for the best worker match.

2.1. The mainstream approach

It should be now clear that youth unemployment should be a temporary problem, provided that sooner or later young people will be able to fill their experience gap. Since youth unemployment depends on their experience gap and the pursuit of the "best job-market match" than what really matters for young people is, according to liberalist economists, only the flexibility of the labour market. This thesis has been uttered, for instance, in the famous OECD (1994) Job Study.

Why? Because the more flexible is the labour market, the more young people are able to pass from a job to another, the more "inexperience gap"- pass me this term- decrease. Now, if what has been said above is correct a policy maker has two strategies in order to achieve labour market flexibility.

The first way is to increase the probability for young people to find a job, once (s)he become jobless. Some mainstream economists argue that the longer is the length of unemployment, the lower is the probability of becoming employed.

Why does this happen? First, because the more a young person remains unemployed, the more (s)he is losing his/her skills. Second, of course, human resources (HR) during an interview take into account the time a person has been unemployed. The more a young person has been unemployed, the higher is the signal of low motivation to work that (s)he is transmitting to the interviewer.

In a nutshell, a labour market policy maker should provide young people with more opportunities to training using temporary work. In fact, there are several advantages linked to temporary work according to Loh (1994), Booth, Francesconi and Franck (2002), Ochel (2008) namely:

a) temporary-work is a stepping-stone for young people to find their best job worker match;

b) employers pay low wages for low productivity;

c) employers have the opportunity to "try" young people;

Another important aim for policy makers is to contrast wage-setting mechanisms at a national level, such as the minimum wage and incomes policy. They assign, in fact, the same wage to all people, independent of their skills, age or specific techniques on the job. In this picture firms are more reluctant to hire a young "inexperienced" young person, because (s)he will produce less compared with an "experienced" adult. A solution could be lower entry wages for the lower productivity and lower work experience of young people.

Another aim for policy makers, could be the reduction of hiring and firing costs for firms wishing to hire young people.

2.2. Weakness of the mainstream approach

This is quite an optimistic view about the youth unemployment problem, but there are two formidable arguments against the use of labour market flexibility and temporary work as the only solution to the youth experience gap.

The first one could be attributed to Heckman and Borjas (1980) and Heckman and Singer (1984). In fact they demonstrate that the probability to find a job at a given time is not any more negatively related in a statistically significant way to the duration of the unemployment spell, but becomes flat. Long-term unemployment appears to be the consequence of the low motivation and skills of the unemployed rather than of the time spent in unemployment itself.

In other words, the labour market policies seen above could affect only the portion of youth unemployed really wishing to work-namely the "motivated youth"- .

Giving a closer look at those "young motivated" it could come out that they are not yet employed because they are enriching their solution.

Anyway, it is obvious that among young people, some of them, owning often a lower than average education level, will still find a job due to greater social capital, "informal" network of their household, the availability of their own business and so on.

A policy maker, perhaps, should take care also of the least motivated, helping them in finding a job by implementing employment policy in general and active labour market programs in particular in the short run. In the long, the best solution would be to increase their educational level and the skill level they possess.. To the policies seen before there is an interesting view that Gary Becher, the Nobel prize winner, shared.

He agree that temporary work could be a solution to reduce the experience gap, but then he focuses on job specific work experience arguing that reducing wages, linked to fixed –term work, could not be the right thing to do because employers would still prefer an "experienced adult" to a "first-job young person" if deciding for a specific job. On the other side the short fixed-term contracts and the low entry wages could represent a strong disincentive for young people to invest a job specific competences.

In this context, formal training is more important than lower wages or short-term employment experiences if one wants to raise employability.

The things we said so far should bring us to the conclusion that sometimes those fixed time jobs could be stressful, for young people, forcing sometimes them into low-pay trap.

To be more precise what happens to young people is that they tend to accept low pay jobs remaining trapped in this condition for years sometimes for the rest of their life instead of accumulating work experience, year by year, in order to reduce their "experience gap". However, it is only in the latter way that they could manage to find a more profitable work position under two characteristic: the wage and the quality of work.

Nowadays, it is central to the debate to ask whether temporary work should be considered as a stepping- stone (that will bring you more and more near to the "best job-worker match") or a dead-end jobs. According to Bassanini, Nunziata e Veen(2009), the OECD is trying to shift the debate from the flexibility/rigidity debate towards the definition of the optimal mix of regulation to make temporary work more effective in providing training and job opportunities that are for young people.

The answer could be a mix of different instruments which depend not only on the degree of labour market flexibility but also of educational, training educational, training and, more generally, welfare systems and the system of fiscal incentives to hire the weakest groups of young unemployed.

2.3. Educational systems

According to Hammer (2003), Caroleo and Pastore (2003) and Pastore (2015), educational systems differ in the way they try to fight youth unemployment. They can be:

- rigid vs. flexible

- dual vs. sequential.

Whereas rigid educational system do not allow young students to pass from a curricula to another and require long time to allow getting a degree. A sequential educational system is so called because a person first has to graduate and then (s)he will look for a job.

The perfect match between the previous two features is the dual system that ensure students to have at the same time general education and apprenticeship.

Similarly, welfare systems differ according to:

- the relative share of pro-active versus passive income support schemes;
- targeting and scale of expenditure;
- state- versus family-based welfare systems;
- the size and types of fiscal incentives to hire young people.

2.4. Different school-to-work transition regimes

Following Vogel (2002) and Pastore (2015), based on the mix of characteristics of their social policy, relative to the educational, training and welfare system, European countries can be grouped into different school-to-work transition regimes:

North-European: The educational system is flexible and sequential, even if the flexibility of the overall labour market is generally low. Agencies for employment are really used in those countries and they are optimum as job search. These countries are characterized by an high level of unionization. The mean feature of this system is that relies on a very well developed welfare state system. Passive income support schemes are available for unemployed. Active labour market policies are implemented on a large scale. Youth unemployment rate is relatively low compared with the average of European countries. On the

other side, the relative disadvantage computed as youth unemployment on adult unemployment is relatively high.

Continental European: The educational system used is the dual system, that as explained earlier is particularly efficient because, taking the example of Germany overall, it gives the possibility to young people after compulsory schooling to choose whether to attend a general high secondary school or a vocational school and to go, then, into apprenticeship program. The main features of those countries is that they always showed a low unemployment rate and, overall, Germany and Denmark showed the lowest relative disadvantage.

Anglo-Saxon: The educational system is flexible and sequential. Flexibility comes from low firing and hiring costs due to the fact that in those countries even the little job needs a fixed- term contract. Unionization used to be very high in the past, while now it is decreasing. The bargaining wage is very high decentralized. Job agencies are for the great part private. Apprenticeship is available to everyone; passive income support is available to the weakest group but people have to demonstrate that they are actively looking for a job. The youth unemployment rate is relative low being almost 10 % compared with the rest of the Europe countries. Also the relative disadvantage of young people is low being around only 3.5.

South-European: The educational system is rigid and sequential. A typical educational system for those countries is the Italian one. The best way to find a job is in those countries the Word of Mouth. Young people often rely to the "informal" network of family and friends. Until the consolidate act of 2011, apprenticeship was forbidden. Now, it seems to be reinforced after this act was signed. Today, something seems to be better off. These countries have shown for years the highest unemployment rate among European countries and also the highest relative disadvantage.

New Member States: the feature of this cluster is that the Labour market are becoming more flexible (even if still rigid if compared with the Europe), expenditure in active and passive policies has increased. In the recent years "3+2" reform has been implemented. The debate shifted, during this period, focusing on why, even with excellent education, the youth unemployment rate is still high.

This classification largely overlaps with that elaborated by Esping-Andersen (1990) for the welfare systems of old member states, emended to include also the Latin Rim and the new member states (Burlacu, 2007).

3. Methodology

3.1. The empirical models

The main aim of this paper is to demonstrate that the youth disadvantage, both the absolute and relative disadvantage, depends on the mismatch between the skills required by the labour market and the skills that the potential workers have after completed education. This is what the previous section has defined as the youth experience gap. The youth unemployment rate (YUR) measures the absolute disadvantage and the ratio of the youth to the adult unemployment rate measure the relative disadvantage (RD). Obviously, other factors are at work. For instance, the crisis period further exacerbated an existing problem also in countries where the YUR has particularly soared with the crisis, such as South and East European countries. Therefore, the simple question we ask is whether there is still a statistically significant role of SWT regimes after controlling for all the macroeconomic and institutional factors for which statistical information is available at a country level. This type of estimates is plagued by several specification problems, which we address in the rest of the section.

If the YUR and the RD depend on a lack of skills in young people, the education system or, better, SWT regimes should matter. In fact, it should be a mission of schools and universities to prepare young people to be prepared to the needs of the labour market. However, as theorized in Ryan (2001) and Raffe (2008), among others, a school-to-work transition model includes not only the education system, but also all the institutions which supervise the process, including according to the country, public and private employment services, training institutions, employment protection legislation, trade unions and entrepreneurial organizations, ad so on. Overall, SWTs are very similar in some groups of countries, rather than being totally different from one country to another. Different types of

regimes have been identified in the literature. Following this line of reasoning, the baseline model for estimation is:

$$YUR_{it} = \alpha \sum_{s=1}^{5} SWTR_{it}^{s} + \beta \sum_{x=1}^{n} X_{it}^{x} + \varepsilon_{it} \quad [1]$$

where SWTR is a set of *s=5* school-to-work transition regimes, X is a set of n control variables. Following Pastore (2015), they are: a) North-European System (D_NE: Estonia and Sweden); b) Dual-Educational System (D_CE: Belgium, Germany, Austria, Netherlands, Denmark, France, Slovenia); c) Anglo-Saxon system (D_AS: United Kingdome and Ireland); d) South European System or PIGS (D_SE: Greece, Italy, Portugal, Spain); e) New Member State System (D_NMS: Poland, Slovakia, Hungary, Estonia and Czech Republic). We expect that some SWT regimes perform better than others not only in unconditional terms, but also after controlling for a number of other variables of interest, such as the per capita GDP level and growth, as well as such institutional factors as the degree of employment protection, the evolution of population size and migration, the level of education attainment, the expenditure in passive and active labor market policy. A detailed definition of all the variables is contained in Table 1.[20]

Table 1. *Variables definition*

Model	Variable	Description	Unit of Measurement
Y	l_yur1524	Youth unemployment rate (15-24)	Percentage, log
	dl_gdp	Growth of per capita GDP	US$ current prices, difference of log
	l_gdp	Per capita GDP	US$ current price, log
	l_yupop	Youth population (ylf/tlf)	Thousand of persons, log
	l_edu2	Secondary education	Percentage, log
	l_edu3	Tertiary education	Percentage, log
	l_epi	Employment protection index	Index of costs, logs
	l_almp	Active labour market	Public expenditure as a percentage of

[20] The absolute and relative disadvantage may have a different dynamics. We therefore also estimate the same equation using as dependent variable RD, although, for shortness' sake, we do not present the results here.

$$RD_{it} = \alpha \sum_{s=1}^{5} SWTR_{it}^{s} + \beta \sum_{x=1}^{n} X_{it}^{x} + \varepsilon_{it} \quad [2]$$

		policies	GDP, log
X	l_plmp	Passive labour market policies	Public expenditure as a percentage of GDP, log
D	D_NE	North-European System Dummy	1 if Estonia and Sweden; 0 otherwise, binary
	D_CE	Central European (or Dual-Educational System) dummy	1 if Belgium, Germany, Austria, Netherlands, Denmark, France, Slovenia; 0 otherwise, binary
	D_AS	Anglo-Saxon system dummy	1 if United Kingdome and Ireland; 0 otherwise, binary
	D_SE	South European System dummy or PIGS dummy	1 if Greece, Italy, Portugal, Spain; 0 otherwise, binary
	D_NMS	New EU Member State System Dummy	1 if Poland, Slovakia, Hungary, Estonia and Czech Republic; 0 otherwise, binary

Source: own elaboration.

The hypothesis behind this dummy variable approach to catching differences in SWTRs may be questionable because our SWTR dummies might catch such other relevant factors as the degree of technological innovation of firms, especially in the manufacturing and tertiary sector, as well as the degree of diffusion of new technologies, especially the information & communication technologies, associated more frequently with a graduate workforce. Nonetheless, we do our best to catch other relevant factors with the other control variables. A bottom line of this paper is that international organization in charge of developing comparable cross-country statistical information should put much more effort in collecting information regarding the way SWTR are organized, because the performance at the labor market of young people dramatically depends on the way SWTRs are organized.

3.2. Static panel data analysis

This type of estimates are plagued with a number of specification problems. In order to conduct robust estimations, two estimators can be used, namely the fixed-effect (FE) and the random-effect (RE) models. In the FE:

$$y_{it} = \alpha_i + \beta X'_{it} + \varepsilon_{it}$$

where y_{it} is the dependent (endogenous) variable, α_i is a time invariant individual effect - it measures the effect of all the factors that are specific to individual *i* but constant over time,

X'_{it} is a row vector of observations on K explanatory STRONGLY EXOGENOUS[21] factors for each i at time t , not including the constant term. β is a column vector of K parameters , ε_{it} is an i .i .d . error term such that E[$\varepsilon_{\blacksquare}it$] = 0.

In our sample the FE model will take this form:

$$Yur_{it} = \alpha SWTR_{it} + \beta X_{it} + \varepsilon_{it}$$

Where SWTR is a dummy variable that can take the value 1 if it represent a certain school-to-work transition regimes or 0 otherwise. X_{it} is a set of control variable.

The random effects model is an alternative to the Fixed effects model. The estimation equation is the same:

$$y_{it} = \alpha_i + \beta X'_{it} + v_i + \varepsilon_{it} = \alpha_i + \beta X'_{it} + \omega_{it}$$

The equation I am going to estimate is :

$$Yur_{it} = \alpha SWTR_{it} + \beta X_{it} + \omega_{it}$$

However, contrary to the Fixed effects, the random effects are assumed not to be estimable-in contrast with Fixed Effect that can be estimated-; they measure our **individual specific ignorance** which should be treated similarly to our **general ignorance** ε_{it}. ω_{it} is the composite error term, and is not correlated with regressors: E($\omega_{\blacksquare}it, x_{\blacksquare}(it,k)) = 0, \forall\, k$ and, a feature is that assume a specific form of covariance structure of the two types of error terms.

The natural question that arises after introduction of RE and FE models is: Which one should we use? The specification test devised by Hausman (1978) is used to test for orthogonality of the common effects and the regressors. The test is based on the idea that under the hypothesis of no correlation, both OLS in the LSDV model and GLS are consistent,

[21] It means that is not correlated with ε_{it} present or past. If it does not hold you will use dynamic panel.

but OLS is inefficient (H_0), under the hypothesis of correlation, OLS in the LSDV model is consistent, but GLS is not (Ha).

Thus, under the null, the two estimates should not differ systematically, and a test can be based on the difference. The other essential ingredient of the test is the covariance matrix of the difference vector $\widehat{\beta_{FE}} - \widehat{\beta_{RE}}$.

In poor words, the covariance of an efficient estimator with its difference from inefficient estimator is zero. This results implies:

$$Cov[\widehat{\beta_{FE}} - \widehat{\beta_{RE}}] = Var[\widehat{\beta_{RE}}]$$

which yields:

$$Var[\widehat{\beta_{FE}} - \widehat{\beta_{RE}}] = Var[\widehat{\beta_{FE}}] - Var[\widehat{\beta_{RE}}].$$

The Hausman test is:

$$W = [\widehat{\beta_{FE}} - \widehat{\beta_{RE}}]' \left[Var[\widehat{\beta_{FE}}] - Var[\widehat{\beta_{RE}}]\right]^{-1} [\widehat{\beta_{FE}} - \widehat{\beta_{RE}}].$$

which is asymptotically distributed as a $\chi^2(k)$, where k is the number of degrees of freedom equals to number of parameters to be estimated. If W is greater than the preferred critical value, it means that there is a statistically significant difference between the two estimators. Note. Since only $\widehat{\beta_{FE}}$ is consistent, we have to conclude that $\widehat{\beta_{RE}}$ is inconsistent; otherwise orthogonality of covariance fails.

Table 2. *A comparison of the FE and RE model*

	H_0 **True**	H_1 **True**
$\widehat{\beta_{FE}}$	**Consistent**	**Consistent**
$\widehat{\beta_{RE}}$	**Consistent** **More Efficient**	**Inconsistent**

In order to measure the persistence of the results in long-run and short-run a lagged variable should be introduced in the previous model.

$$Yur_{it} = Yur_{it-1} + \alpha SWTR_{it} + \beta X_{it} + \varepsilon_{it}$$

3.3. Dynamical panel data analysis

Now we move on to various extensions for linear models, with focus on relaxation of the strong exogeneity assumption to permit consistent estimation of models with endogenous variables and/or lagged dependent variables as regressors.

The use of Instrument Variables (IV) is a standard method to handle endogenous regressors. Note that is much easier to find IV with panel data than with cross-section data, since exogenous regressors in other time periods can be used as instruments for endogenous regressors in the current time period.

Panel data provide an excess of moment conditions available for estimation, owing to an abundance of instruments, and panel model errors are usually *iid*. The natural framework is that of Panel Generalized Methods of Moment (GMM).

Since the number of instruments may exceed the number of endogeneous variables (over-identification rather than just identification), the natural question arises on which moments to use. The generalized method of moments estimation technique deals with this issue and provides a general framework for estimation of models with endogenous dependent variable. The method is general in a sense that it nests the ordinary least squares and the instrumental variables estimators.

Consider the linear panel model:

$$y_{it} = \beta X'_{it} + \varepsilon_{it}$$

Where the regressors X'_{it} may have both time-varying and time-invariant components and may incluse an intercept. Here there is no individual-specific effect α_i. X'_{it} is assumed

to include onlu current-period variables. Observations are assumed to be independent over *i* and a short panel with T fixed N--> ∞ is assumed.

Begin by collecting all T observations for the *i*th individual:

$$y_i = \beta X'_i + \varepsilon_i$$

We can apply directly to this model IV. Assume the existence of a T*r matrix for instrument Z_i, where r ≥ K is the number of instruments, that satisfy the *r* moment conditions:

$$E(Z_{\downarrow}it \ [\cdot, \varepsilon]_{\downarrow}it) = 0$$

The GMM estimator based on these moment conditions minimizes the associated quadratic form

$$Q_N(\beta) = \left[\sum_{i=1}^{N} Z_i' \varepsilon_i\right]' W_N \left[\sum_{i=1}^{N} Z_i' \varepsilon_i\right]$$

where W_N denotes an r x r weighting matrix. Given $\varepsilon_i = y_i - \beta X'_i$, some algebra gives the Panel GMM estimator:

$$\widehat{\beta_{PGMM}} = \left[\left(\sum_{i=1}^{N} X_i' Z_i\right)' W_N \left(\sum_{i=1}^{N} Z_i' X_i\right)\right]^{-1} \left(\sum_{i=1}^{N} Z_i' X_i\right)' W_N \left(\sum_{i=1}^{N} Z_i' Y_i\right)$$

The essential condition for the existence of this estimator is, once again, :

$$E(Z_{\downarrow}it \ [\cdot, \varepsilon]_{\downarrow}it) = 0$$

There is a one-step and a two-step Panel GMM. The one-step GMM or two-stage least-square estimator uses weighting matrix $W_N = \left(\sum_{i=1}^{N} Z_i' Z_i\right)^{-1} = (Z'Z)^{-1}$, leading to:

$$\widehat{\beta_{2SLS}} = \left[X'Z(Z'Z)^{-1}Z'X\right]^{-1} X'Z(Z'Z)^{-1}Z'y$$

The motivation for this estimator is that it can be shown to be the optimal PGMM estimator based on $E(Z_{\downarrow}it \ [\cdot, \varepsilon]_{\downarrow}it) = 0$ if $\varepsilon_{\downarrow}i \ | Z_{\downarrow}i$ is iid [0, $\sigma^{\uparrow}2 \ I_{\downarrow}T$].

This estimation is called one-step GMM because given the data it can be directly computed using the equation above. It is called "SLS because it can be obtained in 2 stages by:

OLS of X_i on Z_i that gives back $\widehat{X'}_i$

OLS of y_i on $\widehat{X'}_i$.

The two-step GMM is based on the unconditional moment of E($Z_1 it$ [, ε] $_1 it$) = 0 using weighting matrix $W_N = \widehat{S^{-1}}$, where $\hat{S}$ is consistent S defined as:

$$S = plim \frac{1}{N} \sum_{i=1}^{N} Z'_i \varepsilon_i \varepsilon'_i Z_i$$

Using $\hat{s}$ you have the two-step GMM estimator :

$$\widehat{\beta_{2SGMM}} = \left[X' Z \widehat{S^{-1}} Z' X \right]^{-1} X' Z \widehat{S^{-1}} Z' y \ .$$

It is called two-step GMM since a first-step consistent estimator of β such as $\widehat{\beta_{2SLS}}$ is needed to form the residuals $\widehat{u_i}$ used to compute $\hat{S}$.

The *A*rellano-Bond Estimator is

$$y_{it} = \gamma_1 y_{it-1} + \beta X'_{it} + \alpha_i + \varepsilon_{it}$$

leads to the first-differences model:

$$y_{it} - y_{it-1} = [\gamma(y]_{it-1} - y_{it-2}) + \beta(X'_{it} - X'_{it-1}) + (\varepsilon_{it} - \varepsilon_{it-1})$$

We already said that the OLS estimator is inconsistent because y_{it-1} is correlated with ε_{it-1} , so the regressor ($y_1 it - y_1(it-1)$) is correlated with $(\varepsilon_{it} - \varepsilon_{it-1})$. We said that in order to estimate the above model we need Istrument Variables. Anderson and Hsiao (1981) proposed as IV $y_{i,t-2}$ in order to estimate ($y_1(it-1) - y_1(it-2)$) . This is a valid instrument since is not correlated with $(\varepsilon_{it} - \varepsilon_{it-1})$. Moreover, $y_{i,t-2}$ is a good instrument because it is correlated with ($y_1(it-1) - y_1(it-2)$) . This method requires availability of three periods of data for each individual. An alternative is tu use Ä$y_{i,t-2}$ as an instrument for Ä$y_{i,t-1}$, which will require four period data. Anderson & Hsiao present results suggesting that Ä$y_{i,t-2}$ is the more efficient IV among the two in the case $\gamma > 0$.

More efficient estimation is possible using additional lags of the dependent variable as IV. As you can imagine the model then is overidentified, so estimation should be done by 2SLS or GMM [22]estimator.

The microeconomics literature refers to the resulting GMM estimator as the Arellano-Bond estimator. The estimator is:

$$\widehat{\beta_{AB}} == \left[\left(\sum_{i=1}^{N} \widetilde{X_i'} Z_i\right)' W_N \left(\sum_{i=1}^{N} Z_i' \widetilde{X_i'}\right)\right]^{-1} \left(\sum_{i=1}^{N} \widetilde{X_i'} Z_i\right)' W_N \left(\sum_{i=1}^{N} Z_i' \widetilde{y_i'}\right)$$

Lags of X_{it} or ΔX_{it} can additionally be used as instruments, and fore moderate or large T there may be a maximum lag of $y_{i,t}$ that is used as an instrument, such as not more than $y_{i,t-4}$. The method is easily to replace to the AR(p) model, with $\gamma_1 y_{it-1}$ in the model $y_{it} = \gamma_1 y_{it-1} + \beta X'_{it} + \alpha_i + \varepsilon_{it}$ replaced by $\gamma_1 y_{it-1} + \cdots + \gamma_p y_{it-p}$ though more than three periods of data will be needed to permit consistent estimation.

4. Data and variables

The data bank includes 21 countries observed over a period of 43 years, from 1970 till 2013. The number of variables used was around 143. Hence, the panel had 924 observations. Unfortunately, not all variables covered the entire period for every country. For this reason, only the variables that were not presenting missing observations during a fixed period of time (say by 2001 till 2011) have been selected.

After this procedure 20 countries observed over a period of 10 years compose the panel[23]. The number of variables used is around 97. Hence, the panel is composed by 231 observation. Table 3 includes the description of all the variables used in the econometric analysis and the relative source.

Table 3. *Variables source*

[22] The more you are close to time *t* (present) the less are your IV. Let's say you are in the period 3, you have $\mathbf{y_{i,1}}$. You are in the period 4, you have $\mathbf{y_{i,1}}$ and $\mathbf{y_{i,2}}$. You are in the period 5 and you have $\mathbf{y_{i,1}}, \mathbf{y_{i,2}}$ **and** $\mathbf{y_{i,3}}$ and so on.

[23] Luxemburg is an outlier in all the estimates.

Variable	Unit	Name	SOURCE
EPI_C	Indices of costs	Employment Protection Index_Collective	Labour>Employment Protection> Strictness of employment protection – collective dismissals (additional restrictions)
EPI_I	Indices of costs	Employment Protection Index_Individuals	Labour>Employment Protection>Strictness of employment protection – individual dismissals (regular contracts)
LTIR		Long Term Interest rate	General Statistics > key short-term Economic indicator > Long Term Interest Rate
AI		Annual Inflation	Prices and Purchasing power>prices and prices indices > consumer price (MEI)>consumer prices-Annual inflation
RIR	index (where the year 2005 is the base year)	Real Interest Rate	Finance>Monthly financial statistics>monthly monetary and financial statistics(MEI)> interest rates
GDP	US $, current prices, current PPPs, millions	real GDP (98-2012)	National Account> Annual national account>Main aggregate> gdp> Gross domestic product (GDP) MetaData : GDP, US $, current prices, current PPPs, millions
EMPL	Thousands of persons	Empoyed (98-2012)	Labour>LFS>Short-Term labour market statistics>Employed population
YUR1519	percentages.	Youth Unemployment 15-19	Labour>LFS>LFS by sex and age-indicator>unemployment rate
YUR2024	percentages.	Youth Unemployment 20-24	Labour>LFS>LFS by sex and age-indicator>unemployment rate
YUR1524	percentages.	Youth Unemployment 15-24	Labour>LFS>LFS by sex and age-indicator>unemployment rate
UR1564	percentages.	Unemployment rate 15-64	Labour>LFS>LFS by sex and age-indicator>unemployment rate
ALMP	public expenditure as percentage of GDP	Active labour market policies	Labour>LAbour Market programmes>public expenditure as percentage of GDP> Active
PLMP	public expenditure as percentage of GDP	Passive labor market policies	Labour>LAbour Market programmes>public expenditure as percentage of GDP> Passive
UR2564	percentages	unemployment rate 25-64	Labour>LFS>LFS by sex and age-indicator>unemployment rate
RD=(YUR1524/UR2564)		Relative Deasdvantag	Computated
APOP	Thousands of persons	Active Population aged 15 and over	Labour>LFS>Short-term statistics>short term labour market statistics>Active population
YUPOP=(lfs1524/tlf)	Thousand of persons	Youth population	Computed
EDU3	percantage	Tertiary education	Education & training> Education at Glance> Appendix A>Atteined tertiary education

			degree, 25-34 years old(%)
EDU2	percantage	Secondary education	Education & training> Education at Glance> Appendix A>attained below upper secondary education, 25-34 years old(%)

Table 4 reports the expected sign of the estimated variables. The expected beta of per capita GDP level and growth is negative. The impact of per capita GDP level should be probably attributed to the higher technological level, which typically implies more labor market dynamism and technological innovation. Moreover, with per capita GDP growing, firms hire more, especially young people. As reported, among others, in Jimeno and Rodriguez-Palenzuela (2003), the YUR is particularly fluctuating with the business cycle.

Table 4. *The expected sign of estimated coefficients*

Variable	Expectation on β
Employment Protection Index	>0 (positive)
Per capita GDP	<0 (negative)
Per capita GDP growth	<0 (negative)
PLMP	>0 (positive)
ALMP	<0 (negative)
Secondary education	<0 (negative)
Tertiary Education	<0 (negative)
Youth population	>0 (positive)
Active Youth Population	>0 (positive)

A positive beta is expected for Youth and Active Youth population because if the number of young people increases and the number of work places remains the same, then a bottleneck effect is expected. Meaning that there will not be enough work for all the young people gathering at the labor market. The same applies especially to active young people. A bottleneck effect was behind the so called baby boom of the post-World War II period, which was often recalled as an explanation of the YUR in the 1980s and 1990s (see, for instance, the contributions contained in Freeman and Wise, 1982; and in Blanchflower nd Freeman, 2000). Today, a bottleneck hypothesis is often associated to baby booms, but also to increasing migration, in addition, also in the public opinion.

Moreover, a negative beta is expected for secondary and tertiary education attainment, because education should give to young people the skills that should help them to deal with the world of work.

PLMPs are expected to have a positive coefficient, because if the Government pays the unemployed, their reservation wage increases reducing the availability to work for the unemployed. On the opposite side, ALMP are expected to have a negative coefficient, because those policies should help countries to reduce youth unemployment rates. However, on the other hand, the expenditure in ALMPs may be higher the higher the YUR, which would return a positive coefficient. This may be also the result for having missing observations on those two variables.

A positive beta of the EPI is expected because if a country presents a high level of employment protection it means that there are a lot of firing and hiring costs. Those lead labour markets to be more rigid since employers think a lot before hiring some new workers in order to reduce the cost of labor, or even when workers are hired, high firing costs do not allow managers to dismiss workers. This leads to higher youth unemployment.

What follows is a complete descriptive analysis of the variables used in the Panel. Since the basic thesis is trying to empirically demonstrate that the dual system could be a good solution to youth unemployment if applied in all European Countries, in all the graph a distinction is used in order to let the reader better understand where the countries using different educational and welfare system are positioned.

4. Results

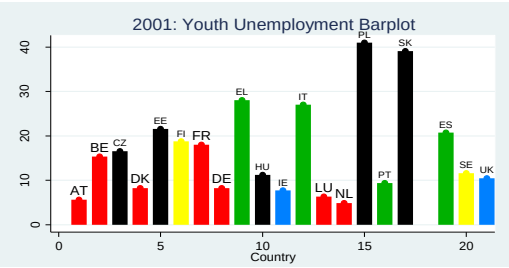
4.1. Descriptive analysis

The analysis starts by showing the youth unemployment rate during three different years: 2001 (pre-crisis), 2008 (during the crises) and 2011 (after the crisis exploded). Panel a) of Figure 3 shows the level of youth unemployment during the pre-crisis period. The highest YUR is in Poland and Slovakia, while the lowest YURs are where the Dual system (in red) is used and in the Anglo-Saxon System (in blue). Other countries with a high YUR are the Mediterranean countries (in green). During the crisis period, the YUR increased a lot in some

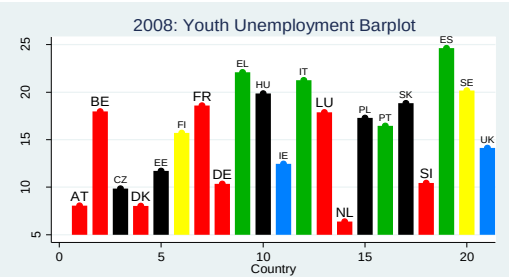
countries. The the Mediterranean System (in green) are the worst performers, while the countries using the Dual System, once again, and the Anglo-Saxon countries that reacted well to the crises period. After the crisis year, in 2011, youth unemployment seems to be rocketing in Mediterranean countries reaching pick of about 46%. The countries that best performed are those belonging to the dual system, such as Austria, Germany and Netherlands, which showed a very low youth unemployment rate, at around 10%. Overall, it can be seen that among all the periods considered, the countries belonging to the Dual System are those with the lowest YUR, while Mediterranean and New EU Member have the worst.

Figure 3. *The YUR in 2001, 2008 and 2011*

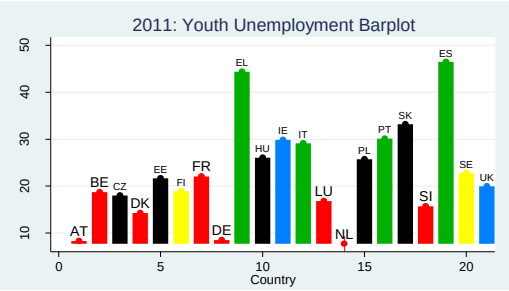
Panel (a)



Panel (b)



Panel (c)

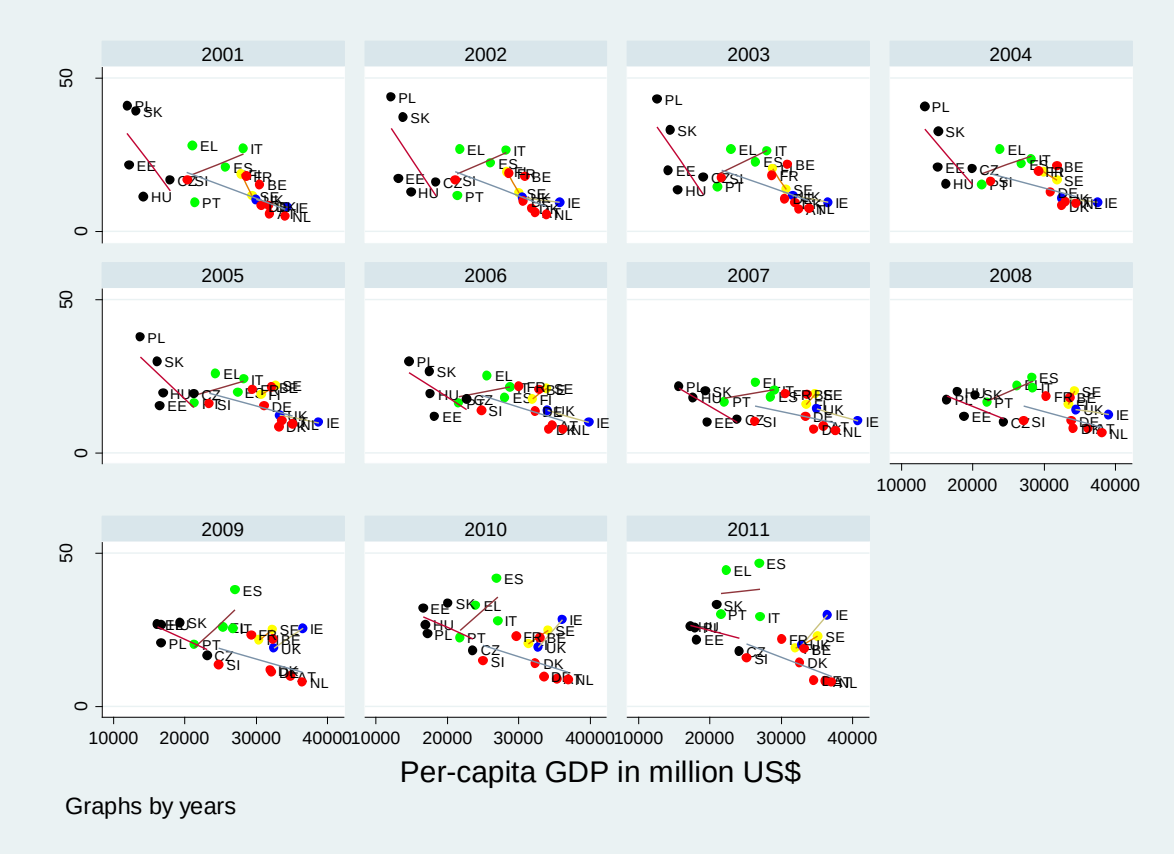


Source: own elaboration on OECD data.

Let us now look at scatter plots of the YUR with the aforementioned independent variables to catch regularities and expected signs. Figure 4 confirms overall the expectation of a negative relationship between the YUR and the per capita GDP level. In other words, the most developed countries tend to have lower YUR. Notably, the regression lines are negative for all countries except for those countries belonging to the Mediterranean and Scandinavian

welfare system, meaning that in the case of this group of countries, an increase in per capita GDP is correlated with an increase in YUR. The overall effect might depend on the role of the richest countries within the EU, namely Germany and Austria. The Mediterranean countries and the NMSs exhibit the highest YUR, while, on contrast, Dual System countries show the lowest.

Figure 4. *YUR and per capita GDP level across countries (2001-'11)*



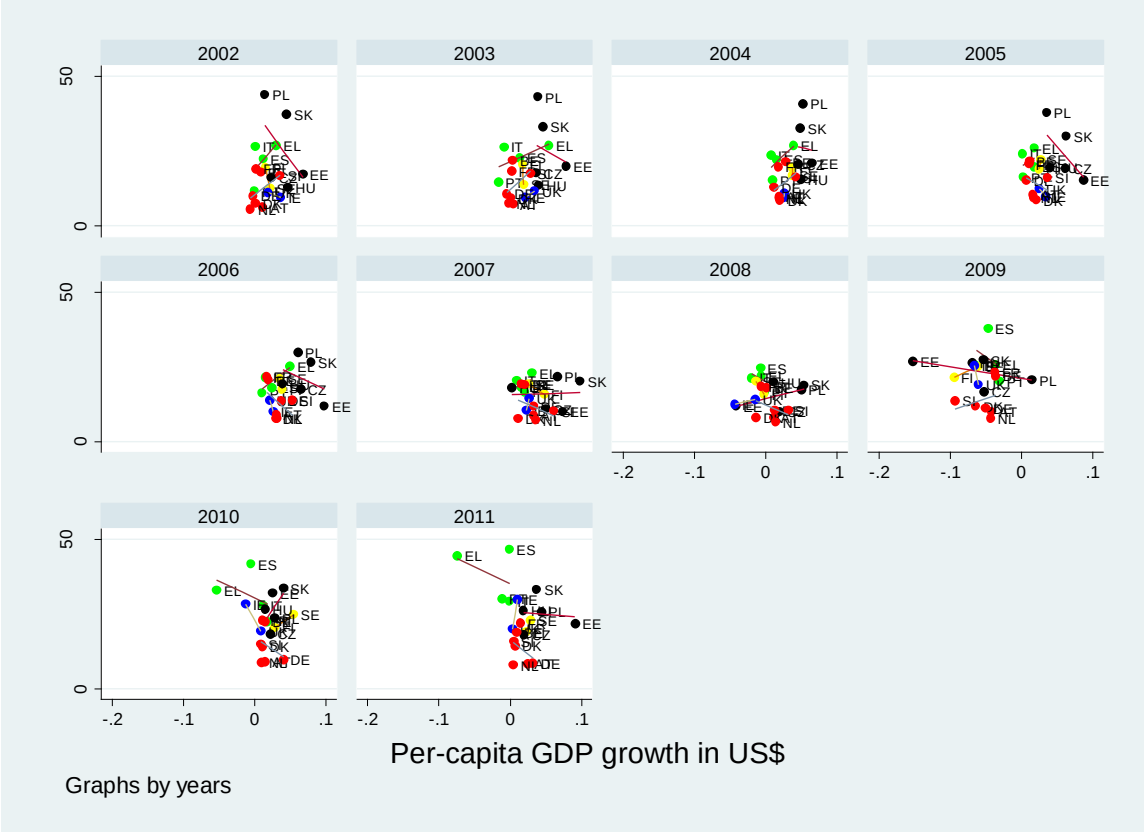
Note: GDP, per head, US$, current price, current PPPs. Source: own elaboration.

Figure 5 focuses on per capita GDP growth. Almost all countries shows a relative positive per capita GDP growth over the pre-crisis period, and in this period the New Member States are showing the worst YUR while, as usual, the Dual system countries are showing the best YUR.

From the crisis year (2008) some Dual System and Anglo-Saxon countries are showing negative per capita GDP growth. In 2009, per capita GDP has the lowest growth rate for

almost all countries. The worst country that year is Estonia while the best is Poland, in terms of per capita GDP growth. In the period 2010-2011, Mediterranean countries are the worst performing, especially Spain and Greece. Overall, there is a slightly negative relationship between YUR and per capita GDP growth.

Figure 5. *YUR and per capita GDP growth across countries (2001-'11)*



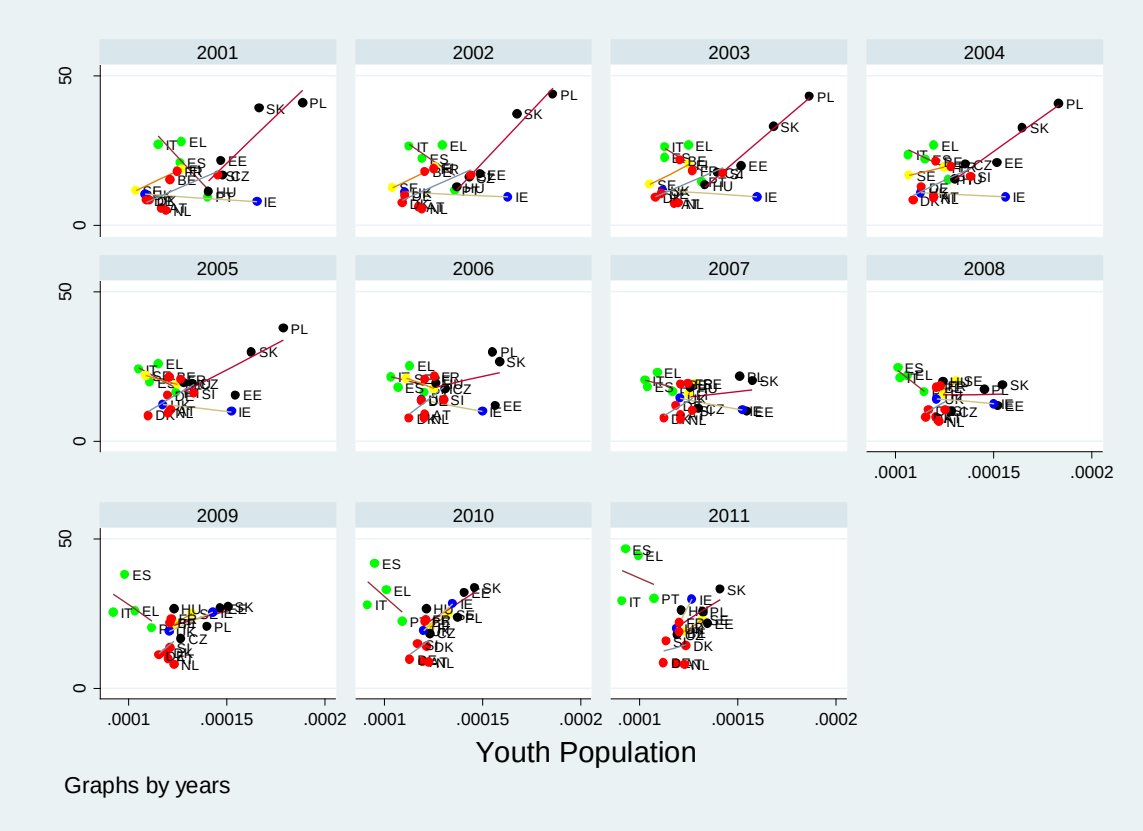
Note: GDP, per head, US$, current price, current PPPs. Source: own elaboration.

Figure 6 focuses on the percentage of the working force aged 15-24 over the total labor force.

An increase in the youth population is expected to correlate positively with an increase in the YUR, because of a "bottleneck effect": too many young people for the same number of jobs. The fitted lines tell us that a bottleneck effect is at place. That is observable for almost all

welfare states except for the Anglo-Saxon and the Mediterranean Welfare System, because there the effect seems to be exactly the opposite.

Figure 6. *YUR and youth population across countries (2001-'11)*

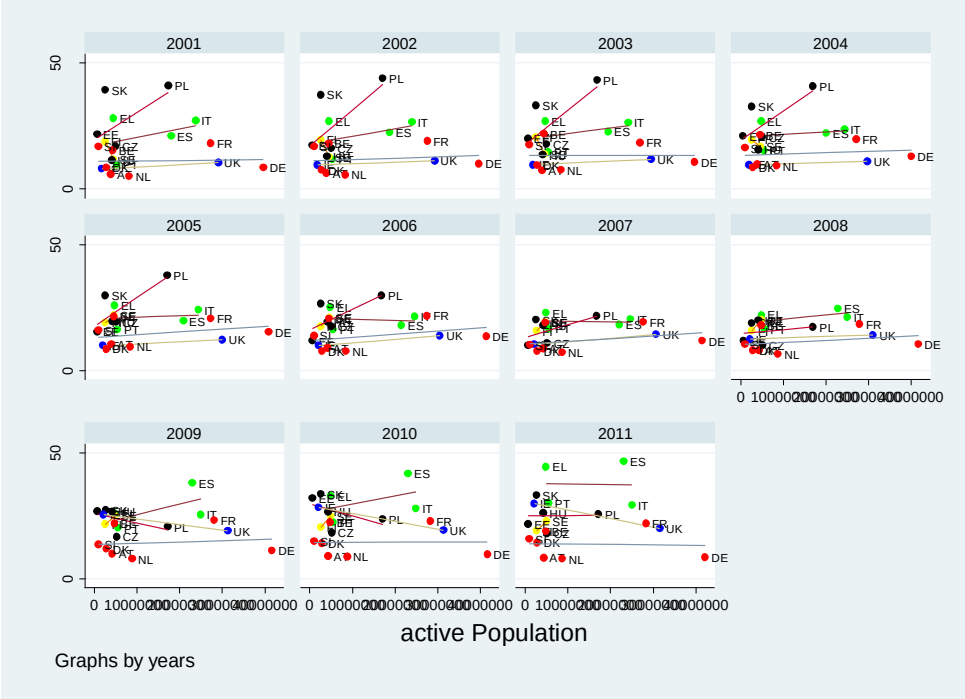


Source: own elaboration.

We also look at the active population (namely Employed population + Unemployed population) aged 15 and over that are really willing to find a job. It is expected a negative relationship if the market is flexible and if the market has not reached the NAIRU.

Figure 7 as expected slightly positive relationship between YUR and active population, meaning of course that the larger the share of job seekers, the higher the YUR, which might be due to two factors. First, the number of jobs is always the same, and there is a "bottleneck" effect; second, if also the adults are actively looking for a job, there is more competition among generations which might reduce the chances for the youth segment of the population. Figure 7 seems to hint at a positive relationship.

Figure 7. *YUR and active population across countries (2001-'11)*



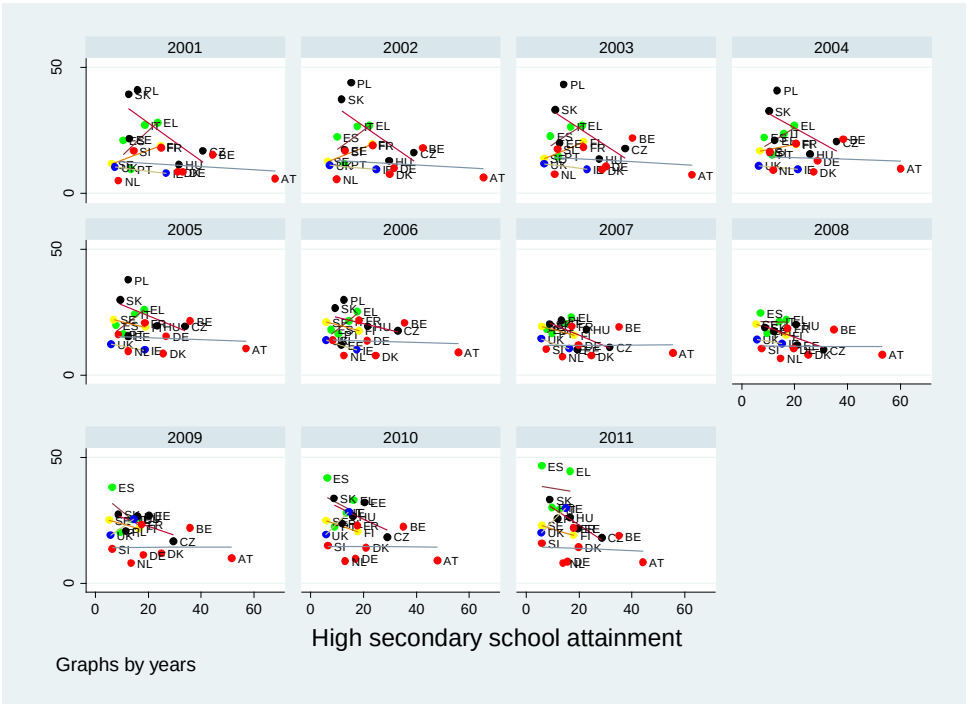
Source: own elaboration.

We also look at the percentage of people aged 25-34 years who attained upper secondary or tertiary education. In principle, a negative relationship is expected, because education should reduce youth unemployment.

Figure 8 and 9, however, do not seem to confirm this in a clear way. For tertiary education attainment, an explanation could be that since the EDU3 take those young person who take a degree in typical age, it could be that a certain period of time has to be waited before those graduated students will find a job. And it is theoretically correct.

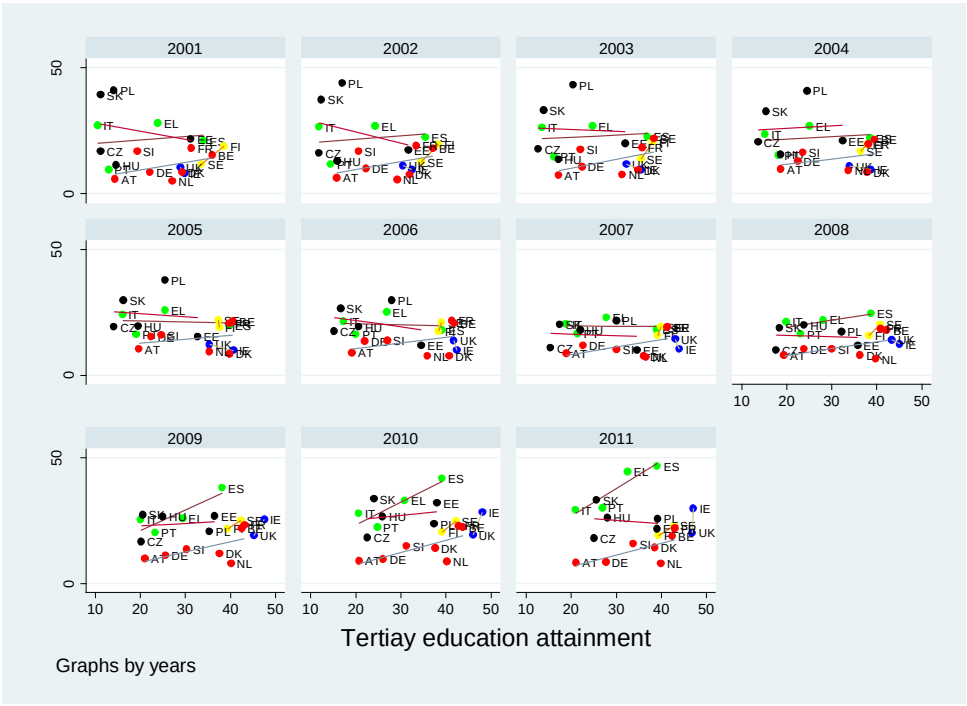
Most of young during studies do not actively look for a job. Once graduated, contrary, they start to look for a job actively and leads to increase the YUR at least in the first year.

Figure 8. *YUR and secondary education attainment across countries (2001-'11)*



Source: own elaboration.

Figure 9. *YUR and tertiary education attainment across countries (2001-'11)*

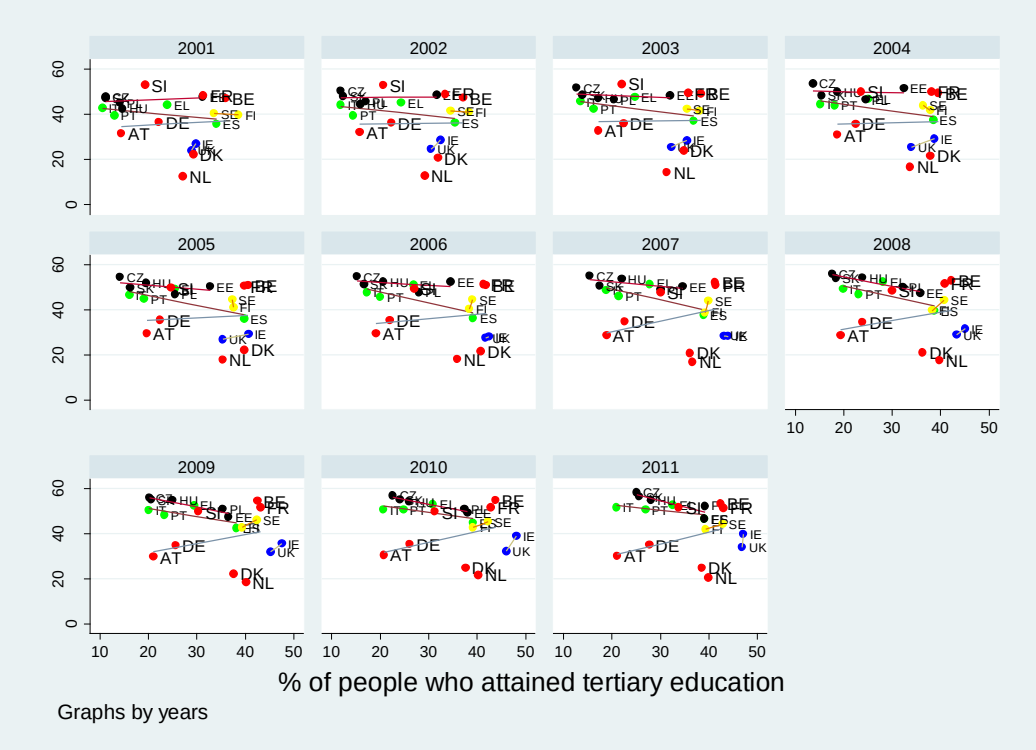


Source: own elaboration.

There is also another aspect to be take into account and is the “over education”. Often, student choose a curricula in which the grat part of the other students are already attending. The results is that the jobs are always the same, but the number of people asking for that job are exponentially increasing. It leads to a lack of number of job places for all, creating a “bottleneck effet”.

In order to shed some light the employment gap has been computed as the difference between the employed aged 25 to 54 and the employed aged 15 to 24. This variable as been related with the percentage of people who attained tertiary education. Figure 10 shows the annual relationship between the employment gap and the people who attained the tertiary education. The countries in the 2001 are in the left part of the graph while moving toward 2011 countries are shifting to the right meaning that the number of people who attained tertiary education grew up. In almost all countries, the employment gap seems to increase meaning that the number of youth employed decrease or adult employed increase.

Figure 10. *Employment gap and tertiary education attainment across countries (2001-’11)*

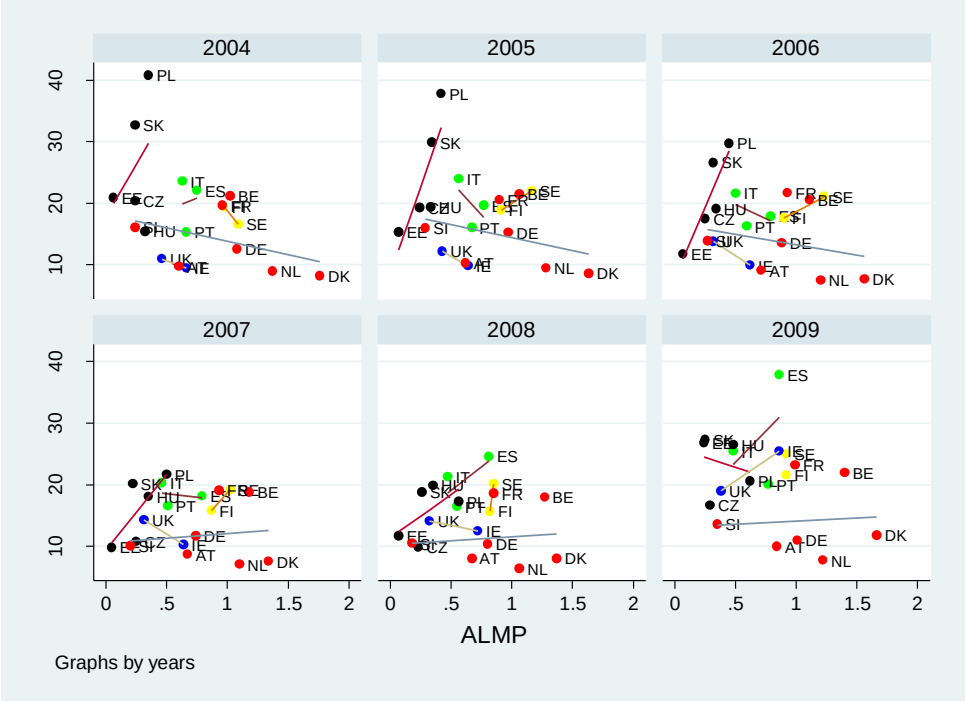


Source: own elaboration.

Overall, it can be seen that the countries showing the lowest employment gap are those belonging to Anglo-Saxon countries and to the dual system as expected. Something has to be noticed, over all the period some dual system showed the worst employment gap; those countries are Slovenia form 2001 till 2003.

Figure 11 regards the total expenditure in active labor market policies over per capita GDP[24]. They include different governmental programmes of training, counselling etc, which aim to increase the employability of the unemployed and therefore their likelihood to find work. Overall, they should obviously reduce the YUR. In fact, the figure confirms for the greatest part of the countries a negative relationship, at least until 2007, from when something seems to change.

Figure 11. *YUR and total expenditure in ALMP across countries (2001-'11)*



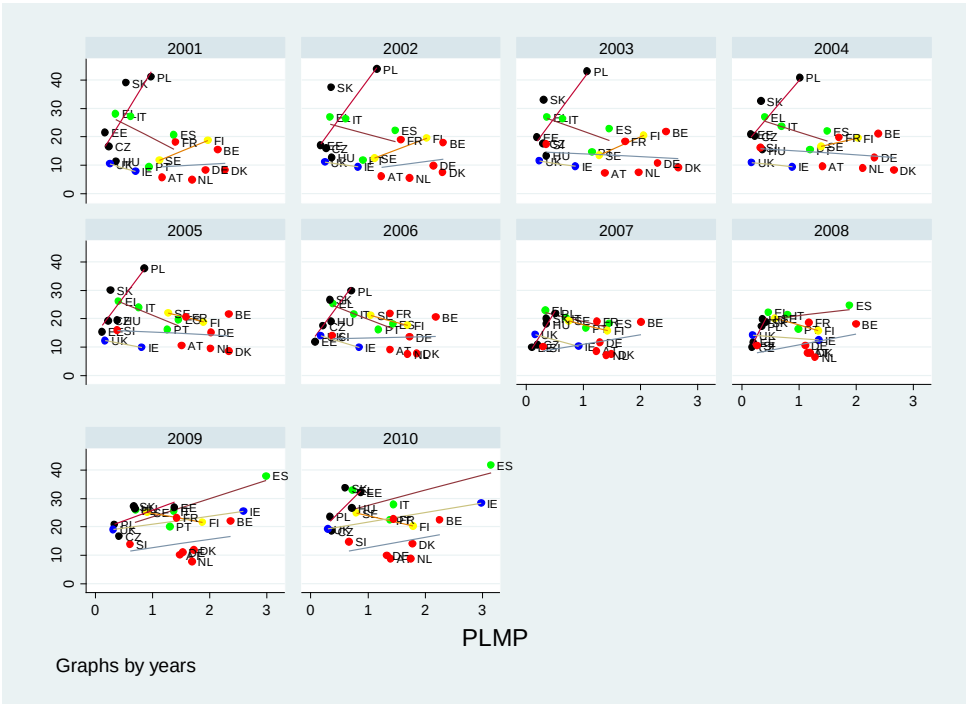
Source: own elaboration.

[24] The definition is took from http://en.wikipedia.org/wiki/Active_labour_market_policies

Overall, the dual system countries seems to be the countries who spent more on ALMP and those who benefited also more from this expenditure. The within-SWTR relationship switches in some cases to positive, which might generate problems in the estimates. this is the case of the countries with the highest unemployment rate, but problems of public finance, whereas the total expenditure in ALMP is low, but seems to increase with the YUR.

The next variable examined is Passive Labor Market Policy (PLMP)[25], that consist of polices that provide income replacement as well as labour market integration measures available to unemployed or those threatened by unemployment. It is expected a positive relationship between YUR and PLMP because a person who is collecting income replacement by government is not willing to find actively a job, especially if passive income support represents a high share of prospective incomes, which might be the case for low skill young people. In fact, there is also another explanation for a positive sign: the higher is the YUR, the higher must be also the expenditure in PLMP, because the bigger will be the share of those in need. From Figure 12, it is not that clear what kind of relationship there is between YUR and PLMP.

Figure 12. *YUR and total expenditure in PLMP across countries (2001-'11)*

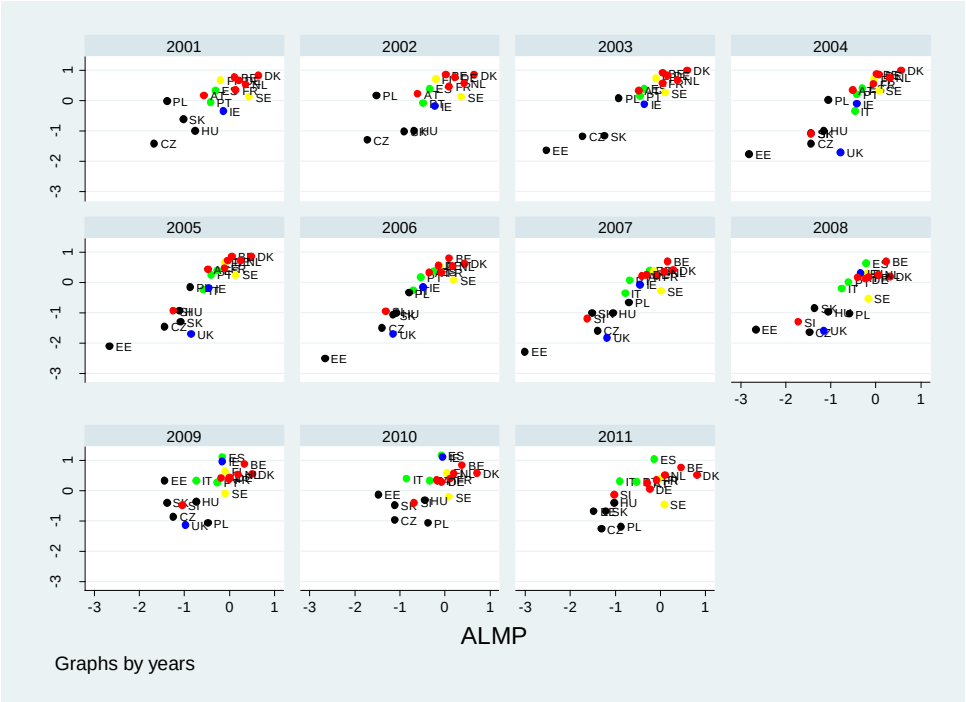


Source: own elaboration.

[25] The definition is took from http://www.ilo.int/empelm/areas/labour-market-policies-and-institutions/lang--en/index.htm

According to Caroleo and Pastore (2003), there is a positive ratio of PLMP to ALMP, which suggests that the overall expenditure in employment policy depends on the approach followed in the country and the importance attributed to them. Figure 13 confirms this hypothesis, suggesting that some degree of correlation could be in place between these two variables. An important evolution of employment policies could be to switch public resources from PLMP to ALMP.

Figure 13. *Ratio of public expenditure in passive and pro-active measures (2001-'11)*



Source: own elaboration.

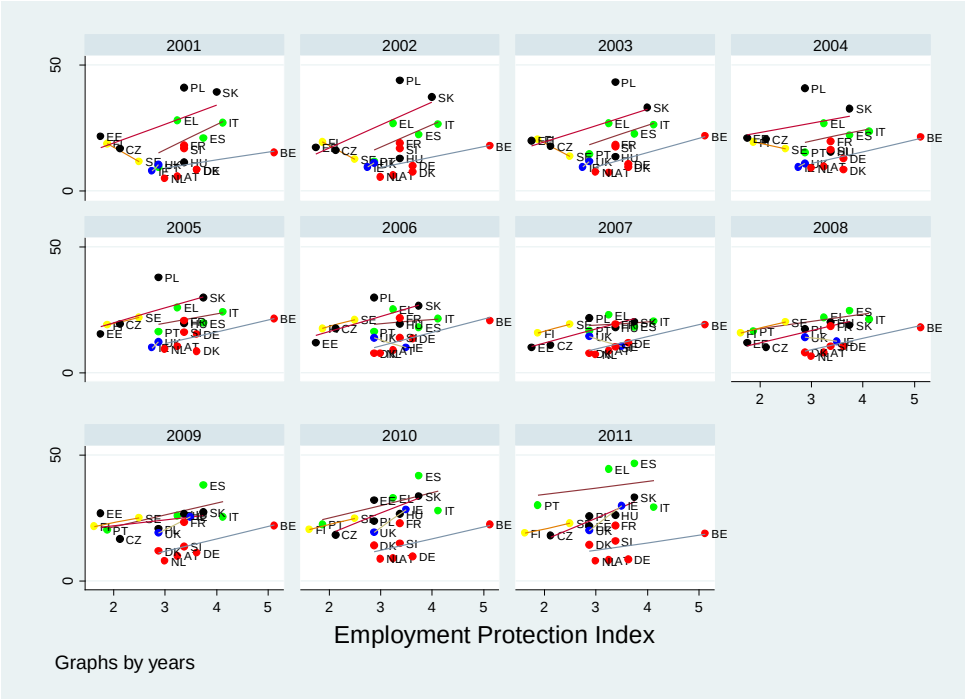
The OECD indicators for employment protection legislation measure the procedures and costs involved in dismissing individuals or groups of workers and the procedures involved in hiring workers on fixed-term or temporary work agency contracts. More particularly, the employment protection index for collective dismissal is the variable used in the estimates. Most countries impose additional delays, costs or notification procedures when an employer dismisses a large number of workers at one time. The indicator measuring these costs includes only additional costs which go beyond those applicable for individual dismissal. It does not

reflect the overall strictness of regulation of collective dismissals, which is the sum of costs for individual dismissals and any additional cost of collective dismissals.[26]

These lead labor markets to be more rigid because firms will think a lot before hiring some new workers in order to reduce the cost of labor, or even when workers are hired, high firing costs do not allow managers to dismiss workers easily

If measured like this, a positive relations is expected with the YUR. The more employment protection increase, the more youth unemployment is expected to increase. Figure 14 largely confirms the expectation of a positive relationship between YUR and EPI, because of course the more EPI is high the more rigid the labour market is, which reduces the tendency of firms to hire and fire workers.

Figure *14.* *YUR and the OECD EPI across countries (2001-'11)*



Source: own elaboration.

[26] Decription taken from: http://www.oecd.org/employment/emp/oecdindicatorsofemploymentprotection.htm.

4.2. Static panel data analysis

This section presents the results of multivariate econometric analysis. Table 5 presents FE estimates of equation [1]. Model 1 takes into account per capita GDP growth, youth population; Model 2 adds high secondary school attainment, tertiary education attainment, PLMP and EPI; in Model 3 EPI is dropped in order to catch the influence of YUPOP; in Model 4 PLMP is dropped and ALMP is inserted instead; in Model 5, since there the is a correlation between ALMP and D_NE because in those countries the expenditure on pro-active measures is big, the dummy variable is dropped in order to catch the influence of policies without D_NE.

Table 5. *FE estimates*

Variable	modFE1	modFE2	modFE3	modFE4	modFE5	modFE6
dl_gdp	-0.337***	-0.074	-0.083	-0.312**	-0.312**	-0.318**
l_yupop	-1.197	31.182***	30.614***	14.507**	14.507**	14.579**
D_SE	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	
D_AS	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	
D_CE	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	
D_NE	(omitted)	(omitted)	(omitted)	(omitted)		
l_edu2		-0.330***	-0.342***	-0.314**	-0.314**	-0.298**
l_edu3		0.335***	0.354***	0.353**	0.353**	0.325**
l_plmp		0.528***	0.502***			
l_epic		-0.299*		0.324	0.324	
l_almp				0.242***	0.242***	0.269***
_cons	3.334	-10.740***	-10.865***	-4.171	-4.171	-3.774
N	229	223	223	203	203	203
ll	-4.592	81.969	80.308	17.234	17.234	16.034
aic	15.184	-149.937	-148.615	-20.468	-20.468	-20.068

legend: * p<.1; ** p<.05; *** p<.01

Source: own elaboration.

Of course, the dummy variables are fixed effects and are hence dropped out in this type of estimates. As expected, per capita GDP growth reduces the YUR. In the short-run, an increase in youth population would be positively related with the YUR increasing the percentage of youth without work. Considering the high secondary school degree as the average level of education, an increase in the percentage of people with secondary degree will lead to a decrease of the YUR. As expected, in the short-run tertiary education leads to an increase in

the YUR, maybe because it creates a bottleneck effect. With regard to the expenditure in PLMP, they lead in all models to an increase in the YUR, probably because of an increase in the reservation wage. The coefficient of the EPI is also as expected: increasing labor market rigidity causes an increase in the YUR, although the effect of the employment protection legislation is not always statistically significant. It is probably due also on the way the variable is built, with little variations over time which tend to cancel out. Overall, theoretical expectations on beta's are fulfilled for most variables.

Table 6 contains the results of RE estimations. The coefficients have similar signs. Per capita GDP growth is reducing the YUR, while the share of the youth population is increasing it. Also the signs of the other control variables are the same as before. The sign of the employment protection legislation turns positive and statistically significant, now. Interestingly, the RE model return the first estimates of the betas of the SWTRs.

Table 6. *RE estimates*

Variable	modRE1	modRE2	modRE3	modRE4	modRE5	modRE6
dl_gdp	-0.329***	-0.227**	-0.208**	-0.331**	-0.329**	-0.310**
l_yupop	0.626	1.838	3.736**	1.040	1.247	2.156
D_SE	0.062	-0.402**	-0.464*	-0.309	-0.197	
D_AS	-0.464*	-0.881***	-0.928***	-0.908***	-0.795***	
D_CE	-0.553***	-1.011***	-1.005***	-0.879***	-0.765***	
D_NE	-0.115	-0.734***	-0.777**	-0.370		
l_edu2		-0.232***	-0.250***	-0.162*	-0.137	-0.267**
l_edu3		0.203**	0.201**	0.353***	0.354***	0.186
l_plmp		0.341***	0.372***			
l_epic		0.075		0.501***	0.587***	
l_almp				0.085	0.029	0.107
_cons	2.782***	2.547***	1.879**	1.584*	1.182	1.993*
N	229	223	223	203	203	203
ll						
aic	.	.	.	.	.	.

legend: * p<.1; ** p<.05; *** p<.01

Source: own elaboration.

The baseline is represented by the eastern European countries, the group with the highest YUR. Also the South European countries are better off also in conditional terms in some, but not all the estimates. This suggests that the difference between the two groups of countries in terms of YUR are partly explained by the observed variables. The North European countries

are doing better, although the coefficient dramatically shrinks in relative terms when we also include the EPI, which might suggest that most part of the gap in YUR between these two groups of countries is explained by the EPI: if the EPI of Scandinavian countries were as high as that of the Eastern European countries, the gap in YUR would be even greater. Two groups of countries outperform all the others: the central European countries and the Anglo-Saxon countries. Their advantage in terms of YUR is neither explained by their lower degree of EPI nor by their higher per capita GDP level and growth.

We run a battery of Housman tests, one for each pair of models in the Tables 5 and 6, to decide whether to refer the FE or the RE model. Table 7 reports the results of the Housman test between Models 2, which are the most complete. For shortness' sake we omit the other tests. All of them, except for the test between Models 1, reject the H_0 of equality of coefficients, which suggests that we should focus on the FE model, which is the most consistent one.

Table 7. *Hausman test results*

```
. hausman modRE2 modFE2

                 ---- Coefficients ----
                 (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
                modRE2       modFE2       Difference          S.E.
-------------------------------------------------------------------------------
      dl_gdp   -.2266433    -.0743548       -.1522885        .0503979
    l_yupop        1.838     31.18161       -29.34361               .
     l_edu2   -.2320371    -.3295064        .0974694               .
     l_edu3    .2032094     .3346536       -.1314442        .0136772
     l_plmp    .3410426     .5282158       -.1871732        .0089323
     l_epic    .0750548    -.2988838        .3739386               .
-------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       76.38
                Prob>chi2 =      0.0000
                (V_b-V_B is not positive definite)
```

Source: own elaboration.

A major shortcoming of the FE model is that it does not allows estimating the coefficient of our SWTRs. Therefore, we turn to the least square dummy variable (LSDV) estimates,

which we report in Table 8, using the same specifications as before, but now with the estimated coefficients for our SWTRs. These are clearly our final (static) panel estimates. The coefficients of control variables are the same as before: statistically significant and negative for per capita GDP growth. Where statistically significant, the youth population tends to increase the YUR due to the aforementioned bottleneck effect. Secondary education attainment has again a negative beta, but is statistically significant only in two models. Tertiary education is still significant and with a positive beta. PLMP is now not statistically significant in any model. Comparing the LSDV coefficient for EPIC with the FE model coefficient, it appears that in the short-run (FE model) it tends to increase a little bit the YUR; but, in the long-run, as the LSDV estimation shows, beta is almost 1. As earlier, ALMP has a negative beta, while PLMP has no discernible effect on the YUR.

However, the most important feature of Table 8 is that, even in the case of LSDV estimates, the dummy relative to the countries using the dual educational system has a statistically significant, negative coefficient and is the one that tends to reduce the YUR the most. Again, though, the Anglo-Saxon countries have a coefficient which is very similar to that of the countries belonging to the dual educational system in all estimated models. This confirms the theoretical expectations according to which the liberalist and the Central European SWT models are the most efficient in coping with the youth experience gap, although using a very different strategy.

In fact, it should be noted that for a full comparison of the Central European and Liberalist model, it would be necessary to consider also the degree of fluctuations of the YUR in the two groups of countries, which is not fully addressed in our empirical analysis. In the former group of countries, the YUR is always very low, whereas in the liberalist countries it is widely fluctuating, which might importantly affect the social preference for the system adopted in the former group of countries, holding constant their performance in comparative terms.

The other three SWT regimes are very similar in conditional terms, with the Scandinavian one performing slightly better and the South-European SWTR being almost identical in terms of ability to reduce the YUR than the baseline of Eastern European countries. Interestingly, when the expenditure in PLMP is included in the estimates, the Scandinavian countries are

performing much better than the South and East European countries, which might be taken to suggest that the bad performance of the Scandinavian countries is partly due to their large expenditure in PLMP which tend to increase the reservation wage of their youth unemployed and therefore reduce their job search intensity.

The same applies to some extent also to the South European countries. In the models 4 and 5, where also the EPI is included, the disadvantage of East European countries tends to disappear, suggesting that their labor market rigidities partly explains their bad performance with respect to the other groups of countries.

Table 8. *LSDV estimates*

Variable	LSDV1	LSDV2	LSDV3	LSDV4	LSDV5	LSDV6
dl_gdp	-0.382***	-0.390***	-0.384***	-0.295**	-0.288**	-0.257***
l_yupop	0.909*	0.845	0.991*	1.900**	1.609**	2.769***
D_SE	0.057	-0.107*	-0.058	-0.079	-0.151	
D_AS	-0.466***	-0.737***	-0.712***	-0.666***	-0.752***	
D_CE	-0.551***	-0.835***	-0.701***	-0.692***	-0.777***	
D_NE	-0.108*	-0.020	-0.351***	0.215*		
l_edu2		-0.003	-0.071*	0.022	0.001	-0.176***
l_edu3		0.298***	0.248***	0.378***	0.399***	0.049
l_plmp		-0.028	0.052			
l_epic		0.821***		0.919***	0.840***	
l_almp				-0.208**	-0.145**	-0.223**
_cons	2.657***	0.909*	2.116***	-0.208	0.106	1.771**
N	229	223	223	203	203	203
ll	-73.846	-31.306	-62.637	-22.076	-23.926	-94.750
aic	159.693	82.613	143.275	64.152	65.851	199.500

legend: * p<.1; ** p<.05; *** p<.01

Note: the number of observations reduces when we consider ALMP, because some observations are missing for this variable. Source: own elaboration.

Now, in order to check for the hysteresis of YUR, dynamic panel estimates are presented. In order to measure the persistence of the results in long-run and short-run a lagged variable should be introduced in the previous model.

$$Yur_{it} = Yur_{it-1} + \alpha SWTR_{it} + \beta X_{it} + \varepsilon_{it}$$

Where Yur_{it} is the youth unemployment rate, $SWTR_{it}$ are the country dummy with value 1 if belonging to certain school-to-work transition regime and 0 otherwise, X_{it} is a set

of explanatory variable already presented in Table 1**.** Since it is common to have exogenous variables, system GMM is used in order to check for it and to confirm what has been already found out with LSDV estimation (Table 9).

Table 9. *System GMM, first step*

Dynamic panel-data estimation, one-step system GMM

Group variable: country				Number of obs	=	172
Time variable : years				Number of groups	=	20
Number of instruments = 110				Obs per group: min	=	6
Wald chi2(17) =	7255.93			avg	=	8.60
Prob > chi2 =	0.000			max	=	9

l_yur1524	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
l1l_yur1524	.9805244	.0888893	11.03	0.000	.8063046	1.154744
l2l_yur1524	-.260141	.0464358	-5.60	0.000	-.3511534	-.1691286
l_gdp	-2.0191	.3518492	-5.74	0.000	-2.708711	-1.329488
l1l_gdp	2.068842	.3363933	6.15	0.000	1.409523	2.72816
l_edu3	.4130471	.1802838	2.29	0.022	.0596974	.7663968
l1l_edu3	-.3746029	.1594076	-2.35	0.019	-.687036	-.0621698
l_edu2	-.1012809	.0559249	-1.81	0.070	-.2108918	.0083299
l_epic	.1274522	.0989734	1.29	0.198	-.066532	.3214365
l1l_epic	-.2800349	.072781	-3.85	0.000	-.4226831	-.1373867
l2l_epic	.2316492	.1300058	1.78	0.075	-.0231575	.486456
l_almp	-.0082981	.019405	-0.43	0.669	-.0463312	.0297351
l_plmp	.1742353	.0422184	4.13	0.000	.0914887	.256982
l1l_plmp	-.1044211	.0489868	-2.13	0.033	-.2004334	-.0084089
D_SE	-.1746285	.0843515	-2.07	0.038	-.3399544	-.0093027
D_AS	-.2335233	.1093813	-2.13	0.033	-.4479068	-.0191399
D_CE	-.3285042	.097429	-3.37	0.001	-.5194617	-.1375468
D_NE	-.1217346	.133105	-0.91	0.360	-.3826156	.1391463
_cons	.5576382	.4425661	1.26	0.208	-.3097753	1.425052

Taking, as usual, as a baseline the SWT regime of the new member states, the first step of system GMM tells us that compared to those countries all the others are performing better in reducing the youth unemployment rate, but the one that has the highest beta in absolute value is the dummy for countries belonging to dual education system, namely Central European countries. Now, looking at the hysteresis of the YUR it can be seen that countries that have a high YUR today is also depending on the YUR of the last year. While, contrary, the lag 2 of the YUR contribute to reduce the YUR of today. Source: own elaboration.

The variable DL_GDP confirm the expectation even if a strong thing happens when looking at the lag 1 of this variable, in fact is found to increase youth unemployment rate an high level of growth of per capita GDP for the past year.

Tertiary education attainment has the beta expected in the present, but it is find out to have a negative beta leading to a reduction of YUR, it has a clear explanation: it seems quite obvious that in the long-run all the person with the tertiary degree will find some jobs, tending, this way, to reduce the YUR the year after. On contrary, in the short-run people with tertiary degree tend to increase YUR because they are not able to find a job once attained the degree. Strange negative beta has EPIC in the second lag, being the first lag not significant. The second lag of EPIC is coherent with theory. ALMP are not significant, but the beta sign was coherent with theory.

PLMP as expected has a positive beta in the short-run, and it is clear that it depends on the fact that young could be attracted from receiving a sort of salary from the government being unemployed. In the long-run, beta for PLMP is negative and statistically significant. According to the theory, government gives to youth unemployed a salary for a little period while they are still seeking actively a job. After a certain period it is clear that the youth has to seek a job, because government grant is not forever, and soon or later young knows that government grant will finish then they start actively to look for a job.

Table 10. *System GMM, two-step estimates*

Dynamic panel-data estimation, two-step system GMM

Group variable: country				Number of obs	=	209
Time variable : years				Number of groups	=	21
Number of instruments = 71				Obs per group: min	=	9
Wald chi2(7) =	208.99			avg	=	9.95
Prob > chi2 =	0.000			max	=	10

l_yur1524	Coef.	Corrected Std. Err.	z	P>|z|	[95% Conf.	Interval]
l1l_yur1524	.9541526	.2087562	4.57	0.000	.5449979	1.363307
l_gdp	-3.798235	.6335759	-5.99	0.000	-5.040021	-2.556449
l1l_gdp	3.230529	.5126956	6.30	0.000	2.225664	4.235394
l_edu3	.739395	.4764621	1.55	0.121	-.1944536	1.673244
l1l_edu3	-.6563392	.5807569	-1.13	0.258	-1.794602	.4819234
l_epic	-.0991399	.8303027	-0.12	0.905	-1.726503	1.528223
l1l_epic	-.4699164	.8141769	-0.58	0.564	-2.065674	1.125841
_cons	6.363168	4.710719	1.35	0.177	-2.869671	15.59601

Source: own elaboration.

Table 10 presents the GMM estimation with the two-step: In the two-step GMM dummy variable are not inserted, because differencing the estimation they would be dropped out as well. Results of the First-step are largely confirmed, except with EPIC that here shows a negative beta, that perhaps is not significant.

5. Concluding remarks

Previous authoritative studies (Nickell, 1997; Nickell, Nunziata and Ochel, 2005; Bassanini, Nunziata and Venn, 2009) have studied the determinants of the aggregate unemployment rate across countries and over time. To our knowledge, this essay presents the first available econometric estimates of the impact of different school-to-work transition regimes on the absolute youth disadvantage at the labor market. Much research has been conducted at a theoretical level on the possible role of school-to-work transition regimes on youth labor market outcomes. Nonetheless, up to now, no empirical analysis has been deployed to empirically assess the role of different labor market and SWT institutions on youth labor market outcomes. This is the first research attempting this analysis in the context of (static and dynamic) panel data analysis.

We study both the unconditional differences and the differences conditional on a number of macroeconomic and institutional factors, such as per capita GDP level and growth, youth population, secondary and tertiary education attainment, expenditure in PLMP and ALMP, degree of employment protection legislation. After presenting the results of LSDV estimate, we also present the results of a system GMM model to assess the relative impact of different school-to-work regimes, using data from the OECD data base. Most of the signs of the control variables are as expected, with per capita GDP level and growth reducing the YUR, the youth population generating bottleneck effects at the labor market, the expenditure in ALMP reducing the YUR and the degree of EPL increasing the YUR. PLMP and education attainment are not statistically significant or with the wrong sign, probably because of the unsatisfactory way these variables are defined.

We find evidence that the Continental European and the Anglo-Saxon SWT regime perform similarly in terms of YUR and much better than the other SWTRs also after controlling for labor market and educational institutions. This is suggestive of the fact that there is a specificity of these SWTRs, which is able to explain the lower than average youth absolute (and relative) disadvantage these countries experience. This specificity is not caught by any of the aforementioned variables.

Based on the theoretical framework laid down in the first sections, such specificity is to be found, in the case of Central European countries, in the dual education principle, according to which school based general education and work based vocational training are provided together rather than one after the other, as it is the case of the sequential system. More than the sequential system, the dual educational system, typical of Germany and other Central European countries, are able to help young people fill in their youth experience gap, through vocational on-the-job training. Nonetheless, it is remarkable that the countries belonging to the liberalist school-to-work transition regime are able to reach very similar results with a different solution. Their performance stands out also after controlling for the degree of employment protection legislation. Although accepting the sequential education system, liberalist countries couple a high quality, fast and efficient educational system with a very flexible labor market to allow young people filling their youth experience gap.

For a full comparison of the Central European and Liberalist model, it would be necessary to consider also the degree of fluctuations of the YUR in the two groups of countries, which is not fully addressed in our empirical analysis. In the former group of countries, the YUR is always very low, whereas in the liberalist countries it is very flexible, which might importantly affect the social preference for the system adopted in the former group of countries.

The assumption of this study is that country dummies are catching the impact of SWTRs, once controlling for all the other confounding factors. Nonetheless, the findings of this study sound as a warning for such international organizations as the OECD, the ILO, the IMF and the World Bank, about the importance of collecting systematic statistical information on the main features of a SWTR to allow in future research overcoming our dummy variable approach and catching the importance of specific components of any SWTR, such as the

existence of the duality principle, the degree of integration between educational institutions and labor market, the expenditure in entry and exit guidance, such as job placement activities.

References

Bassanini, A., L. Nunziata and D. Venn (2009), "Job protection legislation and productivity growth in OECD countries," Economic Policy, 24(58): 349-402.

Blanchflower, D. G., & Freeman, R. (2000). Youth employment and joblessness. Chicago: University of Chicago Press.

Booth, A.L., M. Francesconi and J. Frank (2002), "Temporary Jobs: Stepping Stones or Dead Ends?", *Economic Journal*, 112(480): F189-F213.

Bruno, G.S.F., E. Marelli and M. Signorelli (2014), *The rise of NEET and Youth Unemployment in EU regions after the crisis*, Comparative Economic Studies, 56(4): 592-615.

Burlacu, I. (2007). Welfare state regimes in transition countries: Romania and Moldova compared. CEU Political Science Journal, 2(3), 302–318.

Caroleo F.E. and F. Pastore (2003) "Youth Participation in the Labour Market in Germany, Spain and Sweden", in T. Hammer (*op. cit.*).

Clark, K. B. and L. H. Summers (1982), "The Dynamics of Youth Unemployment", in Freeman, and Wise (eds.), *The Youth Labour Market Problem: Its Nature, Causes and Consequences*, University of Chicago Press/NBER, Chicago (also available in Summers, L. H. (1990), *Understanding Unemployment*, MIT Press).

Esping-Andersen, G. (1990), *The Three Worlds of Welfare Capitalism*, Cambridge:Polity Press.

Freeman, R. e D. Wise (1982, eds.), *The Youth Labour Market Problem: Its Nature, Causes and Consequences*, University of Chicago Press: Chicago.

Gomez-Salvador, R. and N. Leiner-Killinger (2008), "An Analysis of Youth Unemployment in the Euro-Area", *European Central Bank*, N° 89, June.

Hammer, T. (2003), *Youth Unemployment and social Exclusion in Europe*, Policy Press, UK: Bristol.

Hausman, J. A. 1978. Specification tests in econometrics. Econometrica 46(6): 1251–1271.

Heckman, J. J. and G. J. Borjas (1980), "Does Unemployment Cause Future Unemployment? Definitions, Questions and Answers from a Continuous Time Model of Heterogeneity and State Dependence", *Economica*,47(187): 247-83.

Heckman J. J. and B. Singer (1984), A Method of Minimizing the Impact of Distributional Assumptions for Duration Data, Econometrica 52, 271–320.

Jimeno, J. F. & Rodríguez-Palenzuela, D. (2003). "Youth Unemployment in the OECD: Demographic Shifts, Labour Market Institutions and Macroeconomic Shocks," Economics Working Papers 019, European Network of Economic Policy Research Institutes.

Loh, E. S. (1994). Employment Probation as a Sorting Mechanism. Industrial and Labour Relations Review, 47(3), 471–486.

Marelli, E., R. Patuelli and M. Signorelli (2012), *Regional Unemployment in the EU before and after the Global Crisis*, Post-Communist Economies, 24 (2): 155-75.

McKinsey (2014), *Education to Employment. Getting Europe's Youth into Work*, McKinsey, Washington.

Nickell, S. (1997), "Unemployment and Labor Market Rigidities: Europe versus North America", *Journal of Economic Perspectives*, 11(3): 55-74.

Nickell, S., L. Nunziata and W. Ochel (2005), "Unemployment in the OECD since the 1960s. What do we Know?", *Economic Journal*, 115 (500): 1-27.

Ochel, W. (2008), "The Political Economy of Two-Tier Reforms of Employment Protection in Europe", Cesifo Working paper, n. 2461, November.

O'Higgins, N. (2001), *Youth Unemployment and Employment Policy: A Global Perspective*, ILO, Ginevra.

OECD (1994), "*The OECD Jobs Study"*, OECD Publications, Paris.

Pastore, F. (2015), *The Youth Experience Gap. Explaining National Differences in the School-to-Work Transition* (2015), *Physica Verlag, Heidelberg.*

Quintini, G., J.P. Martin and S. Martin (2007), "The Changing Nature of the School-to-Work Transition Process in OECD Countries"; IZA discussion paper, n. 2582, January.

Raffe, D. (2008) The Concept of Transition System. *Journal of Education and Work* 21(4): 277-296.

Roodman, D. (2006) "How to do xtabond2: An introduction to difference and system GMM in Stata," *Stata Journal*, StataCorp LP, vol. 9(1), pages 86-136, March.

Roodman, D. (2009) "A Note on the Theme of Too Many Instruments," Oxford Bulletin of Economics and Statistics, Department of Economics, University of Oxford, vol. 71(1), pages 135-158, 02.

Ryan P (2001) The school-to-work transition. A Cross-National Perspective. *Journal of Economic Literature* 39(1): 1-34.

Vogel, J. (2002). European Welfare regimes and the transition to adulthood: A comparative and longitudinal perspective. Social Indicators Research, 59(3), 275–299.

3. **Youth Uemployment in Italy and Russia: Aggregate Trends and the Role of Individual Determinants**

Enrico Marelli and Elena Vakulenko

Abstract

Youth unemployment is a serious problem in many European countries. In the first part of the paper, we consider the aggregate trends in some EU countries and in Russia; we especially investigate the recent period after the global crisis and the Great Recession. We then consider the different types of determinants, including macroeconomic conditions, structural determinants, labour market institutions and regulations. However, the focus of our analysis is on the role played by individual and family determinants such as age, gender, education level, marital status, health, household income, housing conditions. The econometric part of the paper makes use of Eurostat micro-level data EU-SILC for Italy and RLMS-HSE data set for Russia. We use a Heckman probit model to estimate the unemployment risk of young people during the period 2004-2011. Our main research question is to explain the probability of being unemployed for young people in terms of their personal characteristics and compare these outcomes with results for the same model for adults. We take also into account some macro variables, such as living in urban areas or the regional unemployment rate. The results are of interest, since the two countries have quite different labour market institutions, besides having different levels of youth unemployment. However, most of the explanatory variables act in the same direction in both countries and it is interesting to compare the relative size of such effects, which we measure through the average partial effects.

*JEL Classification***:** J64

Keywords: youth unemployment, individual determinants of unemployment, regional unemployment, Heckman probit.

Introduction

The youth unemployment rate (YUR)[27] is, in most countries, at least twice as high as the total unemployment rate (TUR). In many countries it has increased significantly in the last five years, after the global crisis. Long-term unemployment is especially pernicious, since it causes a loss of work experience and human capital, or in the case of young people a loss of the abilities acquired at school; it leads to lower employability and reduced earnings over the entire life cycle, raising the risk of a "lost generation" (e.g., Scarpetta et al. 2010).

The causes of youth unemployment are several: macroeconomic conditions, structural determinants, institutional features (concerning both the labour market rules and the school system). In this paper we review some of them focusing on personal and family characteristics.

Although in the descriptive section we analyse recent trends of youth unemployment in many countries, with particular reference to the recent period after the crisis, our econometric investigations focus on two countries: Italy and Russia. These countries are different in many ways—structural and institutional conditions, macroeconomic trends—but precisely for this reason it is interesting to assess whether the personal and family determinants behave in a similar manner.

This paper explains the probability of being unemployed for young people in terms of their personal or family characteristics and compares these outcomes with results for the same model for adults. The empirical analysis refers to the period 2004-2011 for both countries. We use Eurostat micro-level data EU-SILC for Italy and RLMS-HSE data set for Russia.

The econometric strategy is based on the Heckman probit model to estimate the unemployment risk of young people. This model is appropriate since it takes into account the possibility of the non-random selection of labour participation. In addition to individual characteristics, we consider also some macro variables, such as living in urban areas or the regional unemployment rate. We also provide more detailed estimations, for instance, by gender. The comparisons between the two countries are mainly achieved by computing the average partial effects (APE).

[27] Generally referring to individuals aged 15-24 years (more detailed definitions provided in the next Section).

The structure of the paper is the following. Section 2 illustrates the trends for youth and TUR in Italy, Russia and other countries. Section 3 reviews the main determinants of youth unemployment, both at the macro and at the individual level. Section 4 describes the data sets used in the empirical investigations and gives descriptive statistics of the samples. Section 5 discusses the econometric investigations of the determinants of the total and YURs, for the two countries. Section 6 concludes.

1. Recent trends in Youth Unemployment

Let us consider, first of all, the trends in TUR. Even before the crisis there were large variations across countries. In 2007 (see Table 1), TUR was 3.9% in Japan, 4.6% in the USA and 7.2% in the EU. Within the EU it ranged from 3.6% (the Netherlands) to 11.2% (Slovakia). Then, the financial crisis led to an increase in unemployment, but the increase was rapid in the countries with more flexible labour markets and slower in markets where there were rigidities or internal flexibilities (e.g. working hour adjustments). In the EU, unemployment also rose in 2012-13 because of the new recession caused by the sovereign debt crisis. Despite the current feeble recovery in 2014 it is expected to remain at high levels for a long period. On average, after recessions, employment returns to pre-crisis levels after four or five months, but such lags are longer in the case of the financial crises. An exceptional case is provided by Germany, where unemployment decreased even during the crisis period (from 11.3% in 2005 and 8.7% in 2007 to 5.3% in 2013), because of company flexibility and labour hoarding practices.

Table 1 - *Unemployment rate (all ages): EU countries and comparisons*

	2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2013/2007 ratio***
European Union (28)	9,3	9,1	8,3	7,2	7,1	9	9,7	9,7	10,5	10,9	*1,5*
Euro area	9,2	9,1	8,4	7,6	7,6	9,6	10,1	10,1	11,4	12,1	*1,6*
Belgium	8,4	8,5	8,3	7,5	7	7,9	8,3	7,2	7,6	8,4	*1,1*
Bulgaria	12,1	10,1	9	6,9	5,6	6,8	10,3	11,3	12,3	12,9	*1,9*
Czech Republic	8,3	7,9	7,1	5,3	4,4	6,7	7,3	6,7	7	7	*1,3*
Denmark	5,5	4,8	3,9	3,8	3,5	6	7,5	7,6	7,5	7	*1,8*
Germany	10,5	11,3	10,3	8,7	7,5	7,8	7,1	5,9	5,5	5,3	*0,6*

Estonia	9,7	7,9	5,9	4,6	5,5	13,8	16,9	12,5	10,2	:	*2,2*
Ireland	4,5	4,4	4,5	4,7	6,4	12	13,9	14,7	14,7	13,1	*2,8*
Greece	10,5	9,9	8,9	8,3	7,7	9,5	12,6	17,7	24,3	27,3	*3,3*
Spain	10,9	9,2	8,5	8,3	11,3	18	20,1	21,7	25	26,4	*3,2*
France	9,3	9,3	9,2	8,4	7,8	9,5	9,7	9,6	10,2	10,8	*1,3*
Croatia	13,8	12,8	11,4	9,6	8,4	9,1	11,8	13,5	15,9	17,6	*1,8*
Italy	**8**	**7,7**	**6,8**	**6,1**	**6,7**	**7,8**	**8,4**	**8,4**	**10,7**	**12,2**	*2,0*
Cyprus	4,6	5,3	4,6	3,9	3,7	5,4	6,3	7,9	11,9	16	*4,1*
Latvia	11,7	10	7	6,1	7,7	17,5	19,5	16,2	15	11,9	*2,0*
Lithuania	11,6	8,5	5,8	4,3	5,8	13,8	17,8	15,4	13,4	11,8	*2,7*
Luxembourg	5	4,6	4,6	4,2	4,9	5,1	4,6	4,8	5,1	5,9	*1,4*
Hungary	6,1	7,2	7,5	7,4	7,8	10	11,2	10,9	10,9	10,2	*1,4*
Malta	7,2	6,9	6,9	6,5	6	6,9	6,9	6,5	6,4	6,5	*1,0*
Netherlands	5,1	5,3	4,4	3,6	3,1	3,7	4,5	4,4	5,3	6,7	*1,9*
Austria	4,9	5,2	4,8	4,4	3,8	4,8	4,4	4,2	4,3	:	*1,0*
Poland	19,1	17,9	13,9	9,6	7,1	8,1	9,7	9,7	10,1	10,3	*1,1*
Portugal	7,5	8,6	8,6	8,9	8,5	10,6	12	12,9	15,9	16,5	*1,9*
Romania	8	7,2	7,3	6,4	5,8	6,9	7,3	7,4	7	7,3	*1,1*
Slovenia	6,3	6,5	6	4,9	4,4	5,9	7,3	8,2	8,9	10,2	*2,1*
Slovakia	18,4	16,4	13,5	11,2	9,6	12,1	14,5	13,7	14	14,2	*1,3*
Finland	8,8	8,4	7,7	6,9	6,4	8,2	8,4	7,8	7,7	8,2	*1,2*
Sweden	7,4	7,7	7,1	6,1	6,2	8,3	8,6	7,8	8	8	*1,3*
United Kingdom	4,7	4,8	5,4	5,3	5,6	7,6	7,8	8	7,9	:	*1,5*
Iceland	3,1	2,6	2,9	2,3	3	7,2	7,6	7,1	6	5,4	*2,3*
Norway	4,3	4,5	3,4	2,5	2,5	3,2	3,6	3,3	3,2	3,5	*1,4*
Turkey	:	9,2	8,7	8,8	9,7	12,5	10,7	8,8	8,1	:	*0,9*
United States	5,5	5,1	4,6	4,6	5,8	9,3	9,6	8,9	8,1	7,4	*1,6*
Japan	4,7	4,4	4,1	3,9	4	5,1	5,1	4,6	4,3	:	*1,1*
Russia	**7,8**	**7,1**	**7,1**	**6,0**	**6,2**	**8,3**	**7,3**	**6,5**	**5,5**	**5,5**	*0,9*

Source: Eurostat and Rosstat (Russia)

Note: 2012/2007 ratio if 2013 not available*

The largest unemployment increases from 2007 to 2013 (see the last column of Table 1) were recorded in Cyprus, Greece, Spain, and Ireland, where TUR increased by a factor of 3 to 4; among the large countries it doubled in Italy (from 6.1% to 12.2%). While in the EU as a whole grew by 50%, in the USA it more than doubled from 2007 to 2010, then it fell back to around 7%. A similar profile, although at lower levels, is shown in Russia. Apart from the German reduction, the smallest increases are recorded in Poland, Austria, Belgium, Malta, Romania, Japan, and Turkey.

As to "youth unemployment" definition[28], in most countries it refers to individuals aged 15-24 years. However other ages are sometimes considered; moreover problems such as underemployment and informal sector employment may be particularly relevant for young people in certain areas (this is the case of the South of Italy and certain Russian regions). The YUR in the pre-crisis situation (2007) exhibited wide variations (Table 2): from 7% in the Netherlands to 22.9% in Greece.

In many countries, even before the recent crisis, the YUR was increasing. The general impact of the crisis on YUR was similar to that of TUR: e.g. in the EU it increased by 50% (see next to the last column in Table 2). Nevertheless, even in countries with flexible employment such as the USA, there is a higher persistence compared to TUR. In some other countries, the initial impact of the crisis on YUR has been moderate, but they suffer because of bad long run consequences, such as loss of work experience and human capital, lower employability and reduced earnings over the entire life cycle, poorer job quality and precarious employment.

Furthermore, in a number of countries the impact of the crisis on YUR has been larger, also due to adverse institutional settings; this is the case in Italy. Younger workers, who have weaker work contracts, lower qualifications and less experience than older workers, have borne the brunt of the "Great Recession" (Arpaia and Curci, 2010). The largest increases of the YUR in the 2007-2013 period are recorded in Cyprus (by a factor of 3.8), Spain (3.1), Ireland (2.9), Greece and Lithuania (2.6), Latvia and Slovenia (2.2), Estonia and Croatia (2.2), Bulgaria and Italy (2.0). The YUR actually decreased only in Germany (and to a less extent in Turkey).

Table 2 - *Youth unemployment rate (<25 years): EU countries and comparisons*

	2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2013/ 2007 ratio***	**YUR/TUR ratio (2013)°**
EU Union (28)	19,1	18,9	17,6	15,7	15,8	20,1	21,1	21,5	23	23,5	*1,5*	*2,2*
Euro area	17,9	18,1	16,9	15,4	15,9	20,2	20,9	20,8	23,1	24	*1,6*	*2,0*
Belgium	21,2	21,5	20,5	18,8	18	21,9	22,4	18,7	19,8	23,7	*1,3*	*2,8*
Bulgaria	24,3	21	18,3	14,1	11,9	15,1	21,8	25	28,1	28,6	*2,0*	*2,2*

[28] In addition to the youth unemployment rate, some other definitions are sometimes used. For example, O'Higgins (2011) and Scarpetta et al. (2010) observe that the size of the group of "youth left behind" can be proxied by the number of young people who are neither employed nor in education or training (NEET). This definition is now considered also by OECD, Eurostat, and other institutions.

Czech Rep.	20,4	19,3	17,5	10,7	9,9	16,6	18,3	18,1	19,5	18,9	*1,8*	*2,7*
Denmark	8,2	8,6	7,7	7,3	8,1	11,8	13,9	14,3	14	13	*1,8*	*1,9*
Germany	13,8	15,6	13,8	11,9	10,6	11,2	9,9	8,6	8,1	7,9	*0,7*	*1,5*
Estonia	21,6	16,1	11,9	10,1	12,1	27,5	32,9	22,3	20,9	:	*2,1*	*2,0*
Ireland	8,7	8,6	8,7	9,1	13,3	24	27,6	29,1	30,4	26,8	*2,9*	*2,0*
Greece	26,9	26	25,2	22,9	22,1	25,8	32,9	44,4	55,3	58,6	*2,6*	*2,1*
Spain	22	19,7	17,9	18,2	24,6	37,8	41,6	46,4	53,2	55,7	*3,1*	*2,1*
France	20,8	21,3	22,4	19,8	19,3	24	23,7	22,9	24,7	25,5	*1,3*	*2,4*
Croatia	32,8	31,9	28,8	24	21,9	25,1	32,6	36,1	43	49,9	*2,1*	*2,8*
Italy	**23,5**	**24**	**21,6**	**20,3**	**21,3**	**25,4**	**27,8**	**29,1**	**35,3**	**40**	***2,0***	***3,3***
Cyprus	10,2	13,9	10	10,2	9	13,8	16,6	22,4	27,8	38,7	*3,8*	*2,4*
Latvia	20	15,1	13,6	10,6	13,6	33,3	36,2	31	28,5	23,2	*2,2*	*1,9*
Lithuania	23,1	16,3	10,2	8,4	13,3	29,6	35,7	32,6	26,7	21,9	*2,6*	*1,9*
Luxembourg	16,4	14,6	15,5	15,6	17,3	16,5	15,8	16,4	18	19,9	*1,3*	*3,4*
Hungary	15,5	19,4	19,1	18,1	19,9	26,5	26,6	26,1	28,1	27,2	*1,5*	*2,7*
Malta	16,6	16,5	15,9	13,9	12,2	14,4	13,1	13,8	14,2	13,9	*1,0*	*2,1*
Netherlands	9	9,4	7,5	7	6,3	7,7	8,7	7,6	9,5	11	*1,6*	*1,6*
Austria	9,7	10,3	9,1	8,7	8	10	8,8	8,3	8,7	:	*1,0*	*2,0*
Poland	39,6	36,9	29,8	21,6	17,2	20,6	23,7	25,8	26,5	27,3	*1,3*	*2,7*
Portugal	18,9	19,8	20,1	20,4	20,2	24,8	27,7	30,1	37,7	37,7	*1,8*	*2,3*
Romania	21	19,7	21	20,1	18,6	20,8	22,1	23,7	22,7	23,6	*1,2*	*3,2*
Slovenia	16,1	15,9	13,9	10,1	10,4	13,6	14,7	15,7	20,6	22,7	*2,2*	*2,2*
Slovakia	33,4	30,4	27	20,6	19,3	27,6	33,9	33,7	34	33,6	*1,6*	*2,4*
Finland	20,7	20,1	18,7	16,5	16,5	21,5	21,4	20,1	19	19,9	*1,2*	*2,4*
Sweden	20,4	22,6	21,5	19,2	20,2	25	24,8	22,8	23,7	23,4	*1,2*	*2,9*
United K.	12,1	12,8	14	14,3	15	19,1	19,6	21,1	21	:	*1,5*	*2,7*
Iceland	8,1	7,2	8,2	7,1	8,2	16	16,2	14,6	13,6	10,7	*1,5*	*2,0*
Norway	11,2	11,4	8,8	7,2	7,3	9,2	9,2	8,7	8,6	9,1	*1,3*	*2,6*
Turkey	:	17,4	16,4	17,2	18,4	22,7	19,7	16,8	15,7	:	*0,9*	*1,9*
United States	11,8	11,3	10,5	10,5	12,8	17,6	18,4	17,3	16,2	15,5	*1,5*	*2,1*
Japan	9,5	8,7	8	7,7	7,3	9,1	9,3	8,2	8,1	:	*1,1*	*1,9*
Russia	20.8	18.3	19.6	16.9	16.3	22.6	20.4	17.9	17.3	:	*1,0*	*3,1*

*Source: Eurostat and Rosstat (Russia). Notes: *: 2012/2007 ratio if 2013 not available; °(2012) for the same countries*

If we now focus on the YUR/TUR ratio (the last column of Table 2), we can see that the YUR is double the TUR in most countries; this is the mean situation in the EU, and in non-European countries. The best statistics for young people (compared to the TUR) can be found in Germany, where the YUR in 2013 was less than 8%. On the contrary, the worst situation is recorded in Luxembourg (3.4 ratio and 19.9% YUR in 2013), Italy (3.3, 40%), Romania (3.2, 23.6%), Russia (3.1, 17.3%), Sweden (2.9, 23.4%), Belgium (2.8, 23.7%), Czech Republic (2.7, 18.9%), Poland (2.7, 27.3%), United Kingdom (2.7, 21%). In absolute

terms, the highest YUR are those of Greece (58.6%), Spain (55.7%), Croatia (49.9%), Italy (40%). In Ireland, a country also deeply affected by the crisis, it is "only" 26.8%.

Although we have made, so far, many comparisons across countries, we must emphasize that there is a wide variation also within countries, especially in large ones. For example, in Italy unemployment has traditionally been much higher in Southern regions: in 2007, TUR was equal to 11% in the South compared to 6.1% for the country as a whole; in 2011 (the last available year for regional data) 13.3% and 8.4% respectively. In the case of YUR, the differences are similar, e.g. 39.2% in 2011 in the South of Italy and 29.1% in the whole country. The relative increase between 2007 and 2011 (last column of Table 3) appears smaller in the South: this is because the impact of the economic crises in such regions lagged, although it is more persistent over time.

If we consider some individual regions, the variation is even greater. As an example of "good" regions, we consider Lombardy, which the richest and most populated region in the North, although it is not the best from the point of view of unemployment (the regions in the North-East of the country perform even better). The worst region, from the point of view of unemployment, is Campania, a populous region in the South. In 2011, the TUR was equal in these two regions: 5.8% and 15.5% and the YUR to 20.7% and 44.4%, respectively. Despite these significant regional variations, we maintain that youth unemployment is a worrying problem in all regions of the country.

Also in Russia there are significant regional variations (Table 4), with the TUR as low as 1.5-1.7% in St. Petersburg and Moscow,and 13 per cent in the North Caucasus.

Table 3 - *Unemployment rate: regional differences in Italy*

	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**11/07**
Total unemployment	9,0	8,5	8,4	8,0	7,7	6,8	6,1	6,7	7,8	8,4	8,4	*1,4*
Lombardy	3,3	3,3	3,6	4,0	4,1	3,7	3,4	3,7	5,4	5,6	5,8	*1,7*
Campania	18,8	17,6	16,9	15,6	14,9	12,9	11,2	12,6	12,9	14,0	15,5	*1,4*
South of Italy	16,0	15,0	15,0	14,0	14,0	12,0	11,0	11,0	12,0	13,0	13,3	*1,2*
Youth unemployment	23,1	22,0	23,6	23,5	24,0	21,6	20,3	21,3	25,4	27,8	29,1	*1,4*
Lombardy	9,7	10,1	11,2	12,7	13,0	12,3	12,9	12,5	18,5	19,8	20,7	*1,6*
Campania	45,5	44,7	39,9	37,7	38,8	35,4	32,5	32,4	38,1	41,9	44,4	*1,4*
South of Italy	39,0	38,0	37,0	36,0	37,0	33,0	31,0	31,0	34,0	38,0	39,2	*1,3*

Source: Istat

Table 4 – *Total unemployment rate: regional differences in Russia*

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	13/04
The Russian Federation	7,8	7,1	7,1	6,0	6,2	8,3	7,3	6,5	5,5	5,5	*0,7*
Central Federal District	4,7	4,3	4,0	3,1	3,6	5,8	4,6	4,1	3,1	3,3	*0,7*
Northwestern Federal District	6,0	5,4	4,9	4,1	5,0	6,9	5,9	5,1	4,0	4,3	*0,7*
Southern Federal District	9,6	8,4	8,2	7,0	6,4	8,6	7,6	7,0	6,2	6,5	*0,7*
The North Caucasus Federal District	18,8	17,1	22,6	19,2	15,7	16,0	16,5	14,5	13,1	13,0	*0,7*
Volga Federal District	7,9	7,4	6,5	6,1	6,2	8,6	7,6	6,5	5,3	4,9	*0,6*
Urals Federal District	7,4	6,7	6,8	4,9	5,5	8,1	8,0	6,8	6,0	5,7	*0,8*
Siberian Federal District	9,9	9,3	8,7	7,6	8,3	10,5	8,7	8,1	7,1	7,2	*0,7*
Far Eastern Federal District	8,9	7,9	7,4	6,6	7,7	9,2	8,6	7,4	6,7	6,5	*0,7*
Moscow	1,6	0,8	1,6	0,8	0,9	2,8	1,8	1,4	0,8	1,7	*1,1*
St. Petersburg	2,7	2,2	2,4	2,1	2,0	4,1	2,6	2,0	1,1	1,5	*0,6*

Source: Rosstat

2. Factors explaining Youth Unemployment: a brief survey

Before analysing the youth unemployment problem and the literature on micro determinants of personal and family characteristics, we discuss the issue of unemployment in general. At the macro level we can identify three groups of variables[29]: cyclical conditions, structural variables, and the institutional framework.

The business cycle, measured for instance by the growth of output or GDP, is a key explanatory variable of labour demand, hence of employment and unemployment dynamics. The link between GDP growth and unemployment change is normally expressed through the Okun's law; changes in Okun's coefficients across countries and over time are generally explained by differences in institutions and policies (IMF, 2010). The highest impact of the crisis can be delayed up to three years and the persistence of effects is sometimes detected for up to five years.[30] The impact of GDP on unemployment can be amplified by systemic uncertainty, for instance after the events of the financial crises (Bartolucci et al. 2011). Some other macroeconomic variables that are significant in explaining unemployment dynamics

[29] Part of this discussion is better explained in Choudhry et al. (2013), where it is shown in the empirical section that YUR are particularly sensitive not only to economic growth, but also to variables such as economic freedom, labour market reforms, share of part time employment, and active labour market policies.

[30] With reference to previous financial crises, Choudhry et al. (2012), considering approximately 70 countries in the world, found that the crises' impact on YUR is significant and robust; youth unemployment increases until five years after a financial crisis, with the largest effects in the second and third years.

include productivity growth, trade openness, the terms of trade dynamics, the inflation rate and real (long-term) interest rates.

Structural variables include the trade specialisation of countries, the links between the financial structure and real economic activities, the degree of competitiveness. In broader terms, structural variables also include demographic variables such as population density, the age structure of population, and migration flows.

A third group of variables comprises the institutional determinants, whose importance has been long recognized (Nickell and Layard, 1999). They include regulation and policies concerning product markets (liberalisations, reforms, "economic freedom", etc.), housing markets (incidence of home ownership and housing policies), and more specifically labour markets. Some specific variables are the degree of unionisation (union density and union coverage), the structure of collective bargaining (degree of coordination and/or centralisation), employment protection legislation (EPL), incidence of temporary (or part-time) contracts, labour taxes, unemployment benefits and active labour market policies.[31] Notice that reforms in labour and product markets are mutually reinforcing, justifying comprehensive reform programmes; moreover, improvements in labour market performance require reforms in more than one area of the labour market (Bassanini and Duval, 2009).

According to OECD (2006), two-thirds of non-cyclical unemployment changes are explained by changes in policies and institutions. The traditional OECD view (since the *Jobs Studies* of the 1990s) is that the weak employment performance in many European countries can be explained in terms of labour market rigidities and inappropriate policies or institutions. A progressive shift of resources, from passive income support to active measures, was therefore advocated.

If we now analyse the specific issue of youth unemployment, first of all it should be observed that YUR are more sensitive to the business cycle than adult unemployment rates. According to many studies, there is a disproportionately large response in youth employment or unemployment to changes in overall unemployment (Blanchflower and Freeman, 2000). Also following the recent crisis and the Great Recession, the young have suffered

[31] The key roles of active labour market policies (ALMP) and unemployment benefits in the explanations of changes in both employment and the unemployment rate are confirmed by the empirical analysis of Destefanis and Mastromatteo (2010).

disproportionately: see e.g. Bell and Blanchflower (2011)[32] and Bruno et al. (2014). In particular, the rate of transition of youth from unemployment to employment fell dramatically, which is well documented in the case of Ireland, by Kelly et al., 2013.

However, the worse youth labour market performance, compared to adults, can be explained by more specific elements. First, a lower level of human capital. This explains the wide differences existing within the young group, OECD (2005) found that young people with low human capital and few skills are more exposed not only to higher YUR, but also to long-term unemployment, unstable and low quality jobs, and perhaps social exclusion. Although young people generally have higher education than older workers, often they lack other components of human capital, like generic and job-specific work experience.[33] In fact, the youth experience gap harms the employability of young people; an "experience trap" happens when employers select workers with experience, hence labour-market entrants are never hired and so cannot increase their experience.

From this point of view, some other determinants become important. First of all, the quality of the educational system and its structure: it seems that "dual apprenticeship systems", like the German one, guarantee better outcomes. Secondly, the school-to-work transition system (STWT)[34] is relevant, particularly to facilitate "good matches"; in fact, a possible cause of high youth unemployment and low quality employment is the mismatch between the knowledge acquired through formal education and the skills required by the labour market (young workers are generally less efficient in job search activities than adults)[35]. Thirdly, labour market institutions are also important for young workers: for example, the impact of unemployment benefits, labour taxes, minimum wages, employment protection legislation.

A crucial variable is the diffusion of temporary contracts: not only during recessions are young workers generally among the first to lose their jobs (especially in countries with the

[32] In this study, the sensitivity of YUR to adult rates, for the Oecd countries in the 1970-2009 period, is estimated equal to 1.8.
[33] In fact in some countries (Belgium, Italy, and a number of eastern European states) unemployment rates among graduates have sometimes been higher than those with a secondary qualification.
[34] Appropriate "school-to-work" transition services are fundamental to break up the work experience trap, See Caroleo and Pastore (2007), Quintini and Manfredi (2009), Pastore (2012b) and Formez (2012).
[35] An incentive to restrict their job search activity is given by the willingness of parents to support their children, should they not find work.

highest EPL on "permanent contracts"), but labour hoarding practices can further reduce the labour demand for young people.[36] Thus, because of a reduction in labour demand, school-leavers compete with more jobseekers for fewer vacancies and youth unemployment increases and becomes persistent over time: this is the risk of a "lost generation" (Scarpetta et al., 2010). Moreover, not only are the young more often unemployed (or in the NEET group), but even when employed they are frequently underemployed, in the sense of more likely working part-time (even though they would prefer full-time), or under temporary contracts rather than permanent ones (Bell and Blanchflower, 2011). In many cases, an increase in youth unemployment is also accompanied by a decline in labour participation (due to the "discouraged worker effect") or intensified emigration flows.[37]

Recent policies have been undertaken at the EU level in support of youth employment. The new "Youth opportunity initiative" (European Commission, 2010) is designed to prevent early school leaving, help young people in developing skills relevant to the labour market, assisting them in finding a good first job and ensuring on-the-job training. In particular, the "Youth Guarantee Recommendation" (agreed by the EU Council of Ministers in 2013) requires Member States to put in place measures to ensure that young people up to age 25 receive a good quality offer of employment, continuing education, an apprenticeship or a traineeship within four months of leaving school or becoming unemployed (Eurofound, 2012).

Before considering the individual and family determinants of youth unemployment, we recall that there are few investigations of unemployment and youth unemployment at a regional level. Marelli et al. (2012) show that regional unemployment differentials are wide and persistent and low unemployment regions tend to cluster close to each other; in addition, such differentials show a clear core-periphery pattern. With specific reference to YUR, we mention Demidova et al. (2013) concerning the Russian regions and Demidova et al. (2014) regarding both Italian and Russian regions; in both studies, the use of distance matrixes allows an analysis of the role played by spatial effects. A feature of the Russian labour market

[36] In many countries, for example in Italy, practically all new employment opportunities in the recent period have been temporary (O'Higgins, 2012).

[37] In some countries like Ireland the age-selective emigration may have reduced, after the crisis, the youth–adult unemployment ratio.

is its overall flexibility, both in terms of working time and pay; this flexibility comes from the willingness and ability of both employers and employees to curtail their exposure to formal rules and rely on informal arrangements (Gimpelson et al., 2010).

In Italy, there is a dichotomy of the labour market between the Mezzogiorno regions, i.e. the South and the two islands, where unemployment rates are much higher, activity rates very low, together with the presence of informal activities (or the "black" economy), and the remaining regions of the country (in the North and Central Italy).[38] In Russia, both North-South and East-West divisions have been considered (see the two papers by Demidova et al. mentioned above), although the second type of geographical division is more common. In addition to such divides, other types of polarisation can be detected, for instance contrasting the urbanised centres (especially Moscow) to the rural regions, affected by economic and demographic decline; and the low interregional mobility in Russia (Shilov and Möller, 2009).

Let us now turn to the microeconomic determinants of unemployment, with reference to personal or family characteristics. The econometric investigations making use of micro-data are not numerous, but they are increasing over time. They use either large samples of cross-sectional units or longitudinal data. While a specific application to Italian and Russian data will be made in the next sections, we provide here some examples of empirical investigations making use of micro-data.

Kostoris and Lupi (2002) investigated Italy's unemployment.[39] In addition to the probability of unemployment, they estimated the probability of participation in the labour force and the probability of long-term unemployment. In particular, they found—by means of standard logit models—that youth unemployment strongly depends on family income and wealth; this is particularly true for first-job seekers (but there is no significant relation in case of "strictly unemployed"). Moreover, the probability of unemployment decreases if the families have their own businesses. Education seems to have the opposite effects for the first-job seekers and strictly unemployed: low school degrees increase the risk of unemployment

[38] A recent paper by De Sanctis (2008) focuses on youth employment and unemployment and compares the situation of Mezzogiorno with that of other European regions. Notice that Southern regions have been especially hurt by the recent crisis. However Pastore (2012c) found that that high unemployment regions have a higher, not a lower rate of reallocation; this is because they especially suffer from high job destruction, rather than from low job creation. Thus economic policies should be targeted at increasing labour demand and raising the competitiveness of such regions.

[39] They used micro-data from Bank of Italy's surveys on households' income.

only for the second group. Finally some regional and local variables (average regional per-capita income, local fiscal burden, local public-to-total employment ratio, size of the town of residence, etc.) turn out to be significant.

Caroleo and Pastore (2003) investigated the youth labour market participation decisions in a selection of European countries. The analysis focuses on Spain and Sweden, two countries with rigid and flexible sequential STWT systems respectively, with training following education, and Germany as the best example of a dual educational and training system. They estimated, through multinomial logit estimates, the probability of belonging to one of the five different labour market statuses: unemployed, employed, in training, in education and inactive. Despite significant differences between the three countries, they found little evidence for the positive role of training programmes in increasing the employability of young participants. The subsequent study by Pastore (2012a) focuses on the probability of finding employment in a sample of young adults in Poland, by making use of Heckman probit estimates and controlling for the possible selection bias (in fact employment/joblessness and investment in education are not independent choices). He found that regional characteristics may also be important: in high unemployment areas young people prefer to seek a job rather than study.

A joint consideration of personal characteristics and macroeconomic conditions can be found in Hérault et al. (2012), analysing employment outcomes and school-to-work transition of young people in Australia (for the period 1985-2008). They used longitudinal data from two different national surveys and employed a multinomial logit specification. The most important finding is that young men who did not complete secondary school suffered the largest increase in unemployment risks as the unemployment rate increased (on the contrary for females the main impact is an increase in part-time work); overall, the effects of the unemployment rate appear to be more important for youth performance than those of GDP growth.

Bell and Blanchflower (2011) argued that young people aged 16–24 have suffered disproportionately during the recent Great Recession. For the EU-27 countries they used data from the Eurobarometer surveys (February 2008-February 2010) including 88,000 observations. They found that unemployment rates tend to be higher among the less educated

young.[40] Finally, Dolado et al. (2013), by using cross-country econometric evidence from different micro-datasets, focused on the labour market characteristics and determinants of youth unemployment in Spain, together with some other key youth labour market dimensions (wages, decisions to work and study, mobility, type of employment contract, time to find a first job, skill mismatches).

The most commonly used personal variables in this type of studies are: gender, age, health conditions, family status (single or married, being head of household, number of children, young adults still living with their parents i.e. cohabitation choice), education level (e.g. primary school, secondary school or tertiary education), nationality (country of origin or immigrant status)[41]. In case of individuals who have previously worked, the most recent industry of employment is in some cases taken into account; perhaps jointly with occupation or profession. In other cases, especially regarding recently graduated students in search of their first job, the school-to-work transition procedures and methods of job search (e.g. employment service, asking a friend.) are analysed.

The most frequently used family variables are family income (disposable income is more often employed) and other family characteristics or socioeconomic background (e.g. parental education and employment status); wealth variables are sometimes considered, although information about the house is more easily obtainable (e.g. number of rooms, area, available services, presence of computers or use of internet). The location of the household is also important, with particular reference to urban or rural locations. More generally, the region of residence plays a key role, provided the previously mentioned regional differentiation in unemployment rates.

3. The role of individual determinants: the data sets used and descriptive statistics

[40] In this study they focus not only on the determinants, but also on the consequences of youth unemployment, including the long-run effects. Through another investigation on micro data, they show – making use of a continuing longitudinal study that seeks to follow the lives of all those living in Great Britain and various measures of "wellbeing" (life satisfaction, health status, mental health, job satisfaction) – that youth unemployment continues to hurt even two decades later; however, spells of unemployment experienced after age 23 have little bearing on later well-being.

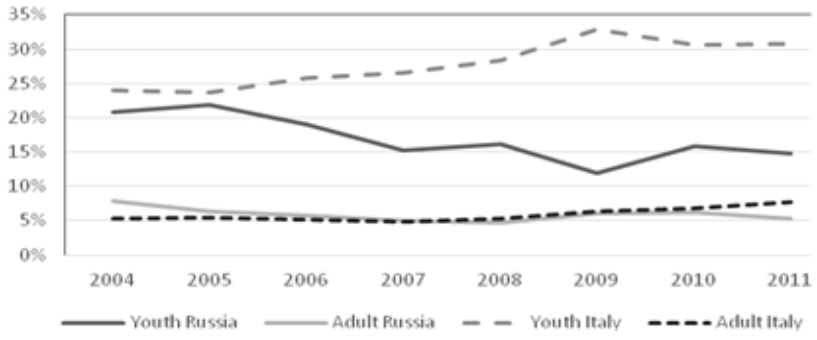
[41] In the case of Germany, the country with the best youth performance (see section 2), Burkert and Siebert (2007) found that "compared to Germans, migrant men and especially migrant women have a higher risk of unemployment and occupational mismatch".

For our empirical analysis, concerning the period 2004-2011, we consider two source of data: RLMS-HSE data for Russia and EU-SILC[42] for Italy. We selected observations relating to youth aged 15-24 and, for comparison purposes, adults aged 25-60 for Russia and 25-64 for Italy as these countries have different retirement ages and different definition of "working age". We analysed the 2004-2011 period for both countries. Our main variable of interest is the employment status of the respondents, among the "active people". We use ILO definition to determine unemployed persons.

Figure 1 shows the dynamics of the unemployment rate which we calculated using sample data for Russia and Italy. Macro level data shows the YUR is much higher for Italy than for Russia. At the end of the period the YUR in Italy is twice that of Russia, 30 and 15% respectively. Adult unemployment rates are similar for both countries and much lower than the YUR.

Table 5 presents descriptive statistics for our samples, separately for Russia and Italy and youth and adults. The unemployment rate for adults is 5% and 6% in Russia and Italy respectively while the YUR is 15% and 27% respectively.

Figure 1. Unemployment rate in Russia and Italy among youth and adult people.



Note: Authors calculation using RLMS-HSE (Russian database) and EU-SILC (Italian database).

The average age of the youth in the Russian and Italian databases is similar: 21 years. However, for adults the mean age in the sample for Italy is higher (due to the different retirement age). The share of men in the Russian sample is lower than in the Italian sample for both youth and adults. The share of young people with tertiary education is higher in Russia

[42] Istat, Indagine sulle condizioni di vita (UDB IT - SILC). This is a survey carried out in the EU countries according to a common methodology. Only the A. (of course not Istat) is responsible for the elaborations in this paper.

(15%) than in Italy (9%). This fact could be explained by differences in their education systems. In Russia people graduate from University at 22; in Italy it is higher (also because fewer students complete their graduate studies within the standard university period). However, the share of adults with higher education is similar for both countries, while the number of people with secondary education is higher for Italy both for young and adults. There is a huge difference in youth marital status between Russia and Italy; in Russia the incidence of married individuals is much bigger: 30% compared to 4% in Italy. This is due to national and cultural traditions.

However, there are no significant differences in marital status among adults. Considering further personal characteristics, young people of both countries have good health: only 1-2% of them have bad health. Around 80% of individuals in Russia live in urban areas and 33-36% in Italy. Approximately 70% of Russian youth own a computer; the same figure can be found for Italy. However, only 30% of the Russian adults have a computer while the corresponding figure is 70% for Italy.

There are also some household characteristics in Table 5, such as housing size, the number of household members and family disposable income (computed as a ratio to average family income in the sample). This ratio of disposal incomes is similar for both countries. In Russia the average housing per household member is 10,6 square meters for youth and 12,2 for adults. The number of rooms per household is approximately 3,5 in Italy. Average number of household members is three in Russia. This data is not available for Italy. About 20% of the Russian respondents were not born in Russia. In Italy this figure is less than 7%.

Table 5. Descriptive statistics in our sample.

Variables	Russian Federation				Italy			
	Youth		Adult		Youth		Adult	
	Mean	Std.dev.	Mean	Std.dev.	Mean	Std.dev.	Mean	Std.dev.
Share of unemployed	0,15	0,36	0,05***	0,21	0,27	0,45	0,06***	0,23
Age	21,48	2,01	42***	9,87	21,63	1,95	42***	9,64
Male (share)	0,51	0,50	0,45***	0,50	0,59	0,49	0,58**	0,49
Secondary education (share)	0,30	0,46	0,28***	0,45	0,56	0,50	0,41***	0,49
Tertiary education (share)	0,15	0,36	0,27***	0,45	0,09	0,29	0,23***	0,42
Married (share)	0,30	0,46	0,74***	0,44	0,04	0,19	0,63***	0,48
Urban (share)[43]	0,79	0,41	0,77**	0,42	0,33	0,47	0,36***	0,48
Bad health (share)	0,02	0,13	0,06***	0,23	0,01	0,09	0,03***	0,17
Housing per household member[44]	10,59	5,52	12,19***	7,02	3,59	1,09	3,62**	1,13
Number of household members	3,45	1,45	1,11*	1,56			1,14***	
Family disposable income[45]	1,13	0,91	0,49***	0,95	1,09	0,69	0,70	0,83
Computer (share)[46]	0,74	0,44	0,18**	0,50	0,70	0,46	0,07***	0,46
Foreign nationality (for Russia) or citizenship (for Italy)	0,15	0,36	0,08	0,34	0,06	0,24		0,21
Moscow (share)	0,09	0,28	0,03	0,28				
St. Petersburg (share)	0,03	0,18		0,18			0,27***	
South of Italy (share)[47]					0,33	0,47	0,06***	0,44
Number of observations[48]	4330		26695		11635		155182	

Note: Significance of test of equal means between adult and youth in each country: *** p<0.01, ** p<0.05, * p<0.1.

4. Econometric estimation and results

[43] For Italian data it is the variable DB100 (Degree of urbanization) in EU-SILC. This dummy variable equals 1 for the densely populated area and 0 for the intermediate area and thinly populated area. For Russia this variable equals 1 for urban areas and 0 otherwise.

[44] For Italian data this variable means number of rooms for household. For Russian data it is housing in square meters per household member.

[45] Family disposable income is considered as the ratio of nominal family income to average income in the sample by the year (therefore we also adjust for effects of inflation). In Russia it is measured in rubles per household members. In Italy disposable income is measured in euros per family.

[46] This is the share of people in the sample who owns a computer.

[47] It includes both Southern regions and the two islands (i.e. Mezzogiorno's regions in a broad sense).

[48] Number of observations for Russia is for all variables except variable nationality. Not all people answered for these questions. The number of observations for these variables are presented in Table 7.

In this paper we model the probability being unemployed for youth and adults. We start using binary choice models. The main specification is written as:

$$P\left(Y_i = 1 \middle| X\right) = F\left(x_i'\beta\right) \quad (1)$$

where $F(\cdot)$ is a normal distribution function. $Y_i = 1$ if a person is unemployed and 0 otherwise. It is so when latent variable y_i^* in latent equation $y_i^* = x_i\beta + u_{1i}$ is greater than zero. Therefore, $Y_i = 1 \; if \; y_i^* > 0$. x_i is the vector of explanatory variables, and β is the vector of estimated coefficients. Therefore, we consider a probit model. However, in this case there is sample selection problem, because not all people are active in the labour market.

To take into account the non random selection of labour participation for both groups we estimate probit model with a correction for sample selection (Heckman Probit).[49] The binary outcome (1) will be observed only when the individual is active. Therefore, the selection equation is:

$$y_i^{select} = \left(z_i\beta + u_{2i} > 0\right) \quad (2)$$

where $y_1^{select} = 1$ when the individual is active in the labour market. We suppose, that the error terms are, from equation (1) $u_{1i} \sim N(0,1)$, and from equation (2) $u_{2i} \sim N(0,1)$, and $corr\left(u_{1i}, u_{2i}\right) = \rho$. If $\rho = 0$ then we can reject non-random selection and we do not need to correct for selection. We test this hypothesis using Likelihood ratio test.

To estimate equations (1) and (2) we use the maximum likelihood method. Our explanatory variables for both equations are individual characteristics of the people in the sample (age, gender, education level, marital status, health, having a computer); the characteristics of households (disposable household income, housing size); the characteristics of location (urban area, unemployment rate in the region); time effects which control for macro conditions and the crisis effect. However, we use unique variables for the selection equation, which is the probability of being inactive in the labour market, such as student status and disability.

For the quantitative interpretation and comparisons between countries, we estimated the average marginal effects accounting for the fact that most of our variables are dummies. The average partial effect for the Heckman probit model is $APE_{x_k} = \sum_{i=1}^{N} \frac{\partial P\left(Y_i = 1 \middle| x_i, y_i^{select} = 1\right)}{\partial x_k} \Big/ N$ for continuous variables. We multiply the average marginal effects by the standard deviation of the corresponding regressor x_k $\left(APE_{x_k} \cdot \sigma_{x_k}\right)$[50] in order to measure the significance of the variables, characterizing the degree of influence of

[49] For recent empirical investigations making use of this methodology, see Kogan (2010), Pastore (2012a), Addabbo et al. (2013).

[50] Something similar was in (Peresetsky, 2007) and (Peresetsky et al., 2011). However, the author multiply coefficients from probit model on standard deviation of regressors.

the variable on the probability. The larger absolute value of $APE_{x_k} \cdot \sigma_{x_k}$, the larger the contribution of the standard deviation change of the variable x_k to the probability of being unemployed (equation 1). For discrete variables the average partial effect is the difference in conditional probabilities of being unemployed for different values of the dummy variable, i.e. $APE_D = \sum_{i=1}^{N} \left[P\left(Y_i = 1 \middle| x_i, D_i = 1, y_i^{select} = 1\right) - P\left(Y_i = 1 \middle| x_i, D_i = 0, y_i^{select} = 1\right) \right] \Big/ N$.

We estimate equation (1) and (2) separately for both groups in Russia and Italy. In fact, we tested the significance of no differences between the youth and adults for both countries and we can reject such a hypothesis at any significance level (Table 12 in Appendix).

5.1. **Econometric results for Italy**

The econometric results for Italy are presented in Table 6. Columns 1- 3 present the results for young people. Columns 4-6 present results for adults. We consider two types of models: probit (model 1) and Heckman probit (model 2). The selection equation (model 3) represents the probability of being active in the labour market.

First of all, we can see that the signs and significance of the coefficients are exactly the same for youth and adults (column 1, 2 and 4, 5 respectively). However, the correlation between unemployment and the selection equation, rho is significant for both groups. Therefore, it is important to control for non random selection and let us now focus on results for Heckman probit (model 2).

Firstly, we consider our main equation of interest, the unemployed equation. We can see that the **age** variable is highly significant for young people. The coefficient is negative, this means that probability of being unemployed decreases with age. For adults, the relationship between the probability of being unemployed and age is nonlinear, it is U-shaped. However, the threshold is 68.5 years, which is out of our sample. There is a significant and negative coefficient for **male**, i.e. women have a higher probability of being unemployed than men. However, the probability of being active is also higher for males for both age groups.

Marital status is also significant for both the youth and adults: the probability of being unemployed is lower for married people. This can be explained by the fact that married people are more motivated to find a job (moreover, especially in Italy, young people who are "single" often live with their parents and are maintained by them if unemployed). **Bad health** leads, as expected, to higher a probability of being unemployed. If the person owns a **computer**, the probability of being unemployed decreases. This fact is associated with the education level of the person and the income level.

We obtained a significant coefficient for the secondary and tertiary **education** for adults. Higher education reduced the probability of being unemployed. However, for youth secondary education level increases the probability of being unemployed, and tertiary education is insignificant; for adults the opposite holds. A possible explanation is that less educated young people have a longer period, in the 15-24 age interval, to search for (and successfully find) a job; graduated individuals have at the best one or two years to search for (and find) a job: the probability of being unemployed consequently increases.[51] Another possible explanation is that highly educated people are frequently "choosy", i.e. tend to reject uninteresting offers or proposals not matching their skills and capabilities. Higher education decreases the unemployment risk for adults.

Table 6. *Probit (model 1) and Heckman probit (model 2) for Italy, 2004-2011. Youth: 15-24 age. Adult: 25-64 age.*

VARIABLES	**Youth**			**Adult**		
	Unemployment equation		Selection	Unemployment equation		Selection
	model 1	model 2	model 2	model 1	model 2	model 2
	(1)	(2)	(3)	(4)	(5)	(6)
Student			-2.325***			-0.971***
			(0.024)			(0.016)
Age	-0.117***	-0.139***	0.914***	-0.092***	-0.137***	0.282***
	(0.007)	(0.008)	(0.085)	(0.006)	(0.009)	(0.003)
Age2			-0.018***	0.001***	0.001***	-0.004***
			(0.002)	(0.000)	(0.000)	(0.000)
Disability	-0.071	-0.026	-0.181***	0.173***	0.204***	-0.230***
	(0.077)	(0.076)	(0.052)	(0.022)	(0.022)	(0.011)

[51] From this point of view, the age group 15-24 is misleading in the case of Italy (15-29 or 15-34 would be better). On the other hand, for many other control variables, this group is satisfactory; moreover, it is convenient to maintain the same age intervals for Italy and Russia.

Male	-0.118***	-0.171***	0.283***	-0.252***	-0.378***	0.903***
	(0.029)	(0.029)	(0.021)	(0.013)	(0.025)	(0.007)
Secondary education	0.066**	0.056*	0.026	-0.242***	-0.286***	0.361***
	(0.032)	(0.032)	(0.024)	(0.015)	(0.016)	(0.008)
Tertiary education	0.062	0.051	0.082*	-0.174***	-0.255***	0.641***
	(0.057)	(0.056)	(0.042)	(0.018)	(0.023)	(0.010)
Married	-0.394***	-0.278***	-0.587***	-0.295***	-0.267***	-0.165***
	(0.082)	(0.081)	(0.051)	(0.014)	(0.015)	(0.008)
Urban area	0.262***	0.274***	-0.043**	0.147***	0.153***	-0.062***
	(0.030)	(0.030)	(0.022)	(0.013)	(0.013)	(0.007)
Housing	0.056***	0.067***	-0.059***	0.012*	0.016***	-0.035***
	(0.014)	(0.014)	(0.010)	(0.006)	(0.006)	(0.003)
Bad health	0.438***	0.587***	-0.797***	0.290***	0.361***	-0.437***
	(0.160)	(0.157)	(0.095)	(0.034)	(0.035)	(0.016)
Household income	-0.686***	-0.689***	0.116***	-0.520***	-0.536***	0.185***
	(0.029)	(0.029)	(0.013)	(0.014)	(0.014)	(0.005)
Computer	-0.172***	-0.156***	0.036	-0.144***	-0.150***	0.077***
	(0.033)	(0.032)	(0.025)	(0.014)	(0.014)	(0.008)
Unemployment rate	0.005***	0.006***	-0.005***	0.071***	0.074***	-0.031***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)
Constant	2.159***	2.804***	-10.315***	0.992***	2.037***	-5.080***
	(0.171)	(0.179)	(0.869)	(0.117)	(0.214)	(0.061)
+ time effects						
Observations	9,940		32,978	126,578		194,068
Uncensored observations		9,940			126,578	
Rho			-0.342***			-0.291***
			(0.040)			(0.050)
LR test (independent equations) (rho = 0), chi(1)			75.03			32.29
Log likelihood	-5206.36		-15035.02	-23597.02		-116239.6
Wald chi2(19)	1464.34		1416.80	10106.19		8525.70
% of correctly predicted (cut off 0.2)	85.73	86.01		32.36	32.46	

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The probability of being unemployed is higher for more densely populated areas. The coefficients for the variable **urban** are significant and positive for both youth and adults. This can be explained by labor supply behavior: many people migrate to urban areas to search for a job.

As to **housing** conditions, such as the number of rooms, it is significant and positive for both youth and adults. Disposable household **income** (with respect to the average in the

sample by the year) is highly significant and has negative coefficients for both age groups. Therefore, respondents from rich families have a higher probability of being employed.

To take into account the macroeconomic conditions, in our model we also control for regional specific features, such as the regional **unemployment rate**[52]. For both groups, this variable is significant and has a positive sign. Therefore, if the average unemployment rate in the region is higher, the probability of being unemployed is higher too. There were significant coefficients for the **time dummies** after the 2007 year (not reported in the table). This clearly reflects the impact of the recent crisis. All coefficient for the 2008-11 years are significant and positive for both youth and adults. Therefore, the probability of being unemployed is much higher in the crisis period.

To test the quality of the estimated Heckman probit models, we estimated the percent of correctly predicted outcomes for a given cut off of 0.2. For youth the percent correctly predicted is higher than for adults, 86% and 32% respectively (see last row of Table 6). The reason is because the number of unemployed is higher for young people, therefore the model can better predict unemployment for them.

If we consider the selection equation (model 3), we can see that most of the variables which are significant in the unemployment equation, are also significant in the selection equation. However, they have the opposite sign, because they estimate the effect of the explanatory variables on the probability of being active in the labor market. Only marital status has the same sign in both equations. If the individual is married than the probability of being active is lower; this may be explained by the behaviour of women: in many Italian regions (especially in the South) they do not look for jobs if married.[53] The student status is intentionally included only in the selection equation: it is significant for both age groups and is negative. This means that the probability of being active is lower—as expected—when the individual is a student.

[52] We consider 5 regions (Nuts-1 level of Eurostat) for Italy. We use the regional youth unemployment rate for youth people (15-24 age) and the regional total unemployment rate for the adult.

[53] On the other hand, if they do look for jobs, they are more likely to find them, perhaps due to more intensive search efforts (this explains the negative sign in the unemployment equation).

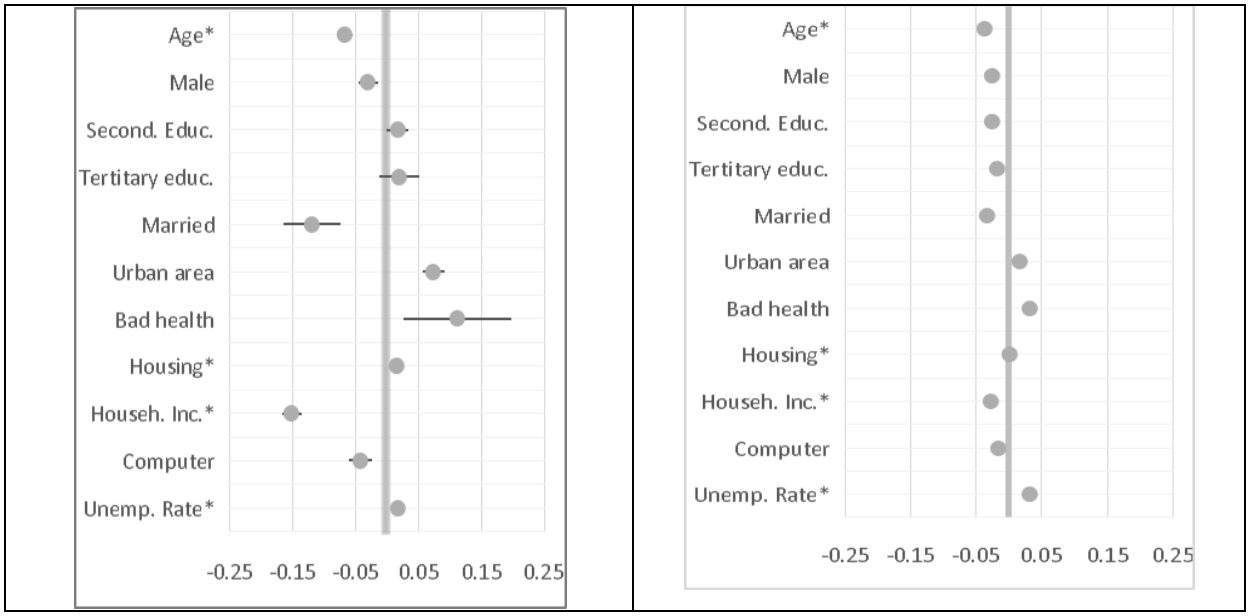
We also control for immigrants (Table 8 in Appendix). Our results show that **immigrants** have a smaller chance of being unemployed if they are young: this can be explained by the fact that young people decide to migrate to Italy only if they have a chance to find a job (the coefficient is not significant for adult individuals). Finally, Table 9 in Appendix presents the results differentiated by gender.

Figure 2 presents a graphical representation of average partial effects (APE), which we discussed above. We compare, for the different regressors, the marginal effects for youth and adult individuals. In general, we find that APEs are much higher for young individuals than for adults. Therefore, considering almost all regressors, they are more significant for the youth. However, the macro level variable, unemployment rate, has a higher influence on the probability of being unemployed for adults.

Considering the individual regressors, APE of the variable urban is higher for youth. The household income, marital status and bad health have the most significant effect on the probability of being unemployed for young people: an increase of household income by one standard deviation decreases the probability of being unemployed by 0.15. Bad health decreases the probability of being unemployed by 0.11 and marital status decreases this probability by the same value. An increase in age by one standard deviation raises the probability of being unemployed by approximately 0.07 for the youth and 0.04 for the adult. Therefore, age is more critical for young individuals.

Figure 2. Comparison of APE and their confidence intervals for youth and adult unemployed in Italy.

Youth	Adult



Note: * is for continuous variables.

5.2. **Econometric results for Russia**

The econometric results for Russia are presented in Table 7. Columns 1-3 show the results for young people and the other columns for adults. First of all, we compare results for probit (model 1) and Heckman probit (model 2). The selection equation (model 3) refers to the probability of being active.

An important difference between the two models (1 and 2) is found only for the secondary education variable, for youth unemployment, and for the regional unemployment rate for adult unemployment. These variables are insignificant in the unemployment equation with selection. All other variables have the same signs and significance for both types of models. However, the correlation between disturbances in the selection and in the unemployment equation are significant. Therefore, we discuss below the results of the Heckman probit model.

Table 7. *Probit (model 1) and Heckman probit (model 2) for Russia, 2004-2011. Youth: 15-24 age. Adult: 25-60 age.*

VARIABLES	**Youth**			**Adult**		
	Unemployment equation		Selection	Unemployment equation		Selection
	model 1	model 2	model 2	model 1	model 2	model 2
	(1)	(2)	(3)	(4)	(5)	(6)

Student			-2.088***			-1.917***
			(0.046)			(0.180)
Disability			-0.577***			-0.994***
			(0.119)			(0.035)
Age	-0.146***	-0.055***	0.720***	-0.010***	-0.010***	0.178***
	(0.014)	(0.014)	(0.117)	(0.002)	(0.001)	(0.008)
Age2			-0.014***			-0.002***
			(0.003)			(0.000)
Male	0.018	0.072	0.251***	0.151***	0.182***	0.378***
	(0.050)	(0.048)	(0.036)	(0.028)	(0.028)	(0.020)
Secondary education	-0.134**	-0.060	0.140***	-0.122***	-0.099***	0.224***
	(0.060)	(0.058)	(0.045)	(0.035)	(0.034)	(0.023)
Tertiary education	0.080	0.116	0.115	-0.110***	-0.082**	0.308***
	(0.086)	(0.083)	(0.076)	(0.039)	(0.039)	(0.028)
Married	-0.161***	-0.170***	-0.226***	-0.044	-0.052	-0.174***
	(0.060)	(0.057)	(0.046)	(0.033)	(0.032)	(0.023)
Urban area	0.014	0.051	0.377***	0.103***	0.123***	0.213***
	(0.062)	(0.058)	(0.043)	(0.034)	(0.033)	(0.022)
Bad health	0.120	-0.049	-0.362***	0.253***	0.157***	-0.412***
	(0.175)	(0.167)	(0.115)	(0.053)	(0.056)	(0.032)
Housing	0.003	0.003	0.002	-0.003	-0.003	0.006***
	(0.005)	(0.004)	(0.003)	(0.002)	(0.002)	(0.001)
Household income	-0.311***	-0.266***	0.113***	-0.281***	-0.270***	0.157***
	(0.038)	(0.037)	(0.022)	(0.024)	(0.024)	(0.014)
Computer	0.120*	0.081	0.330***	-0.162***	-0.123***	0.409***
	(0.063)	(0.060)	(0.046)	(0.034)	(0.034)	(0.024)
Unemployment rate	0.018***	0.012**	-0.030***	0.010**	0.006	-0.040***
	(0.007)	(0.006)	(0.004)	(0.005)	(0.005)	(0.003)
Constant	2.179***	-0.056	-8.168***	-0.979***	-1.046***	-2.431***
	(0.301)	(0.316)	(1.166)	(0.092)	(0.091)	(0.180)
+time effects						
Observations	4,330		9,350	26,695		31,553
Uncensored observations		4,330			26,695	
Rho			0.842***			0.453***
			(0.072)			(0.128)
LR test (independent equations) (rho = 0), chi(1)			179.06			15.89
Log likelihood	-1684.43		-4750.91	-4744.01		-15972.4
Wald chi2(18)	331.46		112.34	472.84		353.89
% of correctly predicted (cut off 0.2)	51.28	44.78		0.08	0.4	

Note: Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Firstly, we consider individual characteristics. There is significant result for **age**, which has a negative coefficient for both age groups, as in Italy. There is no significant nonlinear

relationship between age and the probability of being unemployed. However, there is nonlinearity by age in the selection equation for youth and adult individuals. **Gender** is significant only for adults and the probability of being unemployed is higher for men. However, gender is significant in the selection equation for both age groups and the "male" variable has a positive sign. Therefore, the probability of being active in the labour market is higher for men. For young people both **education** proxies are insignificant; on the contrary, for adults both education levels are significant and have a negative sign. **Marital** status is significant only for youth, showing a reduced probability of being unemployed if married, as in Italy. Bad **health** is significant for unemployment only for adults. The presence of a computer is a significant factor only for adults: it decreases the probability of being unemployed.

Secondly, we analyzed **region** specific features. The probability of being unemployed is higher in **urban areas** for adults. A possible reason is the operation of labour supply effects: people move to urban areas to search for jobs. The average **unemployment rate**[54] in the region increases the probability of being unemployed for youth and reduces the probability of being active for both age groups. Among the various household characteristics, only disposable **household income** is highly significant and has a negative coefficient, as in Italy. For Russia, too, we find significant **time effects** (with negative signs in the crisis period), however not all year dummies are significant.

The variables in the selection equation have opposite signs compared to the unemployment equation for both Russia and Italy. Two specific variables have been intentionally included only in the selection equation: disability and student status; both of them are significant and have negative sign for both age groups.

The percentage of correctly predicted outcomes (unemployed individuals) in Russian models is lower than for Italy. That is due to the lower number of unemployed people in the sample. It is 44.4% for the youth unemployment model and only 0.4% for the adult one. Therefore, the model has low predictive power for adult unemployment in Russia.

[54] We consider all regions of Russia which are included in RLMS-HSE data. We use the regional youth unemployment rate for the youth (under 29 years) and the total unemloyment rate for the adult.

Figure 3. Comparison of APE and their confidence intervals for youth and adult unemployed in Russia.

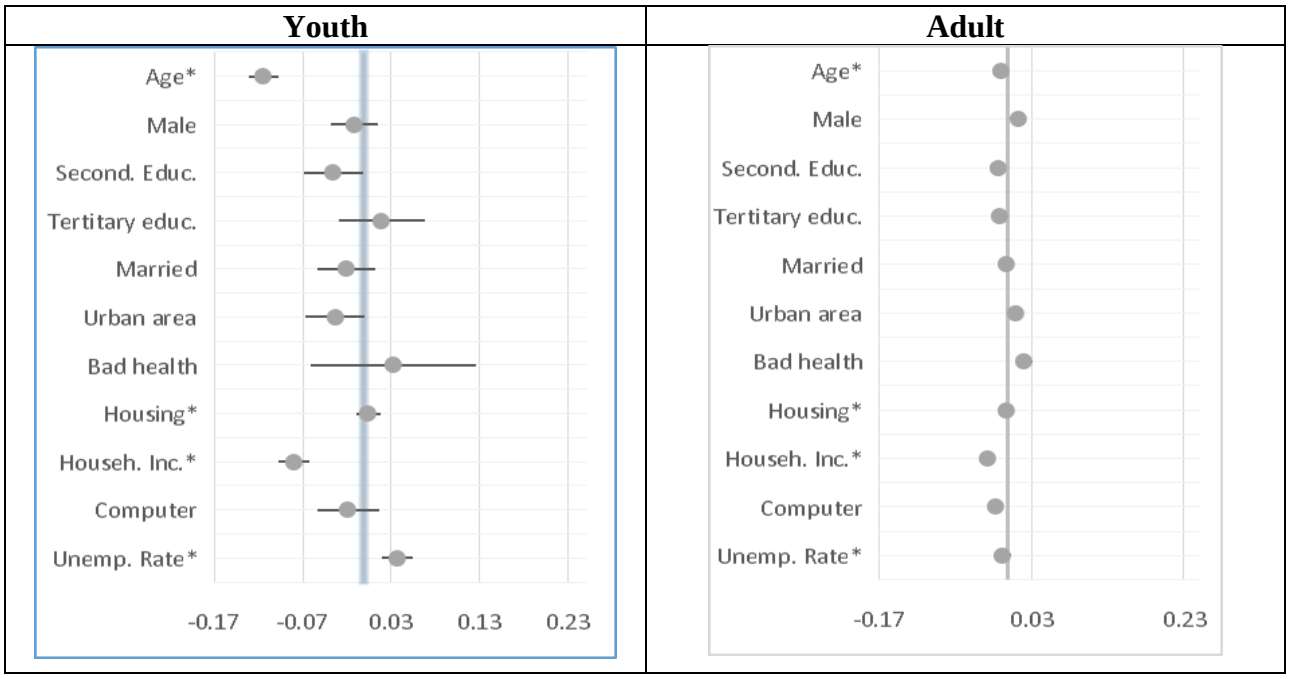


Figure 3 presents APE for youth and adult unemployment equations. As for Italy, APEs for the youth are higher than for adults. The highest APE is for the age variable. A rise of age by one standard deviation decreases the probability of being unemployed of young individuals by 0.11. High marginal effects are also found in case of household income (-0.08). The APE of the regional unemployment rate is significant only for the youth (0.037).

We also considered a specification including the variable of non-Russian **nationality**, (Table 10 in Appendix). These results should be discussed separately since the number of observations dramatically reduces in this case. This variable (non-Russian nationality) is significant only in the unemployment equation for adults and has a positive sign, as in Italy. However, a non-Russian nationality is significant also in the selection equation and has a negative sign for both age groups.

5.3. **A synthesis of results for both countries**

We compare the results for both countries by contrasting the APE (see Figures 2 and 3). The highest negative effect for the probability of being unemployed for youth is found—

for both countries—for household income. The APE of marital status and bad health, which are important for young Italian individuals, are insignificant for young Russians. There is also a difference concerning the urban area variable: the probability of being unemployed is lower for young Russians who live in urban areas, but there is a positive (increasing) effect in the Italian case. Bad health has a strong effect on the employment status, for adult people both in Italy and Russia: the APE is 0.03 and 0.02 respectively. The housing condition has very low effect on the employment status, unlike household incomes.

Considering the partial effects of adults, the APE of household income for adult is the same (-0.027) in Russia and Italy. There is strong gender effect for adults. However, this variable has different signs in different groups. In Russia adult men have a higher probability of being unemployed than women (0.01); in Italy, however, women have higher probability (0.026) of being unemployed than men. Education is a significant factor only for adults, however its effect is weak. Adults with secondary education have a lower probability of being unemployed, than people with primary education, by 0.01 in Russia, and 0.025 in Italy. If an adult has tertiary education, the probability of being unemployed is smaller by 0.011 in Russia, and 0.017 in Italy.

Therefore, for young people the key factors explaining their (un)employment status are household incomes and age for both countries, the regional unemployment rate for Russia, and marital status, urban area and bad health for Italy. Individual characteristics, in general, are more important than the regional ones.

For adults, regional specific characteristics are also important; and, as for youth, individual characteristics provide more significant contributions to the explanation of employment status, because standardized coefficients for individual characteristics are higher and their confidence intervals do not overlap. In most cases, the APEs for Italian models are higher than for Russian models (in fact the unemployment risk is higher in Italy and so also the elasticities).

5.4. **Additional evidence**

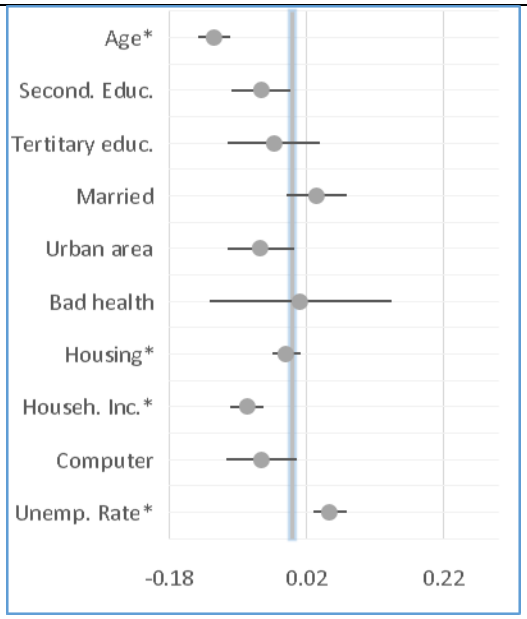
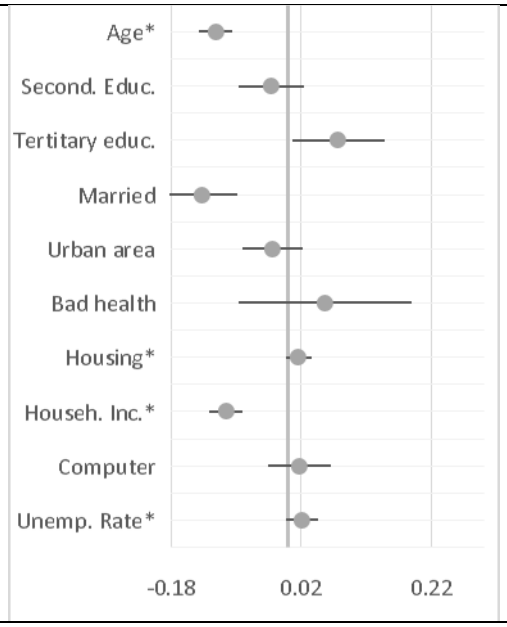
As additional evidence we consider the differences in characteristics of youth unemployment in Italy and Russia by gender. Wald tests show that there are significant

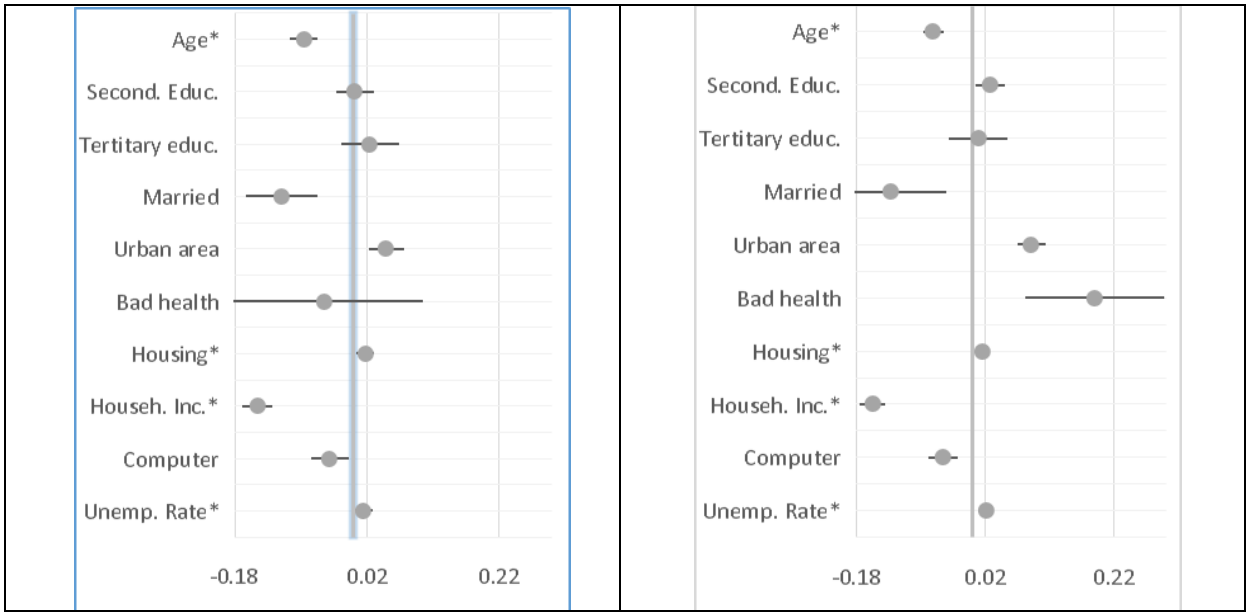
differences between genders in both countries (Table 12 in Appendix). Estimation results of Heckman probit models are in Table 9 and 11 in Appendix for Italy and Russia respectively.

Figure 3 presents the APE for both countries and gender. First of all, we find that when APE is significant, it has the same sign for youth females and males in both countries.

Tertiary education is significant and has a positive sign only for young Russian men; for young Italian men we find the same effect for secondary education: the explanation is that, after finishing school or university, they have little time to find a job (when they start looking for it).

Figure 3. Comparison of APE and their confidence intervals for Russia and Italy for youth by gender.

<table>
<tr><th>Russia. Youth. Female</th><th>Russia. Youth. Male</th></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><th>Italy. Youth. Female</th><th>Italy. Youth. Male</th></tr>
</table>



In Russia secondary education reduces the unemployment risk for females. Marital status is significant and has a negative sign for females and males in Italy and only for males in Russia. Bad health is an important factor only for Italian men.

Young individuals with higher household income exhibit a lower probability of being unemployed, both in Italy and in Russia; however, in Italian models the APE is higher. Computer ownership is a significant variable only for Italian females and males: having a computer reduces the probability of being unemployed and it makes more efficient the job search process.

Concerning the regional characteristics, the regional unemployment rate is significant and has a positive sign for all groups. However, the APE for Russian females is the highest. Urban area is an important factor for the unemployment status only for Italian females and males: the signs are positive because labour supply effects are probably dominant; many young people migrate to Italian urban areas in search for jobs or remain in such areas after finishing school (or university) but stay unemployed for a certain period.

6. Conclusions

Youth unemployment is much higher than adult unemployment and has been particularly sensitive to the economic cycle, reaching after the recent crisis values (in 2013) as

high as 59% in Greece, 56% in Spain, 50% in Croatia, 40% in Italy. In Russia, it is lower—also thanks to informal activities of young people—but it has also increased after the crisis.

In several studies, individual and family characteristics were found to be important elements in shaping the differences and trends in youth unemployment. However, we found that such characteristics are more important for adults rather than young people. For instance, this is the case for education (especially tertiary education). Also gender is more important for adults: females face higher risk of unemployment in Italy, while the opposite is true in Russia.

These results have been obtained using a Heckman Probit model. We analysed the 2004-2011 period for Italy and Russia. Our key variable of interest was the unemployment status of the respondents. We selected observations relating to young people (aged 15-24 years) and, for comparison purposes, adults (aged 25-60 for Russia and 25-64 for Italy). Our explanatory variables included individual characteristics; the characteristics of households; the characteristics of location (region); and time effects (to control for macro conditions and crisis effects). For a quantitative interpretation and comparisons between countries, we also estimated average marginal effects: in fact, most of our variables are dummies. For young people APEs are much higher than for adults in both countries.

The highest negative marginal effect for the probability of being unemployed, for both countries and age groups, is disposable family income. Moreover, the unemployment risk decreases with age of young people (especially in Russia) and marital status (being single increases the risk) in Italy.

The highest positive (marginal) effects are for the regional unemployment rate, which leads to higher unemployment risk. Bad health has a high significant positive effect on unemployment especially in Italy. In general, regional characteristics are less important than individual and family features as risk factors of unemployment. Finally[55] the time effects are significant and, especially for Italy, they led to increased unemployment risk during the recent crisis period (2008-2011).

[55] For future research, we could think of further improvements in the empirical investigations, for instance considering some age classes different from 15-24 years (e.g. 15-29 years would be more appropriate for certain explanatory variables in the case of Italy) or allowing for the type of university degrees (e.g. humanistic vs. scientific).

To conclude, youth unemployment is detrimental to society because it is a waste of resources; it causes a permanent loss of human capital; it affects health and diminishes the well-being of society, not only for the unemployed (e.g. for anxiety over job security). Bell and Blanchflower (2011) found evidence that spells of youth unemployment have harmful impacts on a number of outcomes—happiness, job satisfaction, wages and health—even many years later.

Regarding the policy implications of our study, firstly we emphasize that appropriate "school-to-work" transition services (as specified in Section 3) are important, since our empirical results have shown that higher education, by itself, is not enough to guarantee young people higher employment. Moreover, there is also a need for targeted policies, differentiated by gender (for instance helping women in finding jobs in Italy)[56], supporting people with bad health or youngsters living in under-performing regions in both countries. In fact, we have econometrically detected the importance of the regional unemployment rate in affecting the individual probability of unemployment. The risk of rising—especially after the recent crisis—and persistent unemployment is much higher in such regions. Only through effective policies we can avoid the threat that a "lost generation" will be with us for many years to come.

[56] This is especially true for Southern Italian regions. In Russia, on the contrary, the unemployment risk is higher for men, but more for adults than for youngsters.

References

Addabbo T., Rodríguez-Modroño P. and Gálvez-Muñoz L. (2013), "Youth living in a couple. How women's labour supply adapts to the crisis. The case of Spain", CAPPaper 114, Università di Modena e Reggio Emilia.

Arpaia A. and Curci N. (2010), "EU Labour Market Behaviour During the Great Recession", *European Economy,* Economic Papers, 405.

Bartolucci F., Choudhry M., Marelli E. and Signorelli M. (2011), "Financial Crises and Labour Market: Beyond the Okun's Law", presented at the 16th World Congress *International Economic Association,* Tsinghua University, Beijing, July 4-8, 2011.

Bassanini A. and Duval R. (2009), "Unemployment, Institutions, and Reform Complementarities: Re-Assessing the Aggregate Evidence for OECD Countries", *Oxford Review of Economic Policy,* 25: 40–59.

Bell D.N.F. and Blanchflower D.G. (2011), "Young People and the Great Recession", *Oxford Review of Economic Policy,* 27, 2, 241-267.

Blanchflower D.G. and Freeman R.B. (eds) (2000), *Youth Employment and Joblessness in Advanced Countries*, Chicago, IL, University of Chicago Press and NBER.

Bruno G., Marelli E. and Signorelli M. (2014), "The rise of NEET and Youth Unemployment in EU regions after the crisis", *Comparative Economic Systems*, submitted.

Burkert C. and Siebert H. (2007), "Labour market outcomes after vocational training in Germany : equal opportunities for migrants and natives?", IAB Discussion Paper n. 200731.

Caroleo F.E. and Pastore F. (2003), "Youth participation in the labour market in Germany, Spain and Sweden", in T. Hammer (ed.), *Youth unemployment and social exclusion in Europe A comparative study*, Policy Press, University of Bristol, 109-133.

Caroleo F.E. and Pastore F. (2007), "The Youth Experience Gap: Explaining Differences Across EU Countries", *Quaderni del Dipartimento di Economia, Finanza e Statistica,* Università di Perugia, 41.

Choudhry M., Marelli E. and Signorelli M. (2013), "Youth and the total unemployment rate: The impact of policies and institutions *Rivista internazionale di Scienze Sociali*, 121, 1, 63-86..

Choudhry M., Marelli E. and Signorelli M. (2012), "Youth Unemployment Rate and Impact of Financial Crises", ", *International Journal of Manpower,* 33, 1, 76-95.

Demidova O., Marelli E. and Signorelli M. (2013), "Spatial Effects on Youth Unemployment Rate: The Case of Eastern and Western Russian Regions", *Eastern European Economics*, forthcoming.

Demidova O., Marelli E. and Signorelli M. (2014), "Youth Labour Market Performance in the Russian and Italian Regions", *Economic Systems,* submitted.

De Santis M. (2008), "Il rapporto tra i giovani e il mercato del lavoro: La difficile condizione nel Mezzogiorno", *Rivista Economica del Mezzogiorno,* 22, 3-4, 713-34.

Destefanis S. and Mastromatteo G. (2010), "Labour-market Performance in the OECD: Some Recent Cross-country Evidence", *International Journal of Manpower,* 31, 7, 713-31.

Dolado J.J., Jansen M., Felgueroso F., Fuentes A. and Wolfl A. (2013), "Youth Labour Market Performance in Spain and its Determinants: A Micro-level Perspective", OECD Economics Department Working Papers, n. 1039.

Eurofound (2012), *NEETs – Young people not in employment, education or training: Characteristics, costs and policy responses in Europe*, Publications Office of the European Union, Luxembourg.

European Commission (2010), *Youth on the move*, Publications Office of the European Union, Luxembourg.

Formez (2012), *I servizi per l'impiego nell'ottica della transizione scuola-lavoro. Un'analisi comparata*, Roma.

Gimpelson V.E., Kapelyushnikov R.I. and Lukyanova A. (2010). "Employment Protection Legislation in Russia: Regional Enforcement and Labor Market Outcomes", *Comparative Economic Studies*, 52, 4, 611-636.

Hérault N., Kostenko W., Marks G. and Zakirova R. (2012), "The Effects of Macroeconomic Conditions on the Education and Employment Outcomes of Youth", *Australian Journal of Labour Economics*, 15, 1, 17-36.

IMF (2010), "Unemployment Dynamics During Recessions and Recoveries: Okun's Law and Beyond", Chapter 3 in *World Economic Outlook: Rebalancing Growth*, Washington.

Kelly E., McGuinness S., O'Connell P., Haugh D. and González Pandiella A. (2013), "Transitions in and out of Unemployment among Young People in the Irish Recession", OECD Economics Department Working Papers, n. 1084.

Kogan I. (2010), "New Immigrants – Old Disadvantaged Patterns? Labour Market Integration of Recent Immigrants into Germany", in Gozdziak E. – International Organization for Migration (IOM), International Migration, Blackwell Publ., 91-117.

Kostoris Padoa Schioppa F. and Lupi C. (2002), "Family Income and Wealth, Youth Unemployment and Active Labour Market Policies", *International Review of Applied Economics*, 16, 4, 407-16.

Marelli E., Patuelli R. and Signorelli M. (2012), "Regional Unemployment in the EU before and after the Global Crisis", *Post-Communist Economies*, 2.

Nickell S. and Layard R. (1999), "Labour market institutions and economic performance", in: O. Ashenfelter and D. Card (eds.), *Handbook of Labor Economics*, ch. 46, Amsterdam, Elsevier.

OECD (2005), *Education at Glance*, Paris.

OECD (2006), *Employment Outlook*, Paris.

O'Higgins N. (2011), "The Impact of the Economic and Financial Crisis and the Policy Response on Youth Employment in the European Union", presented at the *Eaces International Workshop*, Perugia, November 10-11.

O'Higgins N. (2012), "This Time It's Different? Youth Labour Markets during 'The Great Recession' ", *Comparative Economic Studies,* 3.

Pastore F. (2012a), "To Study or to Work? Education and Labor-Market Participation of Young People in Poland", *Eastern European Economics*, 50, 3, 49–78.

Pastore F. (2012b), "Youth Unemployment in Italy at the Time of the New Great Depression", Friedrich-Ebert-Stiftung, International Dialogue, Berlin, November.

Pastore F. (2012c), "Primum vivere . . . industrial change, job destruction and the geographical distribution of unemployment", *IZA Journal of European Labor Studies*, 1:7.

Peresetsky A.A. (2007). "Modeli veroyatnosti defolta banka" (Probability default models for the banks). *Economics and Mathematical Methods*, 43 (3), 37–62.

Peresetsky A., Karminsky A., Golovan S. (2011). Probability of default models of Russian banks. *Economic Change and Restructuring*, 44(4), 297–334.

Quintini G. and Manfredi T. (2009), "Going Separate Ways? School-to-Work Transitions in the United States and Europe", *OECD Social, Employment and Migration Working Paper*, 90.

Scarpetta S., Sonnet A. and Manfredi T. (2010), "Rising Youth Unemployment During the Crisis: How to Prevent Negative Long-term Consequences on a Generation?", *OECD Social, Employment and Migration Working Papers*, 6.

Shilov A. and Möller J. (2009), "The wage curve in Russia, 1995–2005". *Economics Letters* 102, 90–92.

APPENDIX

Table 8. *Probit (model 1) and Heckman probit (model 2) with nationality variable for Italy, 2004-2011. Youth: 15-24 age. Adult: 25-60 age.*

	Youth		Adult	
VARIABLES	Unemployment equation	Selection	Unemployment equation	Selection
	(1)	(2)	(3)	(4)
Student		-2.324***		-0.966***
		(0.024)		(0.016)
Disability	-0.040	-0.180***	0.157***	-0.229***
	(0.076)	(0.052)	(0.022)	(0.011)
Age	-0.140***	0.914***	-0.029***	0.282***
	(0.008)	(0.085)	(0.001)	(0.003)
Age2		-0.018***		-0.004***
		(0.002)		(0.000)
Male	-0.172***	0.283***	-0.182***	0.902***
	(0.029)	(0.021)	(0.017)	(0.007)
Secondary education	0.042	0.028	-0.215***	0.360***
	(0.032)	(0.024)	(0.016)	(0.008)
Tertiary education	0.038	0.084**	-0.131***	0.641***
	(0.056)	(0.042)	(0.020)	(0.010)
Married	-0.187**	-0.596***	-0.320***	-0.170***
	(0.082)	(0.052)	(0.013)	(0.008)
Urban area	0.274***	-0.043**	0.142***	-0.062***
	(0.030)	(0.022)	(0.013)	(0.007)
Housing	0.053***	-0.058***	0.011*	-0.034***
	(0.014)	(0.010)	(0.006)	(0.003)
Bad health	0.592***	-0.798***	0.251***	-0.437***
	(0.158)	(0.095)	(0.035)	(0.016)
Household income	-0.698***	0.116***	-0.495***	0.188***
	(0.029)	(0.013)	(0.014)	(0.005)
Computer	-0.185***	0.039	-0.141***	0.079***
	(0.032)	(0.025)	(0.014)	(0.008)
Unemployment rate	0.005***	-0.005***	0.069***	-0.030***
	(0.001)	(0.001)	(0.002)	(0.001)
Immigrant	-0.692***	0.044	0.017	0.049***
	(0.071)	(0.049)	(0.029)	(0.018)
Constant	2.947***	-10.326***	-0.352***	-5.102***
+ time effects	(0.181)	(0.870)	(0.043)	(0.061)
Observations		32,978		194,068
Uncensored observations	9,940		126,578	
Rho		-0.341***		0.175***
		(0.040)		(0.031)
LR test (independent equations) (rho = 0), chi(1)		74.78		32.13
Log likelihood		-14982.64		-116236.2
Wald chi2(20)		1499.44		8528.53
Observations		32,978		194,068
Number of uncensored observations	9,940		126,578	
% of correctly predicted (cut off 0.2)	85.97		32.42	

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 9. *Probit (model 1) and Heckman probit (model 2) for Italy by gender, 2004-2011.*

Youth: 15-24 age.

VARIABLES	Female		Male	
	Unemployment equation	Selection	Unemployment equation	Selection
	(1)	(2)	(3)	(4)
Student		-2.275***		-2.395***
		(0.035)		(0.033)
Disability	-0.018	-0.066	-0.050	-0.284***
	(0.110)	(0.074)	(0.106)	(0.073)
Age	-0.157***	0.919***	-0.126***	0.944***
	(0.012)	(0.128)	(0.010)	(0.116)
Age2		-0.019***		-0.019***
		(0.003)		(0.003)
Secondary education	-0.063	0.238***	0.131***	-0.149***
	(0.050)	(0.037)	(0.041)	(0.033)
Tertiary education	0.003	0.287***	0.059	-0.131**
	(0.078)	(0.057)	(0.084)	(0.063)
Married	-0.181*	-0.680***	-0.591***	0.638***
	(0.097)	(0.057)	(0.160)	(0.191)
Urban area	0.170***	-0.007	0.348***	-0.065**
	(0.045)	(0.031)	(0.040)	(0.030)
Housing	0.074***	-0.071***	0.063***	-0.047***
	(0.022)	(0.015)	(0.019)	(0.014)
Bad health	0.062	-0.765***	0.854***	-0.819***
	(0.265)	(0.150)	(0.201)	(0.124)
Household. Income	-0.648***	0.116***	-0.730***	0.121***
	(0.043)	(0.018)	(0.039)	(0.018)
Computer	-0.158***	0.123***	-0.153***	-0.060*
	(0.049)	(0.035)	(0.043)	(0.035)
Unemployment rate	0.004***	-0.003**	0.007***	-0.007***
	(0.002)	(0.001)	(0.002)	(0.001)
Constant	3.312***	-10.591***	2.267***	-10.168***
	(0.275)	(1.315)	(0.234)	(1.185)
Observations		16,329		16,649
Uncensored observations	4,072		5,868	
Rho		-0.385***		-0.292***
		(0.059)		(0.054)
LR test (independent equations) (rho = 0), chi(1)		43.97		29.17
Log likelihood		-6942.736		-7943.542
Wald chi2(18)		590.57		849.83
% of correctly predicted (cut off 0.2)	88.07		83.96	

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 10. *Probit (model 1) and Heckman probit (model 2) with nationality variable for Russia, 2004-2011. Youth: 15-24 age. Adult: 25-60 age.*

	Youth	Adult

VARIABLES	Unemployment equation	Selection	Unemployment equation	Selection
	(1)	(2)	(3)	(4)
Student		-2.049***		-1.594***
		(0.061)		(0.245)
Disability		-0.709***		-1.107***
		(0.161)		(0.047)
Age	-0.076***	0.879***	-0.011***	0.174***
	(0.020)	(0.159)	(0.002)	(0.011)
Age2		-0.018***		-0.002***
		(0.004)		(0.000)
Male	0.107*	0.330***	0.181***	0.427***
	(0.063)	(0.048)	(0.037)	(0.026)
Secondary education	-0.021	0.198***	-0.159***	0.215***
	(0.074)	(0.059)	(0.046)	(0.030)
Tertiary education	0.080	0.140	-0.112**	0.320***
	(0.105)	(0.095)	(0.051)	(0.037)
Married	-0.188***	-0.208***	-0.059	-0.187***
	(0.072)	(0.058)	(0.042)	(0.030)
Urban area	0.059	0.378***	0.154***	0.249***
	(0.078)	(0.057)	(0.044)	(0.028)
Bad health	0.082	-0.457***	0.181**	-0.424***
	(0.210)	(0.154)	(0.076)	(0.042)
Housing	0.004	0.004	-0.002	0.005***
	(0.006)	(0.004)	(0.003)	(0.002)
Household income	-0.354***	0.094***	-0.245***	0.165***
	(0.050)	(0.029)	(0.030)	(0.019)
Computer	0.115	0.448***	-0.129***	0.382***
	(0.084)	(0.064)	(0.043)	(0.030)
Unemployment rate	-0.007	-0.023***	0.005	-0.028***
	(0.010)	(0.007)	(0.007)	(0.005)
Non Russian nationality	0.004	-0.220***	0.150***	-0.236***
	(0.087)	(0.064)	(0.049)	(0.034)
Constant	0.506	-10.117***	-1.059***	-2.709***
+time effects	(0.453)	(1.601)	(0.148)	(0.241)
Observations		5,420		18,699
Uncensored observations	2710		15829	
Rho		0.782***		0.431**
		(0.100)		(0.178)
LR test (independent equations) (rho = 0), chi(1)		82.75		7.68
Log likelihood		-2789.638		-9311.827
Wald chi2(19)		88.84		219.28
% of correctly predicted (cut off 0.2)	44.27		0.97	

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 11. *Probit (model 1) and Heckman probit (model 2) for Russia by gender, 2004-2011. Youth: 15-24 age.*

	Female		**Male**	
VARIABLES	Unemployment equation	Selection	Unemployment equation	Selection
	(1)	(2)	(3)	(4)

Student		-2.142***		-2.080***
		(0.066)		(0.067)
Disability		-0.490***		-0.778***
		(0.147)		(0.207)
Age	-0.059***	0.743***	-0.056***	0.710***
	(0.020)	(0.166)	(0.020)	(0.170)
Age2		-0.015***		-0.014***
		(0.004)		(0.004)
Secondary education	-0.043	0.256***	-0.085	0.010
	(0.080)	(0.061)	(0.087)	(0.072)
Tertiary education	-0.018	0.168*	0.315***	0.125
	(0.117)	(0.097)	(0.119)	(0.136)
Married	-0.148*	-0.569***	-0.208**	0.599***
	(0.077)	(0.059)	(0.089)	(0.092)
Urban area	0.028	0.406***	0.055	0.334***
	(0.088)	(0.061)	(0.080)	(0.063)
Bad health	-0.159	-0.415***	0.059	-0.340*
	(0.244)	(0.151)	(0.235)	(0.188)
Housing	-0.003	0.007	0.009	-0.005
	(0.007)	(0.005)	(0.006)	(0.005)
Household income	-0.226***	0.105***	-0.315***	0.139***
	(0.052)	(0.032)	(0.052)	(0.032)
Computer	0.042	0.431***	0.124	0.159**
	(0.088)	(0.065)	(0.083)	(0.069)
Unemployment rate	0.026***	-0.024***	-0.002	-0.040***
	(0.009)	(0.006)	(0.009)	(0.006)
Constant	-0.147	-8.474***	0.255	-7.526***
+time effects	(0.460)	(1.664)	(0.444)	(1.685)
Observations		4,810		4,540
Uncensored observations	2133		2188	
Rho		0.913***		0.750***
		(0.109)		(0.100)
LR test (independent equations) (rho = 0), chi(1)		100.67		70.77
Log likelihood		-2422.518		-2221.964
Wald chi2(17)		62.04		65.50
Observations		4,810		4,540
Uncensored observations	2133		2188	
% of correctly predicted (cut off 0.2)	48.08		51	

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 12. *Model comparison using Wald test.*

	Russia		**Italy**	
	Adult vs Young (Table 7)	Young Male vs Young Female (Table 11)	Adult vs Young (Table 6)	Young Male vs Young Female (Table 9)
Wald statistics	Chi (22) = 172.71	Chi2(22) = 210.39	Chi2 (22) = 1649.49	Chi2 (22) = 401.04

p-value	0.000	0.000	0.000	0.000

4. **The Beveridge Curve in the OECD Before and After the Crisis**[*]

Sergio Destefanis and Giuseppe Mastromatteo

Abstract

This paper tests the existence of a Beveridge Curve across the economies of nine OECD countries from 1980 to 2011, investigating the impact of various kinds of structural factors (technological progress, globalisation, oil prices) and of the current recession on the Curve. Technological progress (R&D intensity) shifts the Curve outwards, producing evidence in support of the creative destruction effect. Globalisation and unfavourable oil price shocks also shift the Curve outwards, worsening the unemployment-vacancies trade-off. Structural relationships seem to be stable enough in the 2008-2011 period, suggesting that the current crisis mainly implied moves along the Curve.

Jel Classification: E24, J20, F60, O40

Keywords: Unemployment, vacancies, capitalisation effect, creative destruction, labour-market institutions.

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Introduction

In the literature concerning the Beveridge Curve, only a few contributions (Pissarides 1990; Aghion and Howitt 1994) have examined the role of technological progress as a significant shift factor for labour market performance. However, there is no unanimity about the sign of its impact. In the conventional matching model with technological change (Pissarides 1990; Mortensen and Pissarides 1998), a higher rate of growth implies a higher present value of jobs, which spurs the recruiting activity and raises the job finding rate of unemployed workers: thus, in terms of Beveridge Curve, the so-called capitalisation effect should increase the willingness of employers to open new positions and the matching efficiency, which shifts the curve inwards. On the contrary, Aghion and Howitt (1994) propose the creative-destruction effect (Schumpeterian models), whose underlying intuition is that growth has a reallocative aspect that the previous conventional model ignores: faster technological change is accompanied by faster obsolescence of skills and technologies, hence, more intense labour turnover and higher frictional unemployment. In terms of Beveridge Curve, a faster obsolescence should worsen matching efficiency, regardless of search intensity, which shifts the curve outwards.

Few economists would deny that globalisation, that is the growing international interdependence in communications, trade, finance, labour markets (migration), social systems, is one of fundamental socio-economic phenomena of this turn of century. Consequently, globalisation is another factor expected to impact on the Beveridge Curve. Indeed, according to Nickell and Bell (1995) and Song and Webster (2003), the Beveridge Curve for unskilled workers should have shifted outwards in recent years, due to exportation of their jobs to the low-wage countries entailed by the process of globalisation. A corresponding outward shift in the aggregate Beveridge Curve should also follow.

The aim of this paper is to test the existence of a Beveridge Curve analysing the economies of nine OECD countries from 1980 to 2011, and to investigate whether and how technological progress and globalisation affect the unemployment-vacancies trade-off. The empirical set-up draws inspiration from Nickell *et al.* (2003), that analysed the Curve for a similar OECD

sample, but did not allow for technological progress and globalisation. Moreover in recent years the Beveridge Curve has received little analytical attention. Yet the current crisis is widely believed to bring about long lasting changes in the world economy. Hence we provide a predictive exercise for the 2008-2011 period. We ask the following questions: does the Beveridge Curve shift outwards in that period? How are institutional factors (and hence policies) connected with this (eventual) shift?

The paper has the following structure. In Sections 2 we present some recent contributions focusing on the impact of technological progress and globalisation on unemployment; in Section 3 we examine some empirical literature on OECD countries (chiefly Nickell et *al.* 2003, but also Koeniger et *al.* 2007) providing further motivation to our study and some focus for the role of the current crisis in this context. In Section 4 we present the empirical specification and the data. The results are commented in Section 5, whereas Section 6 contains some concluding remarks.

1. Technological progress, globalisation and labour market matching

In the recent literature concerning labour market matching, a few contributions have stood out focusing on technological progress as one of the key factors in the evolution of unemployment. On the one hand, technological developments change the structure of the labour demand, which tends to be biased in favour of higher professional competences, especially if orientated towards growing sectors. On the other hand, more powerful means of communication make the flow of information faster and cheaper and, consequently, enhance the efficiency of the labour market (as well as of other kinds of markets).

Postel-Vinay (2002) aims at analysing the influence of the rate of technological change on the level of unemployment and, in particular, compares the short- and long-run effects of technological progress on employment. He starts from the statement (Mortensen and Pissarides 1998) that faster growth reduces the long-run unemployment rate through a capitalisation effect, or leads to a rise in long-run unemployment through a creative destruction effect (the so-called Schumpeterian models developed in Aghion and Howitt 1994), depending on the particular technological assumptions adopted: the capitalisation

effect rests on the assumption that firms are able to update their technology continuously and at no expense, which precludes technological obsolescence, whereas creative destruction arises from the extreme opposite assumption of total irreversibility in the firms' technological choices.

Suppose that the correct model is of Schumpeterian inspiration, that is there is total irreversibility and the economy leaves no space for any form of capitalisation effect. A speedup in growth eventually leads to a fall in long-run employment. Postel-Vinay's purpose is to find out whether, in that case, sustained technological change is detrimental to employment even in the short run. Critics of the Schumpeterian usually view come up with the argument that there is very convincing evidence according to which unemployment rates respond negatively to changes in the productivity growth rates. For instance, the productivity slowdown of the mid-1970's was accompanied by a rise in unemployment in most OECD countries. However, this argument implicitly ignores the possible differences among short-run and long-run predictions of the model. Short-run predictions may go in the opposite direction of long-run ones. Postel-Vinay adds that there is no a priori reason to think that the long-run effects should be the only ones to consider, or even that they should be in some sense more important than short-run effects.

Then, Postel-Vinay shows a simple model of job destruction, studies its steady state and comparative static properties, proceeds to a theoretical study of its dynamics, finally presents some numerical simulations of the model. Simulations confirm that the short-run adjustment of unemployment goes the ''wrong way'' with respect to long-run outcomes and point out that impact effects are of potentially great magnitude. Yet, according to the model, the time it takes the unemployment rate to be back at its original level after a negative shock on productivity growth is well under the duration of a business cycle.

Pissarides and Vallanti (2007) aim at investigating the impact of total factor productivity (TFP) growth on unemployment, considering that theoretical predictions are ambiguous and depend on the extent to which new technologies is embodied in new jobs: therefore, they evaluate a model where creative destruction very much depends on the existence of this kind of embodied technological progress, and capitalisation effects are linked to disembodied

technological progress along the lines of traditional growth models (disembodied progress is assumed to enhance the performance of extant and new jobs alike).

The analysis starts from the econometric estimates of the impact of TFP growth on steady-state unemployment for the period 1965-1995 for the countries of the European Union (except for Spain and Greece), the USA and Japan. The conclusion is that the negative impact of TFP growth on unemployment is substantial, both in terms of the estimated elasticities and in terms of the contribution of TFP growth to the explanation of the evolution of the unemployment rate in the last thirty years. Then, "creative destruction" appears to play no part in the steady-state unemployment dynamics of the countries in the sample and the Solow growth model augmented by an unemployment equation is an appropriate framework for the study of unemployment dynamics.

Consequently, Pissarides and Vallanti evaluate a matching model with embodied and disembodied technology, capitalisation and creative destruction effects and verify whether this model matches the estimated impacts. They find that: a) consistency between the empirical evidence and the model requires totally disembodied technology, because when technology is embodied creative destruction effects have a much bigger quantitative impact on unemployment than capitalisation effects; b) with entirely disembodied technology, the capitalisation effect of faster growth is quantitatively sufficiently strong to explain alone the full impact of TFP growth on unemployment when two other conditions are satisfied: a) wages need to be insulated from labour market conditions, in particular the vacancy-unemployment ratio, and b) the firms need to discount the revenues from new jobs over an infinite horizon. Dynamically, if one posits that job destruction reacts faster than job creation to shocks, the impact effect of productivity growth on unemployment should be positive in the short run and eventually turn negative in the medium to long run.

A final interesting point of the analysis of Pissarides and Vallanti is that, in the empirical implementation of their model, they allow for capital accumulation as an extra factor capable of bringing about capitalisation an creative destruction effects. They expect the capital stock and TFP to have different effects on unemployment, mainly because the costs of adjustment in capital are different from the technology implementation lags. In the steady-state, capital

stock per worker (as well as wages and employment) is an endogenous variable growing at the same rate of technological progress.

As international interdependence and integration grew significantly and more and at a furious pace in the last decades, the impact of globalisation on labour market matching and performance looks like another issue highly worthy of discussion. As shall be clear from the following account, however, this discussion has never been embodied in economic models similar to those examined in the previous section.

Higher unemployment and loss of jobs are quite commonly associated with globalisation, mainly due to the following arguments: a) multinationals have exported jobs from developed countries to developing countries through foreign investments and outward production in special economic zones; b) through trade liberalisation, governments have encouraged the replacement of domestically produced goods with goods produced abroad; c) the increased application of technology, especially in globally operating companies, can reduce the use of and dependence on labour (clearly this point overlaps with the role of technological progress highlighted in the previous section). Hence inter-government and inter-worker competition intensified to attempts at improving working conditions and benefits in industrial countries were weakened. Unemployment has been rising amongst low-skilled and relatively low-paid male workers, who traditionally found work in the manufacturing sectors that are most exposed to increased competition[i].

The opposite view is that globalisation (e.g. through foreign investment, trade, new technology and liberalisation) contributes to growth, which is the key to employment. Unemployment, on the other hand, is mainly due to governments' failure to adopt sound macroeconomic and labour market policies. In particular, International Monetary Fund (IMF) and OECD[ii] share the opinion that structural adjustment policies and globalisation, far from being the main sources of unemployment, can be used in a strategy for better growth and employment. A basic condition for this is that governments have their priorities right, and accept to complement the structural adjustment program by a major effort at reforming the state, including, in particular, reducing unproductive spending, collecting properly the taxes from those who can pay, and allocating them more efficiently to key social priorities.

At any rate, according to Nickell and Bell (1995) and Song and Webster (2003), the Beveridge Curve for unskilled workers should have shifted outwards in recent years, due to exportation of their jobs to the low-wage countries entailed by the process of globalisation. A corresponding outward shift in the aggregate Beveridge Curve should also follow.

On the other hand, the impact of energy (especially oil) prices on the Beveridge Curve has received little, if any, attention in the literature. Yet energy prices are widely believed to be one of the *dominant factors* in the world economy (see e.g. Loungani 1986). Oil-price shocks are also believed to affect the capital-output ratio and the labour share in the OECD since 1970 (Bentolila and Saint-Paul 2003). By the same token, they could also influence the skill demand-mix and jobs matching. Besides, energy prices are also an important determinant of induced technological progress (Kumar 2008).

2. The empirical literature on OECD countries

In proceeding to set up a framework for empirical analysis where the effects of globalisation and technological progress are jointly measured and appraised, we draw inspiration chiefly from a paper by Nickell *et al.* (2003). They analyse empirically the unemployment patterns in the OECD countries from the 1960s to the 1990s, through a detailed study of changes in real wages and unemployment, as well as shifts in the Beveridge Curves in twenty countries (Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States). Their basic aim was to ascertain, using a very simple empirical model, if these shifts can be explained by changes in the labour market institutions expected to impact on equilibrium unemployment. Nickell *et al.* (see Table 1) include in their Beveridge Curve a set of institutional variables expected to influence equilibrium unemployment in the long run.

Table 1. *Institutional variables affecting the Beveridge Curve, Nickell et al. (2003)*

Unemployment benefit replacement ratio
Benefit duration index
Bargaining coordination index
Collective bargaining coverage
Union density
Employment protection legislation
Labour taxes
Owner occupation rate

What is remarkable from our point of view is that, without any theoretical or empirical justification, no structural factor is included in the Beveridge Curve estimates. This obviously also includes variables which may be linked to the role of technological progress or globalisation. On the other hand, an important role is played in the estimates by the inflow rate, defined as the monthly inflow into unemployment divided by employment. Given that the Beveridge Curve equation is estimated through LSDV, and that the inflow rate is likely to be determined jointly with unemployment, there is some concern that the Nickell *et al.* estimates may be affected by endogeneity issues[iii].

In any case, the Nickell *et al.* results indicate the Beveridge Curves of all the countries except Norway and Sweden shifted to the right from the 1960s to the early/mid 1980s. At this point, the countries divide into two distinct groups, those whose Beveridge Curves continued to shift out and those where they started to shift back. Second, these movements in the Beveridge Curves are partly explained by changes in labour market institutions. In particular, union density, unemployment benefit duration and owner occupation shift the Curves to the right whereas stricter employment protection shift them to the left. Indeed, stricter employment laws may lead to an increased professionalisation of the personnel function within firms, as was the case in Britain in the 1970's (see Daniel and Stilgoe 1978), which can increase

matching efficiency. The possibility that the estimates are affected by endogeneity and omitted variable bias raises however some doubt about the soundness of these results.

Further inspiration for our empirical framework was drawn from a paper by Koeniger *et al.* (2007). This paper first shows in a simple model of bilateral monopoly how labour market institutions affect labour demand, the surplus of the firms and workers and thus the wage differential, then uses panel data from eleven OECD countries (Australia, Canada, Finland, France, Germany, Italy, Japan, Netherlands, Sweden, UK and USA) to determine how much of the increase in wage inequality across countries can be attributed to changes in institutions within countries, employing an empirical set-up similar to Nickell *et al.* (2003). As illustrated in Table 2, this paper also directly relates wage inequality to a set of variables related to technological progress and globalisation: R&D intensity and import (from non-OECD countries) intensity as well.

Table 2. *Factors affecting wage inequality, Koeniger et al. (2007)*

Institutional variables	Unemployment benefit replacement ratio Benefit duration index Bargaining coordination index Union density Employment protection legislation Tax wedge Minimum wage
Other variables	R&D intensity Import (from non-OECD countries) intensity

From the joint analysis of these two papers we then draw the idea of assessing the impact of institutional variables on the Beveridge Curves of various OECD countries, also allowing for the impact of globalisation and technological progress.

In more recent years the Beveridge Curve has received little analytical attention. Yet, the current crisis is widely believed to bring about long lasting changes in the world economy An outward shift of the curve can be interpreted as an indicator for an increased mismatch (a deterioration of human capital or of the search ability of the unemployed, a negative

perception of the long-term unemployed on the part of potential employers, a higher availability of unemployment benefits, etc.). These are of course instances of hysteresis, but there may be other channels through which the crisis may have changed the skill demand-mix leading to an increased mismatch. There is the *discouraged worker effect*, that may pushed off the market a quota of mainly marginal workers. On the other hand, low-skilled workers may have brought in the market by the *added worker effect*.

At any rate, Arpaia and Curci (2010) for European labour markets, Elsby *et al.* (2010) for the US labour market, both find that there have been *moves along* rather than *shifts of* the Beveridge curve.

3. The empirical specification

The basic model is the following Cobb-Douglas dynamic specification of the Beveridge Curve:

$$u_{it} = f(v_{it}, inf_{it}, glob_{it}, rd_{it}, k_{it}, tfp_{it}, oilp_{it}, Z_{it}, a_t, a_i, t_i, t_i^2) \qquad [1]$$

where $i = 1, \ldots, N$ stands for the country, and $t = 1, \ldots, T$ stands for the time period (year), u_{it} is unemployment rate, v_{it} the vacancy rate, inf_{it} the inflow rate, $glob_{it}$ the globalisation index, rd_{it} the index of R&D intensity, k_{it} the capital stock per worker, tfp_{it} a measure of total factor productivity, $oilp_{it}$, are real oil prices (deflated by consumer price indexes). All these variables are taken in natural logs[iv]. Z_{it} is a vector of institutional variables which are expected to influence unemployment either because of their impact either on matching efficiency or on job creation, a_t and a_i are vectors of yearly and country dummies respectively; t_i and t_i^2 are country-idiosyncratic linear and quadratic time trends.

The inflow rate is measured by the ratio of inflow into unemployment to total employment. We used three distinct proxies for the globalisation index. The preferred one, the same used by Koeniger *et al.* (2007), is the ratio of total manufacturing imports from no-OECD countries to manufacturing value added (both variables at current prices). In order to explore the role of other dimensions of globalisation, we also used the KOF index of actual economic flows

(allowing for external trade, capital flows and outsourcing) and the KOF overall index of globalisation (Dreher, 2006).

We follow Koeniger *et al.* (2007) also by taking an index of R&D intensity (the ratio of R&D expenditure over value added in the manufacturing sector, both variables at current prices) as our preferred measure of technological progress. However, this measure is likely to emphasise the role of technology embodied in new jobs. Hence we also allow for other long-run variables: capital per worker (measured as the ratio of the capital stock of the business sector to total employment). This capital stock is also used, along with gross domestic output, employment and a smoothed share of labour, to construct a Tornqvist index of total factor productivity. TFP also works as a catch-all control (shades of the debate about the Solow residual).

In selecting our institutional variables, we relied on those considered in Nickell *et al.* (2003). In particular, we introduce: a) union density and bargaining coordination, as trade union power in wage setting has a significant positive impact on unemployment, but highly coordinated bargaining may completely offset the negative impact of unionism on employment[v]; b) employment protection legislation, whose overall impact is an empirical issue: actually, on the one hand it tends to make firms more prudent about filling vacancies, which slows the speed at which the unemployed move into work, reducing the efficiency of job matching; on the other hand, however, employment protection laws often lead to an increased professionalisation of the personnel function within firms and lean to reduce involuntary separations and consequently reduce inflows into unemployment; c) unemployment benefits, which negatively affect the willingness of unemployed to fill vacancies; d) the total tax wedge including employer payroll taxes. We also attempted to include in our estimates of active labour market policies (ALMP) but they never worked. They were never significant and their coefficient was consistently positive.

More information about the data and their sources is provided in the Appendix.

Unlike in many macroeconometric studies (including Nickell et al. 2001, and Koeniger et al., 2004), we do not restrict a priori the dynamic specification of our regressors. We follow

Pissarides and Vallanti (2007) in introducing two lags for unemployment, while other variables enter (1) with a current *and* a (first-order) lagged value.

We started our analysis with nineteen OECD countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, Norway, New Zealand, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States, for a 28-year (1980-2007) and a 32-year period (1980-2011). There were some missing data, and hence we had an unbalanced panel. However, the OECD provides vacancy data only for nine countries (Australia, Austria, Finland, Germany, Norway, Portugal, Sweden, Switzerland, United Kingdom). It soon became apparent that estimates for this subset were much better behaved, and in the end decided to stick with them only. Still, missing data imply an unbalanced panel.

Important influences on our econometric approach were Judson and Owen (1999), Blundell *et al.* (2001), and Soto (2007). Judson and Owen (1999) provide a guide to appropriate techniques for panels of various dimensions. Their results, based on a Monte Carlo analysis, show that Kiviet's corrected Least Squares Dummy Variable estimator (LSDVC) is the best choice for any balanced panel, whereas for unbalanced panels: a) if T = 30, where T is the time dimension of the panel, LSDV performs just as well or better than the viable alternatives; b) when $T \leq 10$, Arellano and Bond's one-step Generalised Method of Moments estimator (AB GMM) is the best choice; c) when T = 20, AB GMM or Anderson and Hsiao estimator (AH) may be chosen.

Blundell *et al.* (2001), reviewing developments to improve on the relatively poor performance of the standard one-step difference GMM estimator for highly autoregressive panel series, provided Monte Carlo simulation comparison between one-step difference and a new estimator, denoted system GMM, that relies on relatively mild restrictions on the initial condition process, and made an application to a simple panel Cobb-Douglas production function for US data, showing that system GMM has substantial asymptotic efficiency gains, as it not only greatly improves the precision but also greatly reduces the finite sample bias.

Soto (2007) analysed through Monte Carlo simulations the properties of various GMM and other estimators when the number of individuals is small, as typical in country studies. He

found that the system GMM estimator has a lower bias and higher efficiency than all the other estimators analysed, including the standard one-step difference GMM estimators.

We have an unbalanced panel with N = 9, and T = 28 or 32: thus, we have implemented LSDV and AB GMM (one-step difference and system) estimators. Moreover, we consider the useful advices provided by Roodman (2009a, 2009b) in order to make appropriate specification choices for AB GMM and correctly face up to the econometric problems which may emerge, particularly autocorrelation and endogeneity. More specifically, Roodman suggests: a) to use orthogonal deviations, in order to maximise sample size; b) to put every regressor into the instrument matrix: if a regressor is strictly exogenous, it is inserted as a single column; if it is predetermined but not strictly exogenous (such as our regressors), lags 1 and deeper are used in GMM-style; if it is endogenous, lags 2 and deeper are used in GMM-style; c) to pay attention in evaluating the results of autocorrelation and endogeneity tests, as a small number of cross-country observations makes Arellano-Bond test for autocorrelation not very reliable and too many instruments weaken the power of Sargan and Hansen tests to detect overidentification[vi].

4. The Econometric Results

Before discussing our results, we recapitulate in Table 3 the main predictions about the role of various factors within the Beveridge Curve.

Table 3. *Expected shifts of the Beveridge Curve: institutional variables, globalisation and technological progress.*

	Expected Shifts
Tax wedge	Outward shift: Nickell *et al.* (2003)
Unemployment benefits	Outward shift: Nickell *et al.* (2003)
Employment protection legislation	Outward **or** inward shift: Nickell *et al.* (2003)
Bargaining coordination	Inward shift: Nickell *et al.* (2003)
Union density	Outward shift: Nickell *et al.* (2003)
Globalisation	Outward shift (ICFTU, Thorpe) **or** Inward shift

	(IMF, OECD)
Technological progress	Outward shift (creative-destruction effect: Aghion and Howitt, 1994, Postel-Vinay, 2002) **or** Inward shift (capitalisation effect: Pissarides, 1990; Mortensen and Pissarides, 1998; Pissarides and Vallanti, 2007). According to Pissarides and Vallanti, the Outward shift should dominate in the short run.
R&D Intensity	Outward shift, as we expect this indicator of technological progress to be largely related to technology embodied in new jobs (in the parlance of Pissarides and Vallanti), and hence to creative-destruction effects.
Capital accumulation	Outward shift (short run) and Inward shift (medium-long run): Pissarides and Vallanti (2007)
Oil prices	Outward shift: Nickell *et al.* (2003)

Our empirical evidence is reported in the Appendix. We sum up here the main results. First, let us examine the 1980-2007, that leave the current crisis out. Our estimation results confirm the existence of a Beveridge Curve for the countries considered. Much as in Nickell et al. (2003), the inflow rate matters. Furthermore we find a significant positive effect of current and lagged technological progress (especially through the index of R&D intensity), which tends to shift the curve outwards through the creative destruction effect. The first-order lagged coefficient of the globalisation index constructed along the lines of Koeniger et al. (2007) is always significant. Its positive sign means that it shifts the Curve outwards. On the other hand, the KOF indexes of globalisation (much as they should allow for capital flows and outsourcing) were never significant. Oil prices intervene in terms of rates of change, but a positive effect prevails. Capital accumulation is never significant and the TFP is, at best, much less significant than R&D intensity.

Among the institutional variables, union density and bargaining coordination are significant and have the expected impact on unemployment (yet union density has a transitory, rather than permanent, impact). EPL has the "wrong" sign, but, as already recalled, also Nickell et al. (2003) found this result. Unemployment benefit and, especially, the tax wedge are much less significant, although having the right sign.

Main Results: 1980-2007 (specification with Imp/VA)

	Baseline	No TFP	No K per w	No R&D		**Institutional Variables**
	-0.15***	-0.17***	-0.18***	-0.15***		EPL
	0.01*	0.01*	0.01*	0.01***		Unemployment benefit
	0.01	0.01**	0.01	0.01**		Tax Wedge (1st or. lag)
	-0.30***	-0.29***	-0.27***	-0.28***		Bargaining coordination
	0.02**	0.02**	0.02**	0.03***		Union density
	-0.02***	-0.02***	-0.02***	-0.03***		Union density (1st or. lag)

Main Results: 1980-2007 (baseline specification with different proxies of globalisation)

	Imp/VA	KOF (actual econ. flows)	KOF (overall)		**Structural Variables**
	0.20***	0.46	-0.70		Globalisation (1st or. lag)
	0.01***	0.01***	0.01***		R&D/VA
	1.12	1.05	1.63**		TFP
	-0.07	0.14	0.12		K per worker
	-0.04	-0.26	-0.18		K per worker (1st or. lag)
	0.50***	0.52***	0.42***		Real oil prices
	-0.19	-0.31**	-0.16		Real oil prices (1st or. lag)

Let us now turn to the current crisis and its impact on the Curve. We re-estimate the former model through 2008-2011 with no frills, and examine model stability. Then, we turn to an augmented model with country-specific (intercept) dummies, and an augmented model with country-specific (intercept) dummies plus a slope dummy for each institutional variable.

First, the 1980-2011 estimates with no frills. We get results that are very much consistent with the above ones.

Main Results: 1980-2011 (specification with imp/VA); no crisis dummies

	Baseline	No TFP	No K per w	No R&D		**Institutional Variables**
	-0.15***	-0.17***	-0.18***	-0.18***		EPL
	0.01***	0.01***	0.01**	0.01***		Unemployment benefit
	0.01	0.01**	0.01	0.01		Tax Wedge (1st or. lag)
	-0.25***	-0.24***	-0.21***	-0.31***		Bargaining coordination
	0.02**	0.01**	0.02**	0.03***		Union density
	-0.02***	-0.02***	-0.02***	-0.03***		Union density (1st or. lag)

Main Results: 1980-2011 – (baseline specification with different proxies of globalisation), no crisis dummies

	Imp/VA	KOF (actual econ. flows)	KOF (overall)		**Structural Variables**
	0.21***	0.29	-0.95		Globalisation (1st or. lag)
	0.01*	0.01*	0.01*		R&D/VA
	0.69	0.89	0.89*		TFP
	-0.30	-0.16	-0.18		K per worker
	0.20	0.04	0.12		K per worker (1st or. lag)
	0.50***	0.53***	0.39***		Real oil prices
	-0.21	-0.27**	-0.13		Real oil prices (1st or. lag)

The above found structural relationships seem to be stable enough in the 2008-2011 period (and formal stability tests, available upon request, validate this point). What about the crisis dummies?

Main Results: 1980-2011 (specification with imp/VA);with country-specific (intercept) dummies

	Baseline	No TFP	No K per w	No R&D		**Institutional Variables**
	-0.14***	-0.17***	-0.18***	-0.14***		EPL
	0.01**	0.01***	0.01**	0.01***		Unemployment benefit
	0.01	0.01*	0.01	0.01		Tax Wedge (1st or. lag)
	-0.29**	-0.28**	-0.27**	-0.29**		Bargaining coordination
	0.02***	0.02***	0.02**	0.03***		Union density
	-0.02***	-0.02***	-0.02***	-0.03***		Union density (1st or. lag)

Main Results: 1980-2011 – (baseline specification with different proxies of globalisation); with country-specific (intercept) dummies

	Imp/VA	KOF (actual econ. flows)	KOF (overall)		**Structural Variables**
	0.17***	0.30	-0.67		Globalisation (1st or. lag)
	0.01**	0.01***	0.01**		R&D/VA
	1.22	0.82	1.11*		TFP
	-0.30	-0.16	-0.18		K per worker
	0.24	0.04	0.12		K per worker (1st or. lag)
	0.41***	0.51***	0.39***		Real oil prices
	-0.16	-0.21**	-0.11		Real oil prices (1st or. lag)

Stability and the Crisis (1980-2011): The Dummies

	Intercept Dummy
Australia	0.07**
Austria	-0.13***
Finland	-0.13***
Germany	-0.17*
Norway	0.24***
Portugal	-0.04
Sweden	0.03
Switzerland	-0.12
UK	0.06

	Slope Dummy

Unemployment Benefit	-0.02
EPL	-2.67***
Tax Wedge	-0.03
Bargaining Coordination	0.06
Δ Union Density	-0.03

Again, we get results that are consistent with those for 1980-2007, and we must ask ourselves is the crisis really a structural change? The answer, pretty in line with the evidence from Arpaia and Curci (2010) and Elsby et al. (2010) suggests that there have been moves along rather than shifts of the Beveridge curve. As for the country dummies, there would appear to exist some role for neo-corporatism (see the negative intercept dummies for Austria, Finland, Germany and Switzerland). Only Norway's Curve seems to shift decisively outwards in the crisis, and this certainly warrants further attention. One would also like to have more evidence (countries?) in order to appraise the robustness and meaning of the EPL-slope dummy shift.

5. Concluding Remarks

In this paper we considered the economies of nine OECD countries from 1980 to 2011 period in order to appraise the existence of a OECD Beveridge Curve and to investigate the impact of various kinds of structural factors (technological progress, globalisation, oil prices) and of the current recession on the Curve.

An OECD Beveridge trade-off is actually found. Current and lagged technological progress (especially through the index of R&D intensity) tends to shift the curve outwards through the creative destruction effect. Also the first-order lagged coefficient of the globalisation index constructed along the lines of Koeniger et al. (2007) is consistently positive and significant. On the other hand, the KOF indexes of globalisation (much as they should allow for capital flows and outsourcing) were never significant. Oil prices intervene in terms of rates of change, but a positive effect prevails. Hence both globalisation and unfavourable oil shocks shift the Curve outwards. Capital accumulation is never significant and the TFP is, at best, much less significant than R&D intensity. Yet the creative destruction effect also comes through with TFP.

Among the institutional variables, union density and bargaining coordination are significant and have the expected impact on unemployment (yet union density has a transitory, rather than permanent, impact). EPL has the "wrong" sign, but, as already recalled, also Nickell et al. (2003) found this result. Unemployment benefit and, especially, the tax wedge are much less significant, although having the right sign.

Our structural relationships seem to be stable enough in the 2008-2011 period. In line with the evidence from Arpaia and Curci (2010) and Elsby et al. (2010) this suggests that there have been moves along rather than shifts of the Beveridge curve. Some role seems to emerge for neo-corporatism, although more evidence (from other countries?) is certainly needed on this point. Further research should also elucidate the paltry role we found for active labour market policies.

References

Aghion P. and Howitt P. (1994) 'Growth and Unemployment', *Review of Economic Studies*, 61, pp.477-494.

Allard G. (2005a) 'Measuring Job Security Over Time: In Search of a Historical Indicator', Instituto de Empresa Working Paper, WP 05-17.

Allard G. (2005b) 'Measuring The Changing Generosity Of Unemployment Benefits: Beyond Existing Indicators', Instituto de Empresa Working Paper, WP 05-18.

Arpaia A. and Curci N. (2010) 'EU labour market behavior during the Great Recession', EU Economic Papers, n. 405.

Bentolila S. and Saint-Paul G. (2003) 'Explaining Movements in the Labor Share', *B.E. Journal of Macroeconomics*. 3(1), pp.1-33.

Blundell R., Bond S.R. and Windmeijer F. (2001) 'Estimation in dynamic panel data models: improving on the performance of the standard GMM estimator', in Fomby T.B. and Carter Hill R.(eds) *Nonstationary Panels, Panel Cointegration, (Advances in Econometrics, Volume 15)*, Emerald Group Publishing Limited, pp.53-91.

Booth A., Burda M., Calmfors L., Checchi D., Naylor R. and Visser J. (2000) *What do Unions do in Europe?, A Report*, Fondazione Rodolfo DeBenedetti, Milan.

Daniel W. W. and Stilgoe E. (1978) *The Impact of Employment Protection Laws*, London, Policy Studies Institute.

Dreher A. (2006) 'Does Globalization Affect Growth? Evidence from a new Index of Globalization' *Applied Economics* 38 (10), pp.1091-1110.

Elsby M.W., Hobijn B. and Sahin A. (2010) '*The Labour Market in the Great Recession'* National Bureau of Economic Research Working Paper, n. 15979.

Harrigan J. (1997) 'Technology, Factor Supplies and International Specialization: Estimating the Neoclassical Model' *American Economic Review*, 87, pp.475-494.

ICFTU (1996) *The Global Market: Trade Unionism's Great Challenge*, ICFTU 16th World Congress, Brussels.

IMF (1996) *The Impact of Globalisation on Workers and Their Trade Unions*.

ISTAT, MARSS Database, http://marss.istat.it/.

Judson R.A. and Owen L.A. (1999) 'Estimating Dynamic Panel Data Models: a Guide for Macroeconomists' *Economics Letters*, 65, n.1, pp.9-15.

Koeniger W., Leonardi M. and Nunziata L. (2007) 'Labour Market Institutions and Wage Inequality' *Industrial and Labour Relations Review*, 60, n. 3, pp.340-356.

Kumar S. (2008) 'Energy Prices and Induced Technological Progress' *Economics Bulletin*, 17 (20), pp.1-14.

Layard R., Nickell S. and Jackman R. (1991) *Unemployment: Macroeconomic Performance and the Labour Market*, Oxford University Press.

Loungani, P. (1986) 'Oil Price Shocks and the Dispersion Hypothesis' *Review of Economics and Statistics*, 68(3), pp.536-539.

Mortensen D.T. and Pissarides C.A. (1998) 'Technological Progress, Job Creation and Job Destruction' *Review of Economic Dynamics*, 1, pp.733-753.

Nickell S. and Bell B. (1995) 'The Collapse in Demand for the Unskilled and Unemployment across the OECD' *Oxford Review of Economic Policy*, 11, pp.40-62.

Nickell S. and Layard R. (1999) Labour Market Institutions and Economic Performance in Ashenfelter O. and Card C. (eds), *Handbook of Labor Economics*, vol. 3 (Amsterdam: North Holland).

Nickell S. and Nunziata L. (2001) 'Labour Market Institutions Database' (attached to CEP discussion paper n. 0502).

Nickell S., Nunziata L., Ochel W. and Quintini G. (2003) 'The Beveridge Curve, Unemployment and Wages in the OECD from the 1960s to the 1990s' in Aghion P., Frydman R., Stiglitz J. and Woodford M. (eds.), *Knowledge, 'Information and Expectations' in Modern Macroeconomics: in honour of Edmund S. Phelps*, Princeton University Press, New Jersey, pp.394-431.

Nickell W. (2006) 'The CEP-OECD Institutions Data Set (1960-2004)' Discussion Paper n.759, Centre for Economic Performance, London School of Economics, November.

OECD (2004) *Database on Unemployment by Duration.*

OECD (1997) *Implementing the OECD Jobs Strategy : Member Countries' Experience.*

OECD (2004) *International Trade by Commodity Statistics.*

OECD, various years. *Labour Market Statistics Database.*

OECD (2006) *Main Economic Indicators.*

OECD (2004) *STAN Bilateral Trade Database.*

OECD, 2005. *STAN Database for Industrial Analysis.*

OECD *Stat Extracts,* http://stats.oecd.org/.

Pissarides C.A. (1990) *Equilibrium Unemployment Theory*. First edition. Cambridge, MA: MIT Press.

Pissarides C.A. (2003) 'Unemployment in Britain. A European Success Story' CEP, London School of Economics.

Pissarides C.A. and Vallanti G. (2007) 'The Impact of TFP Growth on Steady-State Unemployment' *International Economic Review*, 48, n. 2, pp.607-640.

Postel-Vinay F. (2002) 'The Dynamic of Technological Unemployment' *International Economic Review*, 43, pp.737-60.

Roodman D. (2009a) 'How to Do Xtabond2: An Introduction to Difference and System GMM in Stata' *Stata Journal*, 9, n. 1, pp.86-136.

Roodman D. (2009b) 'A Note on the Theme of Too Many Instruments' *Oxford Bulletin of Economics and Statistics*, Department of Economics, University of Oxford, 71, n. 1, pp.135-158.

Song L.L. and Webster E. (2003) 'How Segmented Are Skilled and Unskilled Labour Markets? The Case of Beveridge Curves', *Australian Economic Papers*, 42, pp.332-345.

Soto M. (2007) 'System GMM Estimation with a Small Number of Individuals' Institute for Economic Analysis, Barcelona, mimeo.

Thorpe V. (1997) 'Globalisation and Social Policy' Draft ICEM Position Paper.

Appendix

Table A.1 - *1980-2007 (specification with Imp/VA)*

	full	NO tfp	NO k	NO r&d_va
ur				
L1.	0.90***	0.90***	0.88***	0.97***
L2.	-0.36***	-0.35***	-0.33***	-0.39***
vr	-0.18***	-0.17***	-0.21***	-0.14***
inf	0.18***	0.17***	0.19***	0.20***
nrw	0.01*	0.01*	0.01*	0.01***
epl	-0.15***	-0.17***	-0.18***	-0.15***
Tx				
L1.	0.01	0.01**	0.01	0.01**
co				
--.	-0.30**	-0.29**	-0.27**	-0.28**
L1.	0.24**	0.25**	0.19	0.19
ud				
--.	0.02**	0.02**	0.02**	0.03***
L1.	-0.02***	-0.02***	-0.02***	-0.03***
imp_va				
--.	-0.14	-0.18	-0.08	-0.19
L1.	0.20***	0.20**	0.15**	0.21**
r&d_va				
--.	0.01***	0.01**	0.02***	
L1.	0.00	0.00	-0.00	
tfp				
--.	-0.09		-0.16	-0.84
L1.	1.12		1.14	1.69*
k				
--.	-0.07	-0.11		0.00
L1.	-0.04	0.02		-0.13
oilp				
--.	0.50***	0.43***	0.54***	0.47***
L1.	-0.18	-0.09	-0.19	-0.22

Table A.2 - *1980-2007 (specification with KOF index for actual economic flows)*

	full	NO tfp	NO k	NO r&d_va
ur				
L1.	0.88***	0.87***	0.90***	0.95***
L2.	-0.33***	-0.33***	-0.33***	-0.38***
vr	-0.18***	-0.17***	-0.18***	-0.14***
inf	0.18***	0.17***	0.19***	0.18***
nrw	0.01*	0.01	0.01**	0.01***
epl	-0.16***	-0.18***	-0.19***	-0.16***
Tx.				
L1.	0.01	0.01*	0.01	0.01*
co				
--.	-0.19	-0.19*	-0.23*	-0.19
L1.	0.15	0.16	0.14	0.11
ud				
--.	0.02**	0.02**	0.02**	0.03**
L1.	-0.02***	-0.02***	-0.02**	-0.02**
KOF-flows				
--.	-0.05	-0.18	-0.54	-0.08
L1.	0.46	0.32	0.26	0.21
r&d_va				
--.	0.01***	0.01***	0.02***	
L1.	-0.00	-0.00	-0.01	
tfp				
--.	-0.05		-0.33	-0.58
L1.	1.05		1.16	1.58
k				
--.	0.14	0.09		0.17
L1.	-0.26	-0.16		-0.30
oilp				
--.	0.52***	0.51***	0.57***	0.48***
L1.	-0.31***	-0.21**	-0.23**	-0.33***

Table A.3 - *1980-2007 (specification with KOF overall index)*

	full	NO tfp	NO k	NO r&d_va
ur				
L1.	0.86***	0.85***	0.85***	0.95***
L2.	-0.32***	-0.31***	-0.31***	-0.39***
vr	-0.16***	-0.17***	-0.17***	-0.13***
inf	0.19***	0.16***	0.20***	0.21***
nrw	0.01***	0.01**	0.01***	0.01***
epl	-0.19**	-0.20**	-0.21***	-0.19***
Tx				
L1.	0.01**	0.01**	0.01	0.01**
co				
--.	-0.28**	-0.24*	-0.32**	-0.25*
L1.	0.18	0.19	0.20	0.12
ud				
--.	0.02**	0.02*	0.02**	0.03***
L1.	-0.02***	-0.02***	-0.02**	-0.02***
KOF-overall				
--.	0.18	0.74	-0.03	0.14
L1.	-0.70	-0.82	-0.83	-0.91
r&d_va				
--.	0.01**	0.01***	0.02***	
L1.	0.00	0.00	0.00	
tfp				
--.	-0.59		-0.32	-0.84
L1.	1.63**		1.38	1.95**
k				
--.	0.12	0.19		0.16
L1.	-0.18	-0.25		-0.22
oilp				
--.	0.42***	0.41***	0.39***	0.38***
L1.	-0.16	-0.16	-0.11	-0.23

Table A.4 - *1980-2011 (specification with Imp/VA),No crisis-specific dummies*

	full	NO tfp	NO k	NO r&d_va
ur				
L1.	0.96***	0.94***	0.90***	0.97***
L2.	-0.37***	-0.36***	-0.32***	-0.38***
vr	-0.15***	-0.12***	-0.18***	-0.14***
inf	0.17***	0.15***	0.16***	0.15***
nrw	0.01**	0.01***	0.01**	0.01***
epl	-0.15***	-0.17***	-0.18***	-0.18***
Tx				
L1.	0.01	0.01**	0.01	0.01
co				
--.	-0.25**	-0.24*	-0.21**	-0.31**
L1.	0.19	0.21	0.14	0.21
ud				
--.	0.02***	0.01**	0.02***	0.03***
L1.	-0.02***	-0.02***	-0.02***	-0.03***
imp_va				
--.	-0.08	-0.12	-0.05	-0.13
L1.	0.21**	0.19*	0.17**	0.17***
r&d_va				
--.	0.01*	0.01	0.01	
L1.	-0.00	-0.00	-0.00	
tfp				
--.	0.35		-0.29	-0.46
L1.	0.69		1.22	1.51**
k				
--.	-0.05	-0.43		-0.19
L1.	0.11	0.45		0.24
oilp				
--.	0.50***	0.56**	0.57***	0.52***
L1.	-0.21	-0.12	-0.24	-0.23

Table A.5 - *1980-2011 (specification with KOF index for actual economic flows) No crisis-specific dummies*

	full	NO tfp	NO k	NO r&d_va
ur				
L1.	0.93***	0.93***	0.89***	0.96***
L2.	-0.38***	-0.36***	-0.34***	-0.39***
vr	-0.13***	-0.12***	-0.15***	-0.15***
inf	0.19***	0.17***	0.19***	0.18***
nrw	0.01*	0.01*	0.01***	0.01***
epl	-0.13***	-0.18***	-0.18***	-0.21***
Tx				
L1.	0.01	0.01*	0.01	0.01**
co				
--.	-0.23*	-0.25*	-0.22**	-0.26*
L1.	0.18	0.18	0.12	0.14
ud				
--.	0.01	0.01	0.02*	0.02*
L1.	-0.02*	-0.01***	-0.02**	-0.02*
KOF-flows				
--.	-0.15	-0.40	-0.66	-0.37
L1.	0.29	0.04	0.13	0.03
r&d_va				
--.	0.01*	0.01	0.01*	
L1.	-0.00	-0.00	-0.01	
tfp				
--.	0.89		-0.27	-0.37
L1.	0.18		1.02	1.15
k				
--.	0.01	0.41		0.10
L1.	-0.12	-0.40		-0.15
oilp				
--.	0.53***	0.63***	0.63***	0.52***
L1.	-0.27**	-0.06	-0.20**	-0.25**

Table A.6 - *1980-2011 (specification with KOF overall index)*
No crisis-specific dummies

	full	NO tfp	NO k	NO r&d_va
ur				
L1.	0.91***	0.90***	0.85***	0.92***
L2.	-0.36***	-0.35***	-0.33***	-0.37***
vr	-0.12***	-0.12***	-0.13***	-0.16***
inf	0.21***	0.15***	0.18***	0.19***
nrw	0.01	0.01	0.01	0.01*
epl	-0.21**	-0.16**	-0.19***	-0.25***
Tx				
L1.	0.01	0.01	0.01	0.01*
co				
--.	-0.33**	-0.27*	-0.26***	-0.25
L1.	0.18	0.21	0.15	0.10
ud				
--.	0.02**	0.01	0.02**	0.02**
L1.	-0.01*	-0.01	-0.02*	-0.02**
KOF-overall				
--.	-0.39	0.78	-0.33	0.22
L1.	-0.95	-0.96	-0.61	-1.02*
r&d_va				
--.	0.01**	0.01**	0.01**	
L1.	-0.00	0.00	-0.00	
tfp				
--.	0.11		-0.21	-0.29
L1.	0.89*		1.19*	1.12
k				
--.	0.06	0.60		0.18
L1.	-0.03	-0.63		-0.16
oilp				
--.	0.39***	0.48***	0.42***	0.40***
L1.	-0.13	-0.03	-0.06	-0.20

Table A.7 - *Full specification with Imp/VA, country-specific (intercept) dummies and standalone slope dummy for each institutional variable*

Model	zero	nrw	epl	tx	co	D.ud
cri_aus	0.07**	0.27	3.28***	0.92	-0.05	0.06**
cri_aut	-0.13***	0.10	5.89***	1.42	-0.36	-0.16***
cri_fin	-0.13**	0.26	6.01***	1.24	-0.42	-0.15***
cri_ger	-0.17*	0.26	5.72***	1.46	-0.41	-0.19**
cri_nor	0.24***	0.37*	2.38***	0.85	0.18*	0.23***
cri_por	-0.04	0.34	8.76***	1.13	-0.27	-0.05
cri_swe	0.03	0.36	5.91***	1.43	-0.15	-0.01
cri_swi	-0.12***	0.22	3.90***	0.56	-0.35	-0.13***
cri_uk	0.06	0.09	3.81***	1.09	-0.41	0.03
nrw		-0.01**				
cri_nrw		-0.02				
epl			-0.14***			
cri_epl			-2.67***			
tx				0.01		
cri_tx				-0.03		
co					-0.29**	
cri_co					0.06	
D.ud						0.02**
cri_D.ud						-0.03

Legend of tables A.1-A.7

The sample relates to 1980-2011 period and nine countries, for a sum total of 229 observations (197 observations up to 2007). The dependent variable is always the natural log of the unemployment rate.

Among the Z variables, *nrw* is the unemployment benefits indicator, *epl* the employment protection legislation indicator, *co* the bargaining coordination indicator, *ud* the union density indicator, *tx* the total tax wedge. The other variable labels have already been defined in the text.

In all models we have included yearly and country dummies and linear and quadratic trends, not shown in the interest of parsimony. Coefficient significances are denoted by stars: * means a p-value < .1; ** a p-value < .05; *** a p-value < .01. Diagnostics are always provided by the Arellano–Bond test for first, second and third order serial correlation (distributed as a normal), *Sargan* and *Hansen* tests of overidentifying restrictions that detect the exogeneity of the instruments as a group, and Difference-in-Hansen tests of exogeneity of instrument subsets. They are generally good (but for Sargan's test, which however is not as robust as the other two) and are available upon request.

Data Sources

The unemployment rates are derived from Nickell and Nunziata (2001), and updated through OECD Stat Extracts: they are based on OECD standardised rates and are an extension of those used in Layard *et al.* (1991).

The vacancy rates are taken from Nickell and Nunziata (2001) and updated with data from OECD Main Economic Indicators (2006). For Italy, vacancies data derive from the survey on the help-wanted advertisements published in some important daily newspapers, carried out by CSA (Centro di Studi Aziendali, Florence) and ISFOL (Istituto per lo Sviluppo della Formazione Professionale dei Lavoratori, Rome).

The inflow rate series is mainly taken from Nickell and Nunziata (2001), and updated through OECD Stat Extracts. However, the data for Italy are derived from the ISTAT MARSS Database, and those for Switzerland from the OECD Database on Unemployment by Duration

In our preferred globalisation index, total manufacturing imports from non-OECD countries are drawn by the OECD STAN Bilateral Trade Database and International Trade by Commodity Statistics (2004), and value added by the OECD STAN Database for Industrial Analysis (2005). KOF indexes (the overall one, and the sub-index for actual economic flows) come from http://globalization.kof.ethz.ch.

Oil prices (for the West Texas Intermediate) are taken from the US Energy information Administration. They converted in each country's currency using exchange rates from OECD.Stat Extracts, and deflated by country-specific consumer price indexes from the same source.

R&D intensity uses data for R&D expenditure taken from the OECD Research and Development Expenditure in Industry Database (2005), and value added by the OECD STAN Database. The source of the private non-residential net capital stock (i.e. the capital stock of the business sector) is the OECD Analytical Database (2002), whereas gross domestic output and employment are drawn from OECD.Stat Extracts and the smoothed share of labour from

the OECD Unit Labour Costs Dataset (2009). Total factor productivity is calculated as a Tornqvist index.

Employment protection legislation series, basically following the OECD methodology, are from Allard (2005a). Unemployment benefits are from Allard (2005b), who uses OECD data to build an indicator combining the amount of the subsidy with their tax treatment, their duration and the conditions that must be met in order to collect them. The index of bargaining coordination is taken from OECD (2004). All these data are updated using information from the OECD Stat Extracts.

Union density is calculated using administrative and survey data from the OECD Labour Market Statistics Database.

Finally, the total tax wedge is drawn from OECD.Stat Extracts.

Notes

1 See, e.g., the report produced by the International Confederation of Free Trade Unions (ICFTU) at its 16th World Congress (1996), or Thorpe (1997).

1 See for example IMF (1996) and OECD (1997).

1 In our opinion, endogeneity issues are also likely to concern the vacancy rate, as well as the institutional variables. It is anyway true that neglect of the issues is quite pervasive in the Bevridge Curve empirical literature.

1 There is actually an exception to this. The index of R&D intensity turned out to be more significant if not logged. A linear specification for this variable was then adopted, and is included in our reported estimates.

1 See e.g. Nickell and Layard (1999) or Booth *et al.* (2000).

1 For this reason, we "collapse" the instrument set into a single column.

5. **The Unemployment Gender Gap in a Comparative Perspective**

Maurizio Baussola, Jamie Jenkins, Chiara Mussida and Matthew Penfold

Abstract

This paper analyses the unemployment gender gap by using a three-state labour market model (Employment, Unemployment, Inactivity) which enables us to determine the equilibrium (steady-state) unemployment rate and the contribution that a single transition probability from each state makes to the unemployment differentials between males and females. This investigation falls within a comparative framework, in that we apply our methodology to the Italian and the UK labour markets. This comparison is relevant in that it considers two diversified institutional contexts, one typical of the so called Anglo-Saxon model, characterised by more flexible labour market legislations, and the continental model, which in contrast involves tighter legislative controls and more restrictive institutions. The analysis draws on the Italian and the UK Labour Force Surveys for the period 2006-2013. In addition, we propose an econometric model which enables us to estimate the determinants of the unemployment gender gaps, in order to pinpoint the relative role of individual characteristics (age, human capital) and other structural factors in determining such a gap.

*JEL Classification***:** C21, C41, J16, J31, J71

*Keywords***:** unemployment gender gap, differentials, multinomial models, transition probability matrix.

Introduction

The sharp increase in the unemployment rate during the recent economic downturn poses a number of different issues for researchers and policy makers dealing specifically with the role of structural vis-à-vis cyclical factors in determining an upturn. In this framework it is relevant to analyse an old but still relevant issue which has been largely understated over the last decade, i.e. the role of gender differentials.

The unemployment gender gap, i.e. the difference in male and female unemployment rates, has again started to receive attention only recently, after last being considered as a relevant economic and policy issue in the ’70s and early ’80s. The seminal papers by Martson (1976) and Clark and Summers (1979) are clear examples of that debate, which also included the role of ethnic factors as determinants of structural differences in the unemployment rate in the US. However, succeeding literature has concentrated mainly on other aspects of gender differentials, e.g. the male-female gap in the participation rate or the earning gap.

It is only since the second half of the 2000s that the unemployment gender gap has regained the attention that it deserves, with attention also focusing on international comparisons highlighting different patterns between the OECD economies. The study by Azmat, Guell and Manning (2006) emphasizes the different unemployment gender gaps in the European countries and the US using micro data collected from the European Community Household Panel Survey (ECHPS) and the Current Population Survey (CPS). They found that in countries where the gap is relatively high, i.e. the female unemployment rate is significantly higher than that for males, there is a significant difference in the gender gap in the flows from employment into unemployment and vice-versa. In addition, they show that in countries which show higher female participation rates, the unemployment gap is smaller. However, they also underlined the fact that in many European countries, in particular in southern Europe, this gap has increased despite a rise in the female participation rate over the past decades, thus suggesting that institutional factors can play a crucial role in determining such a persistence gap.

More recently it has been evidenced that the gender gap has decreased even more because of the effect of the economic recession, which has primarily affected the male component of the labour force (Sahin et al 2010) due to its impact on the construction and finance industries, in which the major component of the workforce is male.

Given this framework, we analyse the unemployment gender gap comparing the patterns of the Italian and the UK economies. The analysis is relevant as these two countries represent different institutional frameworks with different labour institutions and regulations. Italy has a typically southern European labour market, partitioned into segments characterised by significantly different levels of employment protection, and therefore different labour costs. The UK has a typically Anglo-Saxon labour market characterised by less employment protection legislation. It is worth noting that despite these intrinsic differences, both labour markets reveal overall high labour mobility, but this affects the labour forces in different ways. In particular, there is still a significant unemployment gender gap in the Italian labour market which underlines the disadvantage of the female component of the labour force; although this has decreased with respect to the '80s, it is still a structural characteristic.

We extend the analysis by Baussola (1985,1988) and Baussola and Mussida (2011, 2014) to provide more detailed and updated evidence of the determinants of labour market flows and, therefore, of the unemployment gender gap. We propose a decomposition of the gap which enables us to measure the marginal contribution of each labour market movement, i.e. from employment, unemployment and inactivity. In addition, we provide econometric estimates of these flows, which enable us to highlight their determinants and thus their impact on the unemployment gender gap, the latter in turn affected by the level of human capital, age, and other structural factors such as regional areas of residence.

Our analysis draws on the Italian and the UK Labour Force Surveys (LFS). These data sets have to be preferred with respect to the European Community Household Panel (ECHP) survey that took place in the 90s or the more recent European Union Statistics on Income and Living Conditions (EU-SILC) survey, as the latter reveal labour market flows only retrospectively. This fact may cause significant measurement errors related to possible misclassification, in particular with respect to unemployment status. Typically, the persistence rate in unemployment, i.e. the percentage of individuals who remain unemployed in a given interval (e.g. quarter or year), is significantly higher when calculated using the ECHP or EU-SILC data with respect to the LFS data. The latter, although not immune from possible misclassification, are specifically tailored to measure both labour market stocks and flows, whereas the ECHP and EU-SILC surveys are mainly tailored to investigate households' economic conditions, and thus an individual's labour force status can be derived only indirectly.

The paper proceeds as follows. Section 1describes stylized facts on the labour market in Italy and the UK. Section 2describes the data sets used and offers (and discusses) the empirical results on the determinants of the components of our decompositions. Section 3 describes the methodological framework adopted for the decomposition of the unemployment gender gap, and the results for Italy and the UK. Section 4 concludes.

1. Stylized facts

Before analyzing in more details the determinants of the unemployment gender gap, it is worth recalling the main stylized facts that characterize the labor market in Italy and the UK.

Figure 1 and figure 2 provide the pattern of the male and female unemployment rate since the beginning of the '90s in the two countries.

The stylized pattern of male and female unemployment in the two countries implies counter evidences, in that the unemployment rate for women is higher with respect to that of men in Italy, whereas the reverse condition applies in the UK. Also, the relative values of the unemployment rate do show a significant difference between the two labor markets. Interestingly, the condition of men in Italy is being better - on average – than the corresponding condition of men in the UK, although the unemployment rate has increased sharply in Italy over the recession.

The female unemployment rate in the UK is far below that prevailing in Italy; the average rate over the entire period is around 7.5% in the UK and around 12.5% in Italy.

In both frameworks the gender gap reduces over time, although this reduction is more significant in the UK. The gender gap decline over the last few years in Italy, crucially depends on the worsening

macroeconomic conditions due to the great recession, which has dramatically worsen employment opportunities for men.

Figure 1. *Unemployment differential by gender in Italy, 1993-2012*

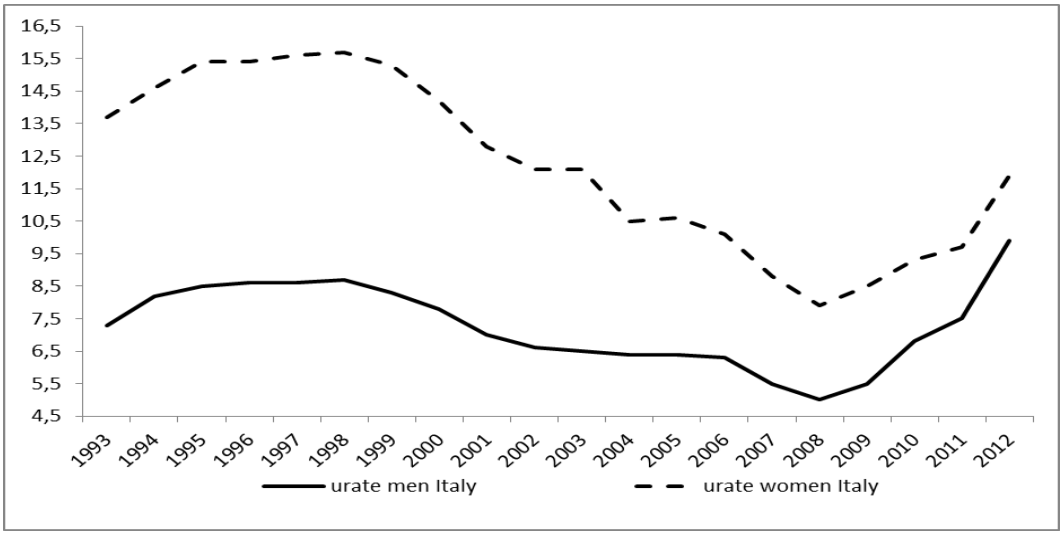
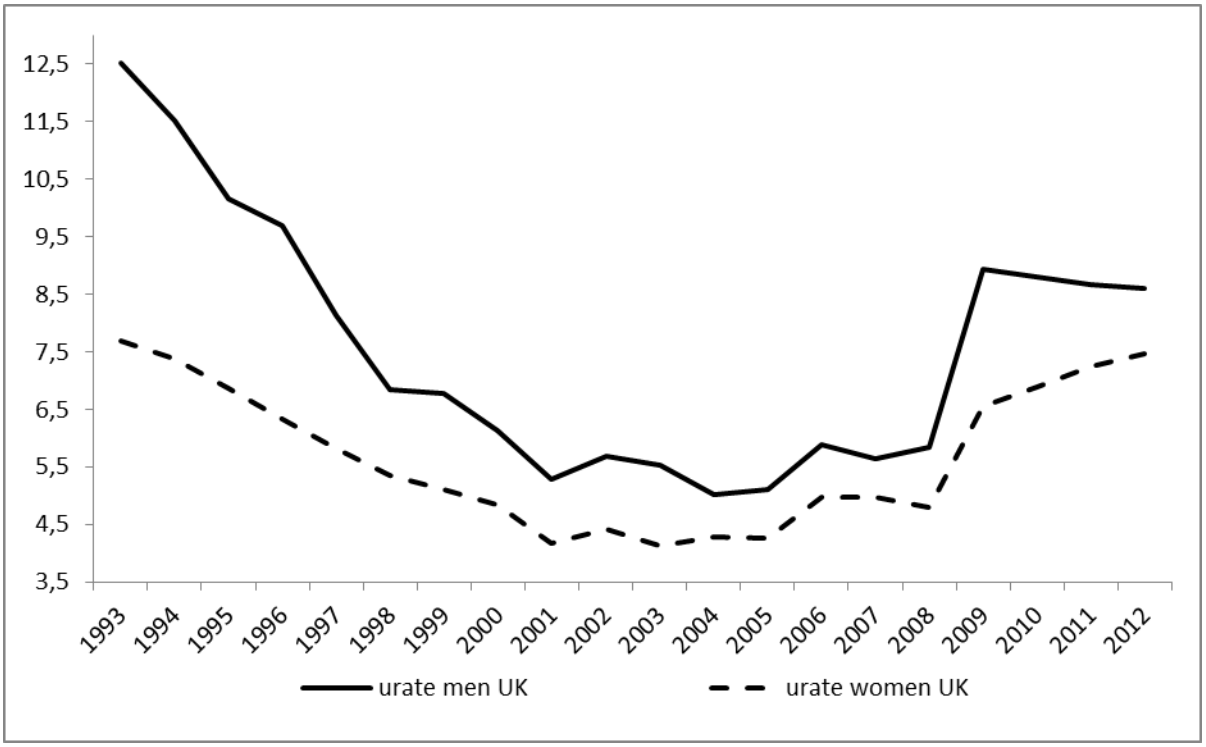


Figure 2. *Unemployment differential by gender in the UK, 1993-2012*



2. Data

The empirical analyses of the determinants of the unemployment gender gap (Section 2) and its decomposition (Section 3) exploit longitudinal data for Italy and the UK provided by the National Institutes of Statistics.

For Italy, we use longitudinal data (2006-2013) derived from the Labour Force Survey set up by the Italian National Institute of Statistics (ISTAT). Each quarter, the Survey collects information on

almost 77,000 households in 1,246 Italian municipalities for a total of 200,000 individuals. Technical details on the survey are provided in Appendix Section A-1.[57]

Information on the UK labour market comes from the Labour Force Survey developed by the Office for National Statistics (ONS). It is a quarterly survey in which households are interviewed for five consecutive quarters. Approximately 20% of the sample is replaced every quarter. The sample is made up of about 41,000 responding UK households per quarter.[58] With the use of proper population weighting procedures, the LFS is intended to be representative of the entire population of the UK.[59]

2.1 The determinants of the unemployment gender gap

The empirical results of our analyses on both countries are based on multinomial logit model estimates. We specify a separate model for each labour market state by assuming a simple three-state representation (employment, unemployment, and inactivity), and by assuming independence of the outflows from each of the three labour market states. The dependent variables utr, etr and itr thus refer to the outflows from the states of unemployed, employed and inactive, respectively.

Let $h = 1, \ldots, n$ be the indices for the h-th individual in the sample; let us define the conditional individual transition probability from state *a* to state *b* at time *t* as:

$$p_{ab,t(h)} = Pr\left(X_{t,h} = b | X_{t-1,h} = a, z_{t,h}\right) \quad (1)$$

where $X_{t,h}$ is the random variable describing the state of individual h at time t that can take the values $l = 0, 1, 2$ with 0 being unemployment, 1 employment and 2 the non-labour force; $z_{t,h}$ is a vector including

[57] The most recent changes in the definitions and design of the survey occurred in 2004. The changes, primarily dictated by the requirement to adapt the survey to new EU standards, were also intended to respond to the need for increased knowledge and improved survey quality. For a more detailed discussion of the characteristics of the Italian LFS, see ISTAT (2006 and 2009).

[58] Additional details on the LFS are available in the National Statistics website at http://www.ons.gov.uk/ons/search/index.html?newquery=LFS+user+guides.

[59] The LFS uses calibration weighting. The weights are formed using a population weighting procedure which involves weighting data to sub-regional population estimates and then adjusting for the estimated age and sex composition by region. Further details on the weighting methodology are available at http://www.ons.gov.uk/ons/search/index.html?newquery=LFS+user+guides.

individual-level covariates. The values of covariates are defined at the beginning of the period considered for the transitions. The model for the transition probabilities can be written as follows:

$$p_{ab,t(h)} = \frac{exp\{z_h^t \beta_l\}}{\sum_{l=0}^{2} exp\{z_h^t \beta_l\}} \qquad (2)$$

where, conventionally we set $\beta_0 = 0$, thus assuming permanence in the initial state as the baseline category. Model parameters are estimated using Maximum Likelihood.[60]

The determinants of labour market flows have been analysed both at the macro and micro level, in particular from the end of the '70s and during the '80s. Junankar and Price (1984) and Nickell (1982) estimated the determinants of unemployment inflows and outflows in the UK, whereas Baussola (1988) focused on the Italian labour market. The main finding of such analyses implies that labour cost, structural change variables (i.e. service and manufacturing employment ratios), labour demand and supply factors (unemployment benefits and vacancies) and unemployment duration do affect such flows.

Microeconomic analysis also focused on approaches typically referring to the search theory (e.g., Mortensen, (1977) and Narendranathan and Nickell (1985)), developed search-based models in which unemployment duration and, therefore, unemployment outflows, are the results of search activities of workers.

The characteristics of our dataset enable us to set up an econometric framework which combines labour demand and supply factors together with other possible structural determinants. However, such proxies of labour demand and supply factors are partially limited as, for instance, we do not have unemployment benefit or vacancies estimates.

Taking into account these unavoidable characteristics of our datasets, we have proceeded to set up an econometric model which explains employment, unemployment and inactivity outflows and inflows.

Explanatory variables may be grouped into supply determinants reflecting individual characteristics which are related to gender and education,[61] age, unemployment duration, employment related

[60] A detailed technical description of the Maximum Likelihood method in this context can be found in Gourieroux (1989, chap. 5), and Cameron and Trivedi (2005, chap. 15).

characteristics, like the sector of employment (whether public or private), the skill level of the job, and whether jobs are characterized by full-time or part-time contracts. We also consider yearly dummy variables to capture time-specific effects related to business cycle variations.

The purpose of our econometrical exercise is twofold. First, we investigate the determinants of labour market flows in Italy and in the UK. Then, we examine discrepancies and similarities between specific outflows determinants, especially the interactions between gender and education and the relevance of age, by comparing the results obtained across countries.

The estimates cover the period 2004-2013. We decided to divide the overall period in two time periods, pre-recession and recession, respectively, in order to examine the possible effects of the recent crisis on the labour market dynamics. For both Italy and the UK, pre-recession covers the period from 2004 to 2008-2009, whilst recession covers the period from 2009 to 2013.

Table 1 displays relative-risk ratios (rrr)[62] estimates for the determinants of unemployment outflows by time period and country. In Italy the impact on gender unemployment was asymmetric. This is confirmed by our estimates. The relative risk of successful exit from unemployment (UE) is higher for male with tertiary education (by a factor of 1.319) with respect to highly educated female before the crisis, whilst the rrr is not significant over the recession. In addition, whilst before the crisis female with secondary education move less frequently from unemployment to employment with respect to highly educated females, the rrr is not significant during the recession. These findings for Italy do offer suggestions in two directions. First, the crisis hit more sectors typically characterized by male employment. Second, the education loses its role in enhancing employment opportunities over the crisis. For the UK we do not find discrepancies of the interacted impact of gender and education before and over the recession. This confirms our finding of symmetric impact of the crisis on male and female unemployment.

[61] As it will be explained below, we introduce specific interactions between gender and educational attainment to obtain the joint effect of gender and education.

[62] The estimated coefficients β of the multinomial logit model are transformed to relative-risk ratios, that are e^{β}. The exponentiated value of a coefficient is the relative-risk ratio for a unit change in the corresponding variable (risk is measured as the risk of the outcome relative to the base outcome).

Another discrepancy between Italy and the UK refer to the probability of living unemployment (both successfully and for inactivity) of the young people in the age range 15-24. In Italy, the young people have lower employment opportunities and lower outflows to inactivity (UE and UN, respectively) compared to individuals in the age range 45-54 (reference category). The opposite is true in the UK. The probabilities of leaving unemployment (successfully or for inactivity) are indeed higher for young people than for those aged 40-55, both before and over the crisis.

The two countries are instead similar in terms of the impact of the unemployment duration. For the outflows from unemployment there is evidence of negative duration dependence, especially for the UK.

The rrr for the outflows from employment (Table 2) suggest two discrepancies between countries in terms of gender and education relevance. First, the nature of the unemployment gender gap is different, i.e. in Italy women do suffer of higher unemployment rates compared to men and this contrasts with the UK. Second, the impact of gender and education (interacted) on the employment outflows is higher in the UK, especially for the male component of the labour force.

We also find two similarities among countries. The young people, in both countries – especially in Italy - have higher probabilities of losing their job, either for unemployment or for inactivity. Finally, job characteristics (e.g., skill level of the job, sector of employment and type of contract) have the same impact (on E outflows) in both countries. In general, we find lower outflows from unemployment, for white-collar workers, in the public sector, and with full-time contracts. This is in line with expectations.

Table 3 shows the rrr for inactivity outflows. In general, women in both countries have higher difficulties to leave the state of inactivity with respect to men (as it emerges also in the empirical investigation in Section 4). The role of education in enhancing inactivity outflows seems to be higher in the UK compared to Italy, both before and over the crisis.

In Italy we find that young people are disadvantaged also in terms of inactivity outflows (as for unemployment outflows). People in the age range 15-24 have indeed lower probabilities of

leaving the state of inactivity compared to adults (25 years of age and over). Our findings therefore suggest that women and young are disadvantaged in Italy.[63] Young people and female component of the labor force are indeed typically defined as disadvantaged labour market categories in Italy.[64]

This contrasts with the finding for the UK: here the young people have higher probabilities of leaving the state of inactivity, both successfully and for unemployment (NE and NU, respectively).

Table 1: *Outflows from Unemployment by Gender and Education, Italy and UK,2004–2013*

	UE				UN			
	Pre Recession[(a)]		Recession		Pre Recession		Recession	
	IT	UK	IT	UK	IT	UK	IT	UK
gender and education[(b)(c)] interactions - Reference: female with a degree								
IT: male_primary education; UK: male_below GCSE, male_noqualifications	.752**	.422***	.727**	.450***	.653***	.483***	.722**	.449***
		.308***		.337***		.618***		.602***
IT: male_secondary education; UK: male_GCSE, male_AS A level, male_other higher education below degree	.776**	.454***	.831	.549***	.761**	.633***	.738**	.600***
		.625***		.576***		1.004		.716***
		.646***		.905		.589**		.669***
IT and UK	1.319**	.825***	1.183	.830***	.811	.521***	.705**	.463***

[63] Disadvantaged Workers are defined by the European Commission Regulation (EC) No. 2204/2012 of 12 December 2002 on the application of Articles 87 and 88 of the EC Treaty to State aid for employment [article 2] as "any person who belongs to a category which has difficulty entering the labour market without assistance". This definition includes: young people, women living in depressed areas, disabled people, migrants and ethnic minorities, long-term unemployed, low-skilled workers, unemployed people over 50, single parents, the formerly convicted, substance abusers.

[64] Italy is characterized by a labor market in which both tightness and flexibility coexists (Baussola and Mussida, 2011, OECD, 2009), and women are still participating at a disadvantage in the labour force. This tendency has lessened over the last decade and the participation rate of women has increased. Nonetheless the gender gap in labour force participation remains wide (Addabbo et al., 2012).

male_tertiary education (degree)								
IT: female_primary	.530***	.415***	.624***	.375***	1.277**	1.294***	1.321**	1.168
education; UK:		.309***		.288***		1.349***		1.165*
female_belowGCSE, female_noqualifications								
IT: female_secondary	.792**	.506***	.810	.515***	1.176	1.256***	1.211	1.222**
education; UK:		.638***		.660***		1.437***		1.183**
female_GCSE, female_AS A level, female_other higher								
education below degree		.689***		.716***		1.102**		1.183
duration of unemployment - Reference: less than 3 month								
3 to 6 months	.700***	.546***	.754***	.649***	.972	.651***	.931	.695***
6 to 12 months	.568***	.396***	.623***	.461***	.905	.585***	1.127	.565***
one to 2 years	.437***	.314***	.445***	.342***	.813**	.606***	.917	.537***
over 2 years	.295***	.140***	.306***	.232***	.950	.586**	.991	.491***
age - Reference: 40(45)-54 for UK (IT)								
[15,24]	.870	1.147***	.787**	1.104**	.727***	1.304***	.731***	1.306***
IT: [25,34]; UK:								
[25,39]	.868**	1.072	.976	1.003	.618***	1.147***	.745***	.995
IT: [35-44]	.945		1.078		.770***		.863**	
Time dummies - Reference: 2004 (2009)[(a)]								
2005 (2010)	1.080	.879	1.161**	.925	1.011	.892	1.204**	.928
2006 (2011)	1.126	.882***	1.000	1.007**	1.273***	.925	.951	.918***
2007 (2012)	1.156**	.865***	.756***	.901	1.004	.935	1.108	.718***
2008	.913	.946		1.009	1.027	.975		,846**
constant	2.306***	1.853***	1.602***	1.144**	1.667***	.491***	1.268***	.473***

Notes: * Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.

(a) We divided the overall period in two time periods, pre and recession, respectively. For both Italy and the UK pre-recession is the period from 2004 to 2008-2009, whilst recession is the period from 2009 to 2012. (b) For Italy, educational dummy indicators refer to the highest and successfully completed educational attainment of a person. The educational classification used to build these indicators is the ISCED 97. We have three categories: primary education (none, elementary or lower secondary educational level), secondary education (upper secondary attainment level), and tertiary education (post secondary or tertiary educational level). (c) For the UK we have six levels: 1 "degree or equivalent", 2 "Other higher education below degree", 3 "AS, A-Level or equivalent, 4 "GSCE or equivalent", 5 "Below GCSE", 6 "No qualifications"

Table 2: *Outflows from Employment by Gender and Education, Italy and UK, 2004–2013*

	EU				EN			
	Pre Recession[a]		Recession		Pre Recession		Recession	
	IT	UK	IT	UK	IT	UK	IT	UK
gender and education[b][c] interactions - Reference: female with a degree								
IT: male_primary education; UK:	1.192	1.455***	1.404***	1.538***	.825***	.565***	.835**	.552***
male_below GCSE,								
male_noqualifications		1.946***		2.060***		.900***		.859
IT: male_secondary education; UK:	.927	1.405***	1.108	1.665***	.681**	.597***	.661***	.610***
male_GCSE, male_AS A level,		1.063**		1.396***		.925**		.916
male_other higher education below								
degree		1.017**		1.481***		.555***		.482***
IT and UK male_tertiary education	.731**	1.096**	.684**	1.169**	.541***	.649***	.487***	.645***
(degree)								
IT: female_primary education; UK:	1.183	1.041	1.260**	1.114	1.705***	1.004	1.402***	.885
female_belowGCSE,		1.133***		1.166		.969		1.105
female_noqualifications								
IT: female_secondary education; UK:	1.169	.905	1.036	1.028	1.206**	.694***	1.104	.740***
female_GCSE, female_AS A level,		.779***		.914		1.019		1.027
female_other higher education below								
degree		.723***		1.011		.714**		.859**
skill level of job - Reference: high skill[a]								
upper middle level		1.201**		1.224***		1.096**		1.040
lower middle level		1.425***		1.330***		1.216***		1.137**
low level	2.251***	1.921***	2.147***	1.547***	1.816***	1.659***	1.788***	1.327***
Public employment	.531***	.547***	.555***	.553***	.593***	.774***	.699***	.788***
Full-Time employment	.475***	.828***	.578***	.764***	.389***	.308***	.402***	.304***
age - Reference: 40(45)-54 for UK (IT)								
[15,24]	4.833***	1.735***	4.284***	1.306***	2.708***	2.255***	3.097***	2.317***
IT: [25,34]; UK: [25,39]	2.360***	.946	2.253***	.946	1.250***	1.163***	1.498***	1.194***
IT: [35-44]	1.264***		1.458***		.716***		.873**	
Time dummies - Reference: 2004 (2009)[a]								
2005 (2010)	.949	1.062	.918	.904***	.952	.931	.939	.962
2006 (2011)	.670***	1.063	1.204***	.875***	1.014	1.014	.983	.881**
2007 (2012)	.886**	.994	1.349***	.869***	.912**	.944	1.426***	.852***
2008	1.207***	.982		.790***	.996	.978		.956
constant	.014***	.029***	.015***	.049***	.066***	.066***	.057***	.067***

Notes: * Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.

(a) We have four skill levels of job for the UK: 1 High; 2 Upper Middle; 3 Low; 4 Low. For Italy we have two categories, blue-collar and white collar.

(b): For Italy, educational dummy indicators refer to the highest and successfully completed educational attainment of a person. The educational

classification used to build these indicators is the ISCED 97. We have three categories: primary education (none, elementary or lower secondary educational level), secondary education (upper secondary attainment level), and tertiary education (post secondary or tertiary educational level).
(c) For the UK we have six levels: 1 "degree or equivalent", 2 "Other higher education below degree", 3 "AS, A-Level or equivalent, 4 "GSCE or equivalent", 5 "Below GCSE", 6 "No qualifications".

Table 3: *Outflows from Inactivity by Gender and Education, Italy and UK, 2004–2013*

	NE				NU			
	Pre Recession		Recession		Pre Recession		Recessi	
	IT	UK	IT	UK	IT	UK	IT	U
gender and education interactions - Reference: female with a degree								
IT: male_primary education;	.618***	.482***	.571***	.377***	.866	1.672***	1.105	1.
UK: male_below GCSE, male_noqualifications		.311***		.231***		1.146**		.8
IT: male_secondary	.798***	.564***	.882	.523***	1.129	1.615***	1.341***	1.
education; UK: male_GCSE, male_AS A level, male_other higher education below degree		.617***		.573***		1.282***		1.
		.849**		.681**		1.746***		1.
IT and UK male_tertiary education (degree)	1.562***	1.210***	1.383***	1.198**	1.241	1.675***	1.597***	1.
IT: female_primary	.219***	.317***	.223***	.333***	.473***	1.215	.487***	1.
education; UK: female_belowGCSE, female_noqualifications		.241***		.183***		.687***		.5
IT: female_secondary	.465***	.469**	.455***	.464***	.740***	1.067	.722***	1.
education; UK: female_GCSE, female_AS A level, female_other higher education below degree		.661***		.658***		.934		.9
		.761***		.695***		.987		.9

age - Reference: 40(45)-54 for UK (IT)								
[15,24]	.958	3.935***	.784***	3.370***	1.391***	2.259***	.874**	1.
IT: [25,34]; UK: [25,39]	2.292***	1.429***	2.003***	1.254***	3.352***	1.442***	2.391***	1.
IT: [35-44]	1.813***		1.732***		2.339***		1.796***	
Time dummies - Reference: 2004 (2009)								
2005 (2010)	1.213***	.938*	1.009	.872***	1.079	.974**	.930	1.
2006 (2011)	1.079**	1.021	.967	.890**	.745***	.959	1.350***	1.
2007 (2012)	1.231***	.956	.567***	.801***	1.064	.937	.952	.9
2008	.994	.913		.791***	.962	1.085**		1,
constant	.184***	.091***	.195***	.087***	.067***	.029***	.087***	.0

Notes: * Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.

2.2 Discussion

Our findings confirm that women and young are disadvantaged in Italy.[65] Young people and female component of the labor force are indeed typically defined as disadvantaged labour market categories in Italy.[66] This contrasts with the finding for the UK: here the young people have higher probabilities of leaving both the states of unemployment and inactivity.

Why people in the age range 15-24 are "not disadvantaged" in the UK compared to Italy? More in general, how does the UK compare with Europe and therefore with Italy? The labour market structure/characteristics and the institutional developments in the UK might have

[65] Disadvantaged Workers are defined by the European Commission Regulation (EC) No. 2204/2012 of 12 December 2002 on the application of Articles 87 and 88 of the EC Treaty to State aid for employment [article 2] as "any person who belongs to a category which has difficulty entering the labour market without assistance". This definition includes: young people, women living in depressed areas, disabled people, migrants and ethnic minorities, long-term unemployed, low-skilled workers, unemployed people over 50, single parents, the formerly convicted, substance abusers.

[66] Italy is characterized by a labor market in which both tightness and flexibility coexists (Baussola and Mussida, 2011, OECD, 2009), and women are still participating at a disadvantage in the labour force. This tendency has lessened over the last decade and the participation rate of women has increased. Nonetheless the gender gap in labour force participation remains wide (Addabbo et al., 2012).

generated more favourable labour market perspectives for young people compared to Italy (and European Countries).

With regard to the characteristics of the labour market in the UK, the official statistics/data help confirming different and more encouraging perspectives for young people compared to Italy. Young people in the UK are increasingly involved in full-time education. The share of people in 15–24 years in full-time education went from 37.3% in 2004 to 42.1% in 2013 (ONS data).[67] After leaving education most young people immediately become unemployed regardless of qualification. The unemployment pool therefore increases. However, as people age and have had more time to look for work after leaving education the proportion unemployed falls. At age 24, the unemployment proportion is lowest for people with degrees or equivalent.

Most young people not in full-time education were employed at the end of 2013. Data from the ONS show that around 69% of the young people not in full-time education were employed at the end of 2013, whilst 15% were unemployed and the remaining 16% inactive. The relatively low percentage (especially whether compared to Italy) of young people not in education and work (inactive) suggest that the phenomenon of "not in employment, education or training" (NEET) is less relevant/important in the UK with respect to Italy. The NEET rate for population aged 15-24 was 14% compared to 21% in Italy in 2012 (latest data available).[68]

The phenomenon of youth unemployment is less relevant in the UK compared with Europe and especially with Italy. The youth unemployment rate in the UK was 21% compared to the European average of 23.5% and to the Italian rate of 40%.

As for the institutional developments, UK and Italy represent different institutional frameworks with different labour institutions and regulations. UK has an institutional context typical of the so called Anglo-Saxon model characterised by more flexible labour market legislations and therefore less employment protection legislation. Italy has a typically southern European labour market characterised

[67] The ONS data are available online at http://www.ons.gov.uk/ons/search/index.html?newquery=young+people.
[68] NEET are young people not in employment, education or training. The age range of the young people included in the definition varies across countries. In the UK the NEET include young people aged 15 to 24, whilst in Italy the range goes from 15 to 29 years of age. Although there is a difference in the age range considered for the definition of the NEET, the phenomenon is less important/relevant in the UK compared to Italy.

by the continental model which involves tight legislative controls and quite restrictive institutions. The labour market is partitioned into segments characterised by significantly different levels of employment protection, and therefore different labour costs.

The advantage of young people in the UK might therefore be partly due to the more flexible legislation compared to Italy. In addition, the fact that in the UK the government labour market policies principally aimed at those who have left full-time education and are not in work limited the explosion of very dramatic phenomena, like the NEET.

The situation of young people therefore varies across countries. From the discussion in this paragraph we can get some insights on the reasons behind these gaps/differences among countries. The UK has a high involvement of students in the labour market, an average level of unemployment (compared to Italy and, in general, to Europe), and a long-standing tradition of students doing part-time or summer jobs. This surely explains the higher opportunities of young people in the UK to leave both the state of inactivity and unemployment compared to Italy. In Italy, indeed, few students are employed or unemployed. The overlap between the labour market and education is very small and many young people complete their studies before looking for their first job. This implies longer periods of both inactivity (when students) and unemployment (when looking for a job) for young people in Italy compared to the UK.

Finally, to enhance the labour market perspectives of young people it is necessary to introduce policies aimed at increasing their labour force participation. In this respect, Germany might act as best practice. The youth labour market in Germany is characterized by high levels of employment and almost no unemployment among those in education. The reason of this favourable conditions for young people in the labour market is primarily due to the presence of established apprenticeships systems or vocational training in secondary education. These systems help to develop competencies and skills not learned on an educational course and therefore help the young people to leave more rapidly and with success the state inactivity and also to reduce the risk of unemployment.

2.3 Hazard rate comparison

The previous analysis has emphasized the determinants of the unemployment gender gap and the different impact of such variables in the Italian and British labor markets. We can use the results of the previous section to compare the prediction – in term of transition probabilities – implied by each estimated equation with the transition probabilities that may be derive from the aggregate labor market flows.

Figure 3 shows how the aggregate labor market flows may be represented, whereas Tables A1 and A2 in Appendix 1 shows the implied transition probabilities. These probabilities may be derived by dividing the flows from each state by the corresponding initial stock. As pointed out by Basawa and Rao (1980) this measure corresponds to the Maximum Likelihood estimation of the corresponding hazard rate.

Figure 3: *Labour Market Transition Matrix*

	State at time t		
State at time t-1	**Employed**	**Unemployed**	**Inactive**
Employed	***ee***	***eu***	***ei***
Unemployed	***ue***	***uu***	***ui***
Inactive	***ie***	***iu***	***ii***

This representation is the familiar first order discrete Markovian model which implies that transition probabilities are independent on the time spent in each state. This is equivalent to say that, for example, the probability of leaving unemployment is not affected by the time one individual is being unemployed. This assumption may be a limitation, particularly when long term unemployment increases and microeconomic data show the significance of the duration dependence effect. However, the Markovian representation may be thought of as a reasonable approximation of the average labor market flows over a relatively long time span.[69]

In addition, one should consider the fact that multiple transitions may occur within the average

[69] We have also tested for the hypothesis that observations are from a first-order Markov chain, concluding that such an hypothesis cannot be rejected.

time span considered (year). For this reason, we have used the methodology proposed by Shimer (2012) which has enabled us to produce transition probabilities consistent with multiple transitions.

The results of both the Markovian transitions and those implied by applying this later methodology are shown in Tables A1 and A2 in the Appendix, together with the fitted values of the implied probabilities estimated with the multinomial logit models (Section 3.1).

Results show values which are relatively similar and, more important, they show a consistent dynamic pattern. In addition the steady state unemployment rate derived from the Markovian representation and the multiple transition approach are very close and therefore, this fact suggests that the methodology we have applied may enable us to decompose the unemployment differential by gender according to the contribution provided by each single transition probability.

In the following section we present and discuss the results of such a decomposition, which has also been discussed and presented in Baussola and Mussida (2014). We simply refer to the equation showing the male-female unemployment rate decomposition, which allows calculating the female and male steady-state unemployment rates (u_f and u_m, respectively) and then to decompose[70] their differentials (Δu) as follows:

$$\Delta u \cong \sum_{k=1}^{6} \frac{1}{2}\left[\frac{du}{d\lambda.m(k)} + \frac{du}{d\lambda.f(k)}\right]\Delta\lambda(k)$$

where $\lambda(k)$ is the individual ($k-th$) transition probability and the terms in brackets represent the marginal impact of each probability on the steady state unemployment rate;[71] $\Delta\lambda(k)$ is the difference between female and male $k-th$ transition probability.

3. Unemployment differential decomposition in Italy and UK

This section sketches the methodology used for the breakdown of unemployment gender differentials in Italy and in the UK. We adopt a simple three-state labour market representation, i.e. employment,

[70] The steady-state unemployment rate decomposition is used by, among others, Barnichon and Figura (2010).

[71] The impact is computed as a partial derivative of the steady-state unemployment rate with respect to each transition probability $\frac{du}{dp(k)}$, evaluated at the intermediate point between the values of male and female. The value obtained from eq. (8) informs on the impact of each gender difference in the transition probabilities on the unemployment rate differential.

unemployment, and inactivity. Such a representation enables us to describe the labour market by means of a Transition Probability Matrix which shows both permanence in each labour market condition and the probability of moving from one state to another in a given period of time. We analise three labour market stocks, namely employment (E), unemployment (U), and inactivity (I). Transition probabilities are computed as the ratio between each flow and the corresponding stock at initial time, assuming a discrete first order Markov chain representation.[72] We compute quarterly transition probabilities, which are then averaged over the year. The Italian and the English LFS, indeed, offer transition probabilities at the same time frequency. We also apply, as explained above, the technique proposed by Shimer (2012)[73] to correct the transition probabilities obtained with the Markovian approach for possible multiple transition bias. The figures are shown in the Appendix Tables A1-A2.[74] In general, the transition probabilities computed with the two methods show the same pattern.[75] We therefore decided to use the uncorrected (Markovian) transition probabilities for our analyses.

In general terms, labour market transition probabilities enable us to measure the relative size of each labour market state and therefore to measure both the unemployment level and its rate. By looking at the transition probability matrix by gender we can determine both the absolute difference between the unemployment rates and the relationship between such transition probabilities, and differences in the unemployment rate by gender.

This decomposition of the unemployment rate differential may be derived by assuming the steady-state condition, i.e., by assuming that inflows and outflows from all labour market states counterbalance.[76] Under this assumption we can express the steady-state unemployment rate in terms of

[72] For details on the methodology, see Baussola and Mussida (2014).

[73] Shimer (2012) developed a technique to correct for multiple transitions bias the labour market transitions obtained by surveys carried out at different time frequency. For instance, quarterly transitions are not directly comparable to annual transitions, since bias would result from the presence of multiple transitions within the year. The technique is used by, among others, Gomes (2012) to compare the quarterly transitions of the UK LFS with the monthly transitions of the US LFS. He corrected the quarterly UK transitions for the bias resulting from the presence of multiple transitions within the quarter.

[74] We decided to show the figures for the initial and final year of the period analysed for the sake of brevity. Nonetheless, estimates for the overall period are available upon reguest.

[75] We also used the corrected (Shimer) transition probabilities to compute the differentials in transition probabilities and in the steady state unemployment rates. Since the corrected transitions gave the same results as the uncorrected, we decided to show only the computation with the uncorrected transitions.

[76] In terms of the aforementioned Markov chain representation, this implies the determination of the equilibrium condition (ergodic condition) within such a dynamic system (Basawa and Rao, 1980).

transition probabilities. This definition of the steady-state unemployment rate allows us to express variation in the unemployment rate in terms of variations in the transition probabilities. In other words, the methodology described enable us to evaluate the marginal impact of each transition probability on the steady state unemployment rate.

3.1 Results

The analysis of the unemployment gender gap is relevant as Italy and the UK are characterized by different institutional frameworks characterized by diversified labor institutions and regulations. Italy, indeed, represents the typical Southern European context in which the labour market is partitioned into segments characterized by significantly different levels of employment protection, and, therefore, different labor costs. On the other hand, the UK represents the typical anglo-saxon labor model characterized by a lower employment protection legislation.

It is worth noting that, despite these different intrinsic characteristics, both labor markets show on the whole high labor mobility which, however, affects the labor force in a diversified way. In particular, the Italian labor market still present a significant unemployment gender gap which underlines how the disadvantage of the female component of the labor force, although reduced with respect to the '80s, is a structural characteristic of the Italian labor market. The aim of our analyses is therefore to show similarities and discrepancies among the two countries.

It should be noted, however, that our results contrast with those analyses based on the reconstruction of ins and outs of unemployment by using variation in labor market stocks. In particular, Elsby et al. (2013) apply the methodology developed by Shimer (2012) to estimate inflow and outflow hazard rates from and to unemployment, using publicly available data from the OECD economies.

This methodology enables them to classify countries in terms of the relevance of inflows and outflows contributions to the unemployment variation. The Anglo-Saxon countries, and therefore the UK, are characterized by high inflow and outflow hazards, whereas such rates are significantly lower in

Continental countries, like Italy. In addition, the outflow rate constitutes the major part of the variation in unemployment in the Anglo-Saxon countries, while in most European economies the split between inflow and outflow contributions to unemployment variation is almost equal.

It should be underlined that this result is obtained ignoring the flows from and to inactivity. Thus, the framework derived under such a methodology which neglects inflows and outflows from inactivity typically describes, for instance, a tight labor market in Continental Europe, particularly in Italy.

Other studies, including Smith (2011) and Gomes (2012) for the UK, Petrongolo and Pissarides (2008) and Silva and Vázquez-Grenno (2013) for France, Spain and other European Countries, have focused on the contribution of unemployment inflows and outflows changes in unemployment stock. They adopt both a two-state and a three-state decomposition and they get similar results.[77] When they use a three-state decomposition, they find that slightly more than 20% of the fluctuations in unemployment can be attributed to flows between inactivity and the labour force. From the remaining, the job finding rate is more important than the job separation rate (around 60% and 40% of the fluctuations in unemployment, respectively). When they adopt a two-state decomposition, the job separation rate is more important and accounts for around 50% of the volatility of unemployment. Their approach is in line with that proposed by Shimer (2012) and includes the extension proposed by Fujita and Ramey (2009).

On the contrary, our investigation is based on the aforementioned Transition Probability Matrix approach, which implies a simple Markovian discrete process.

Although this representation is not immune from possible drawbacks and bias on the calculated hazard rates,[78] it implies nonetheless less stringent assumptions with respect to the Elsby et al. (2012) approach,[79] since it considers also the flows from to and from inactivity.

[77] The values reported by Gomes (2012) are in line with the ones reported by Petrongolo and Pissarides (2008). They found that in the UK, by using data from the LFS, job separation rate has the same contribution to unemployment fluctuations as the job finding rate.

[78] The Markovian representation does imply, for example, that transition probabilities are conditional on the present state of the system and do not depend on the time spent in each state. We have tested for the hypothesis that the calculated TPM is a representation of a first order discrete Markov chain following Basawa and Rao (1980). More in detail, we test for the null hypothesis of independence of transition probabilities. The test rejects the null hypothesis of independence, thus suggesting that the first order Markov chain representation is appropriate.

It is worth recalling, however, that in a more recent study Elsby et al. (2013) do consider the flows to and from inactivity in order to reassess cyclical fluctuations within the US labour market. Their suggestion is that the contribution of flows between unemployment and inactivity to unemployment variation is significant even when error measurements are taken into consideration, and they account for around 1/3 of the overall cyclical unemployment movements.

The adopted transition probabilities are calculated by dividing the quarterly outflows from each status by the corresponding initial stock, according to the Markovian approach.[80]

It can easily be shown that the unemployment gender gap is still a relevant issue within the Italian labour market as the unemployment rate for women is on average 2 to 3.3 percentage points higher than that for men (Table A1 in the Appendix). This characteristic is shared with other OECD countries, in particular the Mediterranean economies, as pointed out in Azmat et al. (2006) and by OECD data.[81]

Instead the gender gap is not relevant in northern European and Anglo-Saxon countries; in particular, the UK shows unemployment rate for men which are higher than those for women, especially over the recent recession (the unemployment rate for men is on average 0.6 to 1.8 percentage points higher than that for women, Table A2 in the Appendix). The US economy exhibits similar trends of the gender unemployment rates, with a disadvantage for the male unemployment especially since the economic downturn (Sahin et al., 2010).

As regards labour market transition probabilities, we refer to employment outflows towards unemployment (*eu*) and inactivity (*ei*), permanence in unemployment (*uu*) and outflows from unemployment (*ue* and *ui*). Finally we consider outflows from inactivity and the probability of successful labour force entry (*pie*)[82]. The corrected and uncorrected transition probabilities for Italy

[79] Elsby et al. (2012b) present average unemployment in- and outflow rates across countries which, for example, show unrealistic values for the Italian labor market. Indeed, their estimate for Italy implies an outflow rate of 4.1% and an inflow rate of 0.4%, which - of course - corresponds to an extremely tight labor market. However, according to our TPM representation outflow and inflow rates are far more realistic, as, for example, the average outflow rate over the period 2006-2012 is about 30.4% and the corresponding inflow rate is about 2%.

[80] We recall that the calculated transition probabilities obtained by dividing each flow by its corresponding stock, is equivalent to the Maximum Likelihood estimation of the corresponding hazard rate (Basawa and Rao (1980)).

[81] OECD data confirm such evidence. These are available at http://www.oecd- ilibrary.org/employment/unemployment-rate_20752342-table1.

[82] The probability of successful labour force enry is defined as: ie/(ie+iu).

and the UK (total and by gender) for the initial and final year of the period analysed[83] are reported in the Appendix Tables A.1 andA. 2, respectively.

Table 4: *Gender Unemployment rate Differentials by Year, Italy*

	eu	en	Ue	un	Ne	nu	Diff. Tot(1)	Diff. Tot(2)
				2006-2007				
diff between transition prob. (F-M)	-.0016	.0391	-.0893	.1483	-.0164	-.0052		
du/dp(i)M	1.5828	.5168	-.0849	-.0572	-.4258	.8783		
du/dp(i)F	1.524	.6266	-.1204	-.0770	-1.224	2.175		
1/2[du/dpiM +du/dpiF]	1.553	.5717	-.1026	-.0671	-.8249	1.527		
Unemployment rate difference	-.2469	2.233	.9174	-.9954	1.3503	-.7961	2.463	2.229
	eu	en	ue	un	Ne	nu	Diff. Tot(1)	Diff. Tot(2)
				2012-2013				
diff between transition prob. (F-M)	.0009	.0171	.0042	.1169	-.0176	-.0159		
du/dp(i)M	2.021	1.098	-.3055	-.1394	-.3488	.6820		
du/dp(i)F	1.759	1.001	-.2861	-.1233	-1.458	1.104		
1/2[du/dpiM +du/dpiF]	1.890	1.050	-.2958	-.1314	-.9036	.8931		
Unemployment rate difference	.1846	1.799	-.1240	-1.535	1.589	-1.425	.4881	.8520

[83] We decided to report only the figures for 2006-2007 and 2012-2013 for the sake of brevity. The results for the overall period are available upon request.

Table 4 displays the transition probabilities – for the initial and final year of the period - used to compute the steady-state unemployment rate for Italy. The last two columns report the total difference between gender in the steady-state unemployment rate explained by such probabilities, and the gender gap in the steady-state unemployment rate,[84] respectively. By looking at the last rows of each yearly estimate it is easy to see the contribution of each probability to the gender unemployment gap. It is worth underlining the fact that the most relevant flow in determining this gap is *ei*, i.e. flows from employment to inactivity. This strengthens previous evidence provided by Baussola (1985) and Marston (1976), and contrasts with other evidence not based on aggregate labour market flows which explains unemployment dynamics only in terms of inflows and outflows from unemployment to employment.

The gender gap trend in the steady state unemployment rate, as reported in the last column of Table 4, is very close to that computed by gender differentials, thus emphasizing the fact that during the recent crisis the gender gap has decreased. This is due to the fact that the economic downturn hit male and female employment asymmetrically. This is particularly due to the sectoral characteristics of this crisis, which has hit economic sectors typically characterized by a high male employment rate. These changes have resulted in an increase in male unemployment and therefore in a reduction in the gender gap in unemployment rates.

The condition of women has not improved, but given that male employment has fallen, there has been a reduction in the unemployment gap with respect to men.

The reduction in the gender unemployment rate gap is also confirmed by official statistical data (Figures 1 and 2 and Table A1 in the Appendix), and drops from 3.3 percentage points in 2006 to 2 percentage points in 2012. This reduction depends on the increase in the male unemployment rate which climbed from 5.5% in 2006 to 9.9% in 2012. The female unemployment rate also increased, but with lower rates compared to men (from 8.8% in 2006 to 11.9% in 2012).[85] The lower increase of

[84] For technical details on the computation of the steady-state unemployment rate, see Baussola and Mussida (2014).
[85] These figures are available at http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database.

the unemployment for women confirms that a significant discouragement effect does exist and crucially affects the female component of the labour force.

Figure 2 displays the official and the steady state unemployment rates by gender in the UK for the period 2006-2012. The gender gap in the unemployment rates in the UK show a disadvantage for the male component of the labour force and this is in contrast to Italy. The structural characteristics of the labour market are different and in the UK and the female component of the labour force do show higher employment opportunities compared to men.

Table 5 show the gender unemployment rate differential for the UK. As for Italy, the most relevant flow in determining the unemployment gender gap is *ei*, i.e. flows from employment to inactivity. Another similarity to Italy, is the evidence of higher difficulties of women to leave the state of inactivity. In both countries, indeed, women do show lower hazard of leaving inactivity both successfully (ne) and for unemployment (nu).

The gender gap trend in the steady state unemployment rate, as reported in the last column of Table 2, is close to that computed by gender differentials especially before the recession.

The gender gap in unemployment, as confirmed by the official statistics, slightly increased from 0.8 percentage points in 2006 to 1.01 percentage points in 2012.[86] The recession therefore did not exert a relevant impact on the gender unemployment gap in the UK. This is due to the fact that, in contrast to Italy, the economic downturn hit male and female employment almost symmetrically. The impacts of the recession have resulted in an (almost) equal increase in male and female unemployment – i.e. both male and female unemployment rates increased of around 2.5 percentage points.[87]

To sum up, the comparison between Tables 4 and 5 suggest discrepancies and similarities between Italy and UK.

In terms of discrepancies, women in the labour force (employed and unemployed) are more favoured in the UK, especially in terms of employment opportunities once unemployed. In Italy, instead, men were

[86]These figures are available at http://www.ons.gov.uk/ons/taxonomy/index.html?nscl=Unemployment+Rates.
[87] The male unemployment rate increased from 5.8% in 2006 to 8.5% in 2012, whilst the rate for women increased from 5% in 2006 to 7.5% in 2012. As a result, the increase (due to the recession) of both genders unemployment rates was around 2.5 percentage points. These figures are available at http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database.

typically favoured at least since the beginning of the recession. This is due to the fact that the economic downturn hit the Italian male and female employment asymmetrically. This is particularly due to the sectoral characteristics of this crisis, which has hit economic sectors typically characterized by a high male employment rate.

The similarities, instead, refer to the inactive women. Women out of the labour force, indeed, are disadvantaged compared to men in both countries and for both the outflows, i.e successful exits (ne) and transitions from inactivity to unemployment (nu).

Table 5: *Gender Unemployment rate Differentials by Year, UK*

	eu	en	ue	un	ne	nu	Diff. Tot(1)	Diff. Tot(2)
				2006-2007				
diff between transition prob. (F-M)	-.0021	.0116	.0011	.1028	-.0132	-.0201		
du/dp(i)M	2.574	1.203	-.1479	-.0788	-.2243	.2558		
du/dp(i)F	2.169	.8896	-.1150	-.0670	-.3945	.5515		
1/2[du/dpiM +du/dpiF]	2.371	1.046	-.1315	-.0729	-.3094	.4036		
Unemployment rate difference	-.4785	1.212	-.0141	-.7499	.4085	-.8119	-.4338	-.4004
	eu	en	ue	un	ne	nu	Diff. Tot(1)	Diff. Tot(2)
				2012-2013				
diff between transition prob. (F-M)	-.0048	.0098	-.0196	.0722	-.0060	-.0234		

du/dp(i)M	2.967	1.733	-.2432	-.1012	-.3102	.2210		
du/dp(i)F	2.785	1.443	-.2067	-.0996	-.5569	.5178		
1/2[du/dpiM +du/dpiF]	2.876	1.588	-.2249	-.1004	-.4336	.3694		
Unemployment rate difference	-1.385	1.563	.4404	-.7243	.2620	-.8649	.1560	-.6691

(1)Sum of the unemployment rate differences.
(2)Difference between the steady-state unemployment rates.

Figure 1: *Official and Steady State Unemployment Rates, Italy and UK, 2006-2012*

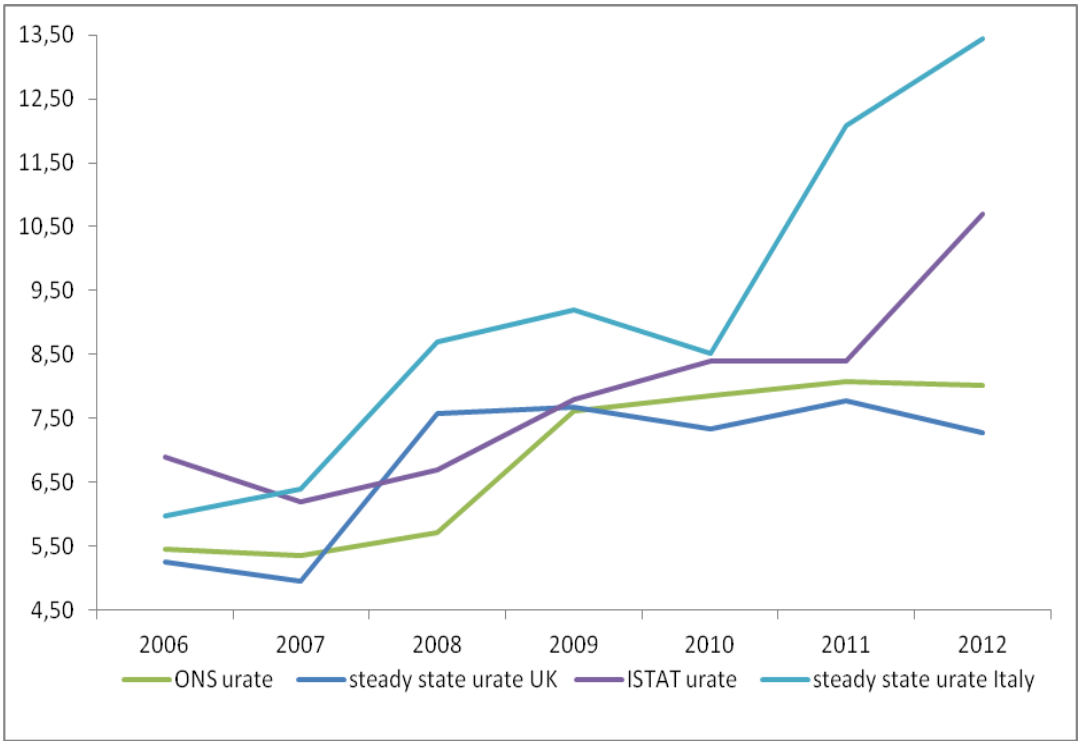
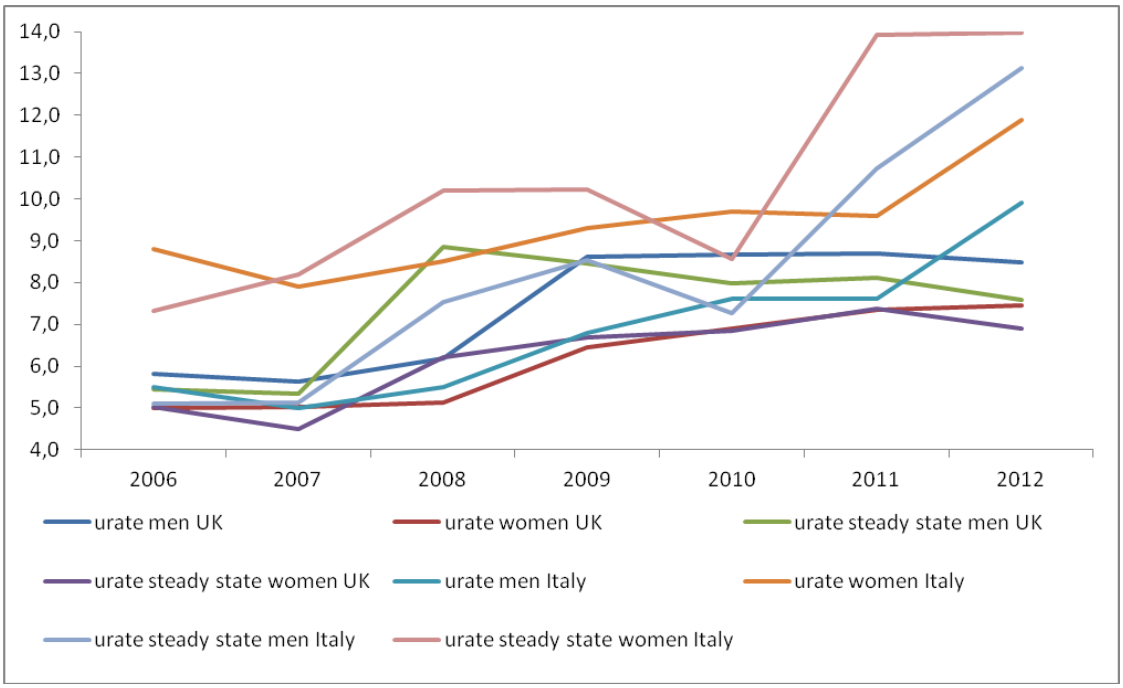


Figure 2:*Official and Steady State Unemployment Rates by Gender, Italy and UK, 2006-2012*



4. Conclusions

Analysis of the unemployment gender gap is particularly relevant for the Italian and UK labour markets. Even though Italy and the UK are characterised by different institutional frameworks - having different labour institutions and regulations - both labour markets present high labour mobility overall, which however affects the two nations' labour forces differently. We have proposed a breakdown of unemployment enabling us to pinpoint the most relevant labour flows determining these gaps in a comparative perspective, i.e. by analyzing the features within the Italian and UK economies.

This analysis suggests that the inclusion of the state of inactivity gives a more precise decomposition of the gender gap, as the flows from inactivity to employment represent a non-negligible component of the overall inflows to employment. In this respect women in both countries do show a significantly lower probability of successful entry into the labour force with respect to their male counterparts.

The microeconometric estimates confirm these analyses and also suggest discrepancies and similarities between the two countries. The recent crisis has given rise to one discrepancy: we find that the impact of the recession on employment in Italy has been asymmetric, the crisis hitting sectors typically characterized by male employment harder. In addition, education has lost its role in enhancing employment opportunities in Italy. For the UK instead, the crisis has had a symmetric impact on gender employment, and the role of education has not altered. Another discrepancy between Italy and the UK involves the probability of young people in the age range 15-24 exiting unemployment. In Italy young people have lower employment opportunities and lower outflows to inactivity compared to older workers. The opposite is true in the UK.

The two countries are instead similar in terms of the impact of unemployment duration. For the outflows from unemployment there is evidence of negative duration dependence. In addition, women in both countries experience greater difficulty in leaving the state of inactivity with respect to men.

Our findings therefore suggest that women and the young are disadvantaged in Italy. Young people and the female component of the labour force are indeed typically defined as disadvantaged labour market categories in Italy. This contrasts with the findings for the UK: here women experience lower unemployment with respect to their male counterparts and young people have higher probabilities of leaving the state of inactivity, both successfully and for unemployment.

References

Addabbo, T., R. Garcìa–Fernàndez, C. Llorca–Rodrìguez, and A. Maccagnan, "Poverty and Unemployment: The Cases of Italy and Spain," in G. Parodi and D. Sciulli, eds., *Social Exclusion. Short and Long Term Causes and Consequences*, Berlin: Springer Physica–Verlag, 2012, chapter 10, pp. 199–220.

Azmat, G., M. Guell, and A. Manning, "Gender Gaps in Unemployment Rates in OECD Countries," *Journal of Labor Economics*, 2006, *24* (1), 1–37.

Barnichon, R. and A. Figura, *What Drives Movements in the Unemployment Rate? A Decomposition of the Beveridge Curve*, Division of Research and Statistics and Monetary Affairs Federal Reserve Board, Washington, DC, Finance and Economics Discussion Series 2010-48.

Basawa, I.V. and B.L.S. Prakasa Rao, *Statistical Inference for stochastic processes*, London: Academic Press, 1980.

Baussola, M., "Flussi occupazionali e differenziali nei tassi di disoccupazione maschili e femminili," *Rivista Internazionale di Scienze Sociali*, 1985, *3*, 122-145.

__ , "Labour Mobility in Italy: An Empirical Investigation," *Labour*, 1988, *3*, 113–142.

__ and C. Mussida, "The natural rate of unemployment and the unemployment gender gap," 2011. Department of Economic and Social Sciences, Catholic University of the Sacred Heart, Piacenza, Working Paper No. 80.

__ and C. Mussida, "Transitions in the Labour Market: Discouragement Effect and Individual Characteristics," *Labour*, 2014, forthcoming.

Cameron, A.C. and P.K. Trivedi, *Microeconometrics: Methods and Applications*, Cambridge University Press, 2005.

Clark K. B – Summers L.H. (1979) , "Labor Market Dynamics and Unemployment: A Reconsideration Brookings Papers on Economic Activity", 1979, 1, 13-72.

Discenza, A.R. and C. Lucarelli, "Dati longitudinali a 12 mesi di distanza - Aspetti metodologici," 2009. ISTAT, Nota metodologica allegata alla diffusione dei file MFR, Dicembre 2009, Roma.

Elsby, M., B. Hobijn, and A. Sahin, "On the Importance of the Participation Margin for Labor Market Fluctuations," 2012. Federal Reserve Bank of New York, September 2012.

__ , , and , Unemployment Dynamics in the OECD, *Review of Economics and Statistics*, MIT Press, 2013, 95(2), 530-548.

Fujita, S. and G. Ramey, "The Ciclicality Of Separation And Job Finding Rates," *International Economic Review*, 2009, *50*, 415–430.

Gomes, P., "Labour market flows: Facts from the United Kingdom," *Labour Economics*, 2012, *19*, 165–175.

Gourieroux, C., *Econométrie des variables qualitative, second edition*, Paris: Economica, 1989.

ISTAT (2006), "La rilevazione sulle forze di lavoro: contenuti, metodologie, organizzazione," 2006. ISTAT - Metodi e Norme n. 32 - 2006 - Roma.

__ "Forze di Lavoro - Media 2008," 2009. Annuari, Roma.

__ , *Rapporto Annuale. La situazione del Paese nel 2009* 2010.

Junankar, P.R. and S. Price, "An Anatomy of Unemployment Flows in Great Britain," 1984. Institute for Employment Research, University of Warwick, September,, Discussion Paper No. 26.
Marston, S.T., "Employment Instability and High Unemployment Rates," *Brookings Papers on Economic Activity*, 1976, (1).
Mortensen, D., "Unemployment Insurance and Job Search Decisions," *Industrial and Labor Relations Re- view*, 1977, *30* (4), 505–517.
Narendranathan, W. and S. Nickell, "Modelling the Process of Job Search," *Journal of Econometrics*, 1985, *28* (1).
Nickell, S., "The Determinants of Equilibrium Unemployment in Britain," *Economic Journal*, 1982, *40* (1).
OECD, *Employment Outlook*, Paris: OECD, 2009.
Petrongolo, B. and C. A. Pissarides, "The Ins and Outs of European Unemployment," *American Economic Review*, 2008, 98 (2), pp. 256-262.
Sahin, A. et al., "The Unemployment Gender Gap during the 2007 Recession," *Federal Reserve Bank of New York, current issues in Economics and Finance*, 2010, *16* (1). Available on line at http://www.newyorkfed.org/research/current_issues.
Shimer, R., "Reassessing the Ins and Outs of Unemployment," *Review of Economic Dynamics*, 2012, 15 (2), pp. 127-148.
Silva, J. I. and J. Vázquez-Grenno, "The ins and outs of unemployment in a two-tier labour market, Labour Economics, 2013, 24 (5), pp. 161-169.
Smith, J. C., "The ins and outs of UK unemployment", *The Economic Journal*, 2011, vol. 121, 402-444.

Appendix

A-1 The Italian LFS

The sampling design of the survey is composed of two stages, with a stratification of the unit at the first stage; the first stage units are municipalities, while the second stage comprises households.

Each household member is interviewed. The main difference between the two stages is that while for families a 2-2-2 rotation scheme is applied, the municipalities surveyed do not change over time.

More specifically, a household was interviewed for two consecutive surveys and, after being excluded from the sample for two quarters, was interviewed for another two consecutive quarters. This is defined as a (2-2-2) rotation scheme.[88]

This rotation system makes it possible to maintain half the sample unchanged in two consecutive quarters and in quarters one year apart. In other words, the scheme implies a 50% overlapping of the theoretical sample to a quarter of the distance, a 25% overlapping to three quarters, a 50% to four quarters, and a 25% to five quarters. Our analyses are based on yearly longitudinal data for the period 2004-2012.

These data are employed both to compute the labour market transitions which determine the steady-state unemployment rate and the related gender differentials, and to estimate the determinants of the labour market transitions which mostly affect such indicators and differentials. This latter investigation is carried out by using the variables described in Appendix Table A-1. The choice of variables was driven both by specific econometric tests and preliminary checks, and by the relevance of the indicators which are widely emphasized in the literature and in the aforementioned descriptive statistics.

Table A1: *Transition Probabilities and Unemployment rates by Gender and Year, Italy.*

[88] For in-depth details on the sampling design, see Discenza and Lucarelli (2009).

	eu	en	ue	un	uu	ne	nu	pne	u*	urate**
					2006-2007					
					Markov					
M	.0157	.0453	.3497	.3257	.3245	.0513	.0249	.6735	5.09	5.50
F	.0141	.0844	.2603	.4741	.2656	.0349	.0197	.6399	7.32	8.80
T	.0151	.0606	.3022	.4045	.2933	.0409	.0216	.6549	5.97	6.99
					Shimer					
M	.0264	.0435	.5952	.5597		.0460	.0432	.5158	5.09	5.50
F	.0256	.0841	.4883	.8733		.0319	.0368	.4643	7.32	8.80
T	.0264	.0587	.5393	.7200		.0368	.0388	.4866	5.97	6.99
					2012-2013					
					Markov					
M	.0313	.0463	.2381	.2967	.4653	.0563	.0670	.4563	13.14	9.90
F	.0322	.0635	.2422	.4135	.3442	.0387	.0511	.4309	13.98	11.90
T	.0316	.0534	.2396	.3516	.4087	.0454	.0571	.4431	13.44	10.70
					Shimer					
M	.0449	.0436	.3483	.4567		.0483	.1039	.3175	13.14	9.90
F	.0536	.0564	.4126	.7152		.0295	.0891	.2485	13.98	11.90
T	.0484	.0486	.3746	.5672		.0370	.0928	.2849	13.44	10.70
					Fitted***					
Pre	.0198	.0430	.3053	.3710	.3237	.0948	.0655	.5914		
Rec	.0278	.0391	.2608	.3645.	.3747	.0818	.0826	.4976		

Notes: (*) u is the steady-state unemployment rate, (**) urate is the actual unemployment rate.
(***) Averages of the periods pre-recession and recession.

Table A2: *Transition Probabilities and Unemployment rates by Gender and Year, UK.*

	eu	en	ue	un	uu	ne	nu	pne	u*	urate**
					2006-2007					
					Markov					
M	.0132	.0145	.2682	.1486	.5832	.0659	.0578	.5327	5.44	5.82
F	.0112	.0261	.2693	.2514	.4793	.0527	.0377	.5830	5.04	5.01
T	.0122	.0199	.2689	.1937	.5373	.0573	.0446	.5620	5.25	5.45
					Shimer					
M	.0168	.0143	.3473	.2049		.0595	.0803	.4258	5.44	5.82
F	.0154	.0257	.3806	.3718		.0479	.0562	.4599	5.04	5.01
T	.0161	.0195	.3615	.2737		.0519	.0635	.4499	5.25	5.45
					2012-2013					
					Markov					
M	.0165	.0121	.2369	.1224	.6406	.0515	.0723	.4160	7.58	8.47
F	.0117	.0219	.2174	.1946	.5879	.0455	.0489	.4818	6.91	7.46
T	.0142	.0167	.2285	.1535	0.6179	.0477	.0575	.4532	7.28	8.01
					Shimer					
M	.0203	.0117	.2957	.1618		.0433	.0962	.3104	7.58	8.47
F	.0146	.0219	.2807	.2630		.0407	.0666	.3791	6.91	7.46
T	.0177	.0164	.2984	.2038		.0415	.0769	.3506	7.28	8.01
					Fitted***					
pre	.0076	.0106	.2763	.1904	.5333	.0644	.0427	.6010		
rec	.0096	.0091	.2196	.1540	.6264	.0526	.0538	.4944		

Notes: (*) u is the steady-state unemployment rate, (**) urate is the actual unemployment rate.
(***) Averages of the periods pre-recession and recession.

6. **Does MigrationLead to Regional Convergence in Russia?***

Elena Vakulenko

Abstract

We analyze the impact of migration on wage, income and the unemployment rate. Using the official Russian statistical database from 1995 to 2010, we calculate a dynamic panel data model with spatial effects. There is a positive spatial effect for wage, income and unemployment rate. There is no significant impact of migration on the unemployment rate. We find a negative relationship between net internal migration and both wages and income, which is explained by the positive effect of emigration and negative effect of immigration for income. However, the migration benefits are not big enough to make a difference on the Gini index across regions. We conclude that migration does not affect the regional σ-convergence of economic indicators.

*JEL Classification***:** R23, C23.

*Keywords***:** convergence, migration, wage, income, unemployment rate, spatial dynamic panel data models.

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Introduction

There are significant differences between regions in the Russian Federation. The inter-regional differences in income in Russia are twice as large as in USA or Canada (Kwon & Spilimbergo, 2006)[89]. However, in 2000 we observe a gradual regional convergence, especially in income, wages and the unemployment rate, less so in GDP per capita (Guriev & Vakulenko, 2012). The differentials in income and wages decreased substantially. In this paper we investigate the contribution of migration to convergence. We use Russian regional data for the period 1995-2010 to answer this question. We analyze the impact of migration on wages, income and unemployment rate.

There are many empirical papers on the role of migration in the convergence process reaching different conclusions. Some papers (Persson (1994), Maza (2006), etc.) conclude that there is a positive effect, that is migration leads to convergence. Other researchers (Peeters (2008), Etzo (2008), etc.) find a negative relationship; migration leads to a divergence between regions. Finally, there are papers (Barro & Sala-i Martin (1991, 1992), Soto & Torche (2004), etc.) which claim that there is no significant statistical relationship between migration and convergence[90]. Theoretical papers also present different economic arguments behind the impact of migration on regional convergence. There are two approaches: the neoclassical theoretical model and the New Economic Geography theory. Therefore, the identification of the role of migration in a convergence processes is an empirical question.

Our results show that migration has no significant impact on the unemployment rate. We find a negative relationship between net internal migration, and wages and income, which is explained by the positive effect of emigration and negative effect of immigration for income. However, the migration benefits are not big enough to make a difference on Gini

[89] The standard deviation of real regional income in USA was approximately 0.2 during 1995-2000, in Russia it was around 0.4 for the same period.
[90] We discuss this question more detailed in the Section 2.2.

index across regions. We conclude that migration does not affect the regional convergence of economic indicators. For the unemployment rate, wages and incomes we find a positive spatial effects.

The rest of the paper is organized as follows. Section 2 provides a review of the theoretical and empirical literature. Section 3 presents the empirical models. Section 4 illustrates our data issues. Section 5 discusses the results. Section 6 concludes.

1. Literature review

1.1.Theoretical papers

There are two different concepts of migration and convergence. This is because interregional migration produces both labor supply and labor demand effects. On the labor supply side, workers can reduce regional disparities by moving to more prosperous regions. Labor supply in receiving regions increases and as a result wages decrease. The opposite situation occurs in sending regions. Therefore, interregional disparities in wages and unemployment reduce. On the labor demand side, migrants increase expenditure in a receiving region because of their demand for goods and services. Neoclassical theory suggests that the labor supply effect dominates the labor demand effect. The main assumptions of the neoclassical paradigm are homogenous labor, constant return to scale and diminishing marginal returns, and perfect competition. On the other hand, the New Economic Geography model argues that the labor demand effect dominates the labor supply effect if we consider imperfect competition. In this case 'core' regions gain from immigration in terms of higher real wages and a lower unemployment rate and 'periphery' regions lose from emigration (Krugman, 1991). Therefore, the disparities between regions increase.

Many papers consider heterogeneous labor migrants. In some cases skill-selective migration can increase interregional disparities in per capita income (Fratessi & Riggi, 2007). Because of the improvement in the capital/labor ratio and savings of returning workers, migration positively affects the sending regions, therefore interregional

disparities can be reduced (Larramona & Sanso, 2006). Labor mobility can reduce the speed of income convergence because emigration creates a disincentive for gross capital investment especially in regions with low initial wage levels (Rappaport, 2005). There is a series of papers where the wages of migrants and the native population are compared (Dustman et al., 2008). Different theoretical concepts have led many researchers to argue that the impact of migration on convergence is an empirical question.

The question about the relationship between migration and per capita income is more complex. We know that there are different sources of income: wages, capital income, social benefits, and one of these could explain the convergence of income. Guriev and Vakulenko (2012) show that the main source of income convergence is capital income. We control for difference channels of income convergence and argue that migration leads to income convergence because of wages. In this case we can explain this relationship through labor market stories mentioned earlier.

1.2.Empirical papers

The first empirical paper on regional convergence and migration was done for the US economy by Barro and Sala-I-Martin (1991). They did not find that migration had a significant effect on convergence. In their following papers the authors estimated the same model for Japanese prefectures and European states, and their conclusions were the same. The authors show that the neoclassical model can be approximated as:

$$(1/T)\ln\left(y_{it}/y_{i,t-T}\right)=\alpha-\left[\ln\left(y_{i,t-T}\right)\right]\left[\left(1-e^{-\beta T}\right)/T\right]+u_{it}$$

where y_{it} is per capita GDP or income for region i at time t. T is the length of the analyzed time period. This model is called the unconditional β-convergence model. The modification of this model by the additional of variables is the conditional β-convergence model. Absolute or β-convergence means that poorer regions tend to grow faster than richer regions, and hence gaps between regions for this indicator will be reduced. Barro and Sala-i-Martin add a migration variable to the model above and show that migration does not influence convergence. A large amount of later research estimated similar models with

different sets of control variables, different instruments for the migration rate, for cross section and panel data (for regions in different countries and for different time spans). In Table 1 a summary of different studies is presented. There are various results with positive, negative and insignificant relationships between migration and convergence.

Table 1. *Empirical studies of migration and convergence*.

Authors	**Country/Period**	**Effect (convergence)**[91]	**Indicator**
Persson (1994)	Sweden (1906-1990)	+	Per capita income
Raymond & García (1996)	Spain (60s-80s)	+	Income
Cashin & Sahay (1996)	India (1961-1991)	Weak +	Per capita income
Lugovoy et al. (2006)	Russia (1998-2004)	+	GDP per capita
Maza (2006)	Spain (1995-2002)	+	GDP per capita
Østbye & Westerlund (2007)	Sweden (1980-2000)	+	GDP per capita
Kırdar & Saraçoğlu (2008)	Turkey (1975-2000)	Strong +	Income
Hierro & Maza (2010)	Spain (1996–2005)	Weak +	Income
Barro & Sala-i Martin (1991, 1992)	USA (1880-1982) Japan (1930-1987)	No	Per capita income
Cardenas, Ponton (1995)	Colombia (1960-1989)	No	Income
Gezici & Hewings (2004)	Turkey (1987-1997)	No	GDP per capita
Soto & Torche(2004)	Chile (1975-2000)	No	Income Productivity level

[91] "+" means that migration leads to convergence, "-" means that migration leads to divergence, "No" means that migration does not affect convergence.

Authors	**Country/Period**	**Effect (convergence)**[91]	**Indicator**
Toya, Hosono &Makino (2004)	Philippines (1980-2000)	No	GDP per capita
Roses & Sanchez-Alonso (2004)	Spain (1850-1930)	No and weak "+" for urban wage	Wage
Čadil & Kaderabkova (2006)	Czech Republic (1995-2004)	No	GDP per capita Nominal wage
Wolszczak-Derlacz (2009a)	EU(27) (1990-2007)	No	GDP per capita
Rattsø & Stokke (2010)	Norway (1972-2003)	No	Per capita income
Shioji (2001)	Japan (1960-1990)	Weak -	Income
Peeters(2008)	Belgium (1991-2000)	-	Per capita income
Østbye & Westerlund (2007)	Norway (1980-2000)	-	GDP per capita
Etzo (2008)	Italy (1983-2002)	- Different effects of in- and outmigration	GDP per capita
Araghi & Rahmani (2011)	Iran (2000-2006)	-	GDP per capita
Basile, Girardi & Mantuano (2012)	Italy (1995-2006)	-	Unemployment rate
Nakamura (2008)	Japan (1955-2005)	+ 1970-75 1989-94 –divergence	GDP per capita
Wolszczak-Derlacz (2009b)	Poland (1995-2006)	No (internal) -(international outflow)	GDP per capita
Phan & Coxhead (2010)	Vietnam (1999-2002)	+ and -	Per capita income
Niebuhr et al. (2012)	Germany (1995-2005)	+ No	Unemployment rate Wage
Bunea (2011)	Romania (2004-2009)	No Weak +	GDP per capita Unemployment

Authors	Country/Period	Effect (convergence)[91]	Indicator
Capasso, Carillo & De Siano (2011)	Italy (1964-2002)	- (high skill) + (low skill)	GDP per capita
Huber & Tondl (2012)	EU(27) (2000-2007)	No (Unemployment) - GDP per capita - productivity	Unemployment GDP per capita Productivity

2. Econometric specification

Empirical testing of the influence of migration on convergence may be done in at least two ways. They are: (1) the Computable General Equilibrium (CGE) model and an econometrical calculation of the statistical relationships using metadata studies, and (2) convergence models (Huber & Tondl, 2012). In this paper we use the second approach. We consider a basic conditional β-convergence model similar to Barro and Sala-I-Martin (1991). However, we extend their approach by exploiting the model data structure using:

$$\ln\left(\frac{y_{i,t}}{y_{i,t-1}}\right) = \alpha_i + \delta_t - \beta \ln\left(y_{i,t-1}\right) + \gamma \text{Migration}_{i,t-1} + \sum_{k=1}^{K} \theta_k \text{X}_{k,i,t} + \varepsilon_{i,t} \quad (3)$$

where $y_{i,t}$ is the dependent variable for region i in year t. We consider three dependent variables: wages, income, and unemployment rate. α_i is a fixed effect, which allow to control for unobserved spatial heterogeneity; δ_t is a time effect in order to control for common country factors affecting dynamics of considering factors. $\text{X}_{k,i,t}$ is the set of explanatory variables, i is the region index, k is the index of an independent variable. β, γ *and* θ_j are the calculated coefficients. β represents the convergence. If $\beta > 0$, then there is a conditional β-convergence: it means that rich regions have lower growth rates than poor regions and there is a convergence between regions. $\varepsilon_{i,t}$ is the remainder disturbance.

The control variables for the wage equation are demographic indicators (population growth rate, share of young people, share of old people), the number of students, and the

infant mortality rate as an indicator of development. Population growth rate is considered to measure agglomeration effects. For the 2005-2010 subsample we also include the sector structure of the economy (the share of labor in different sectors[92]) including agricultural workers, mining workers, and workers in education and health. For the unemployment rate we use the same set of explanatory variables. For the income equation the model is more complicated. As mentioned, there are three parts to income. They are wages, social transfers, and capital income. Therefore, we include factors which influence all of these. We add the same variables as for the wage equation, and add transfers (from federal to regional budgets), and investment per capita. This allows an evaluation of the role of government in income convergence and the contribution of capital mobility.

We can rewrite equation (1):

$$\ln\left(y_{i,t}\right)=\alpha_i+\delta_t+\left(1-\beta\right)\ln\left(y_{i,t-1}\right)+\gamma\text{Migration}_{i,t-1}+\sum_{k=1}^{K}\theta_k\text{X}_{k,i,t}+\varepsilon_{i,t} \qquad (4)$$

Equation (2) is a dynamic panel data model because there is a lag of dependent variables as additional an independent variable. In this case, we capture different regional characteristics. However, we add the spatial lag to equation (3) in order to take into account spatial autocorrelation. The spatial lag term may either help capture the role of externalities arising from neighborhood characteristics or it may act as a proxy for omitted variables clustered in space (LeSage and Pace, 2009). Previous regional research in Russia (Lugovoy et al., 2007, Kholodilin et al., 2012, Kolomak, 2013, Kadochnikov, Fedyunina, 2013) shows that we need include spatial interactions in the model. Elhorst et al. (2010) found that the speed of convergence when ignoring spatial interaction effects is biased; however, this bias decreases by including fixed effects and by reducing the time span for which the growth rate is measured.

$$\ln\left(y_{i,t}\right)=\alpha_i+\delta_t+\left(1-\beta\right)\ln\left(y_{i,t-1}\right)+\rho\sum_{j=1}^{J}\omega_{i,j}\ln\left(y_{j,t}\right)+\gamma\text{Migration}_{i,t-1}+\sum_{k=1}^{K}\theta_k\text{X}_{k,i,t}+\varepsilon_{i,t} \qquad (5)$$

We analyze a spillover effect including the weighted average of the values of our dependent variables for all regions, without the region for which the dependent variable is on

[92]We cannot construct these variables for the years before 2005 because there is no data due to a change in industrial classification in 2004.

the left side of equation (3). The weight for this variable ω_{ij} is the inverse distance between region *i* and all other regions[93]. Therefore, equation (3) is a dynamic panel data model with a spatial effects. To test the spatial correlation significance for our dependent variable we use Moran's I statistics. For equation (3) we use the Blundell and Bond (1998) system GMM: two equations, in levels and in first differences, are calculated simultaneously. The equation in levels is instrumented with lagged differences, and the equation in differences instrumented with a lagged variable in levels. First differences remove unobserved time-invariant region-specific effects. Kukenova and Monteiro (2008) show that it is possible to use the system GMM results for analysing models involving spatial components. Therefore, we use the lags of variables as the instruments. We use the Sargan test for overidentification instrumental variables and the Arellano-Bond test for autocorrelation. First order correlation is expected, but not higher order correlation.

The main variable of interest is migration ($\text{Migration}_{i,t-1}$). The net internal migration rate is the migration variable in our model. In case of neoclassical mechanisms dominating the effects of migration on wage and income interregional disparities, one expects the coefficient of net internal migration rate to be negative and positive in the unemployment rate equation. We also consider separately immigration and emigration as Østbye and Westerlund (2007), the net external migration rate, and the overall migration rate. The effect of immigration and emigration maybe asymmetrical due to selective migration. Gross migration flows may lead to significant interregional redistribution of human capital due to possible heterogeneity even when net migration is zero. The same is true for different effect of internal and external migration flows. If external immigrants have different skills than labor force in the receiving region, considerable labor demand effects of immigration might result (Elhorst, 2003). If traditional neoclassical theory mark the impact of migration on interregional disparities in equation (3) the outward flows will have positive effects on wage and income and negative on unemployment rate whereas the inward flows will decrease wage and income and increase unemployment. We include different migration variables with a lag

[93] The distance between regions is a physical distance between their capitals by railway. If there is no railway between cities, we use alternative ways of estimating distances, i.e. by roads, by sea. We standardize weight matrix by row.

in order to take into account the potential endogeneity of this variable. Guriev and Vakulenko (2013) show that people in Russia move to regions with higher wages and a lower unemployment rate and move out of regions with lower wages and a higher unemployment rate. Therefore, we have a simultaneity problem between migration and income.

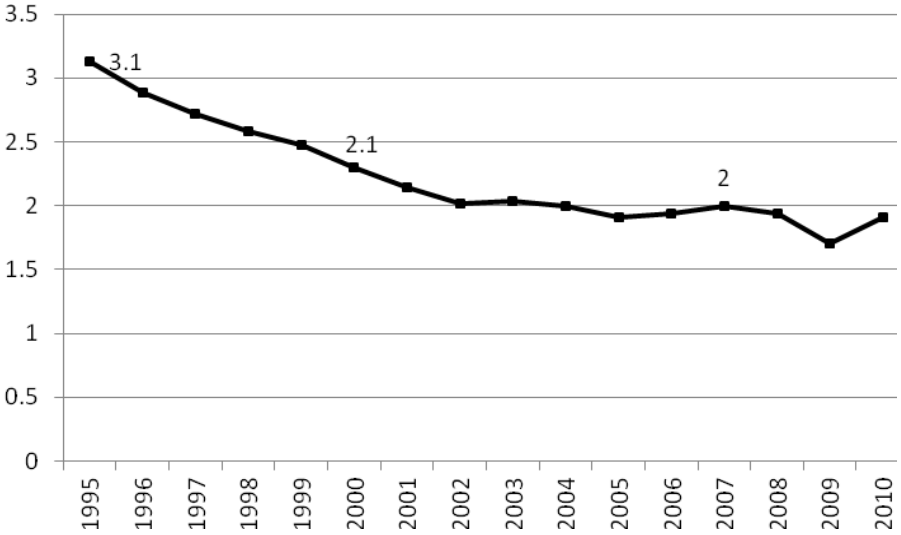
3. Data

We use official data of the Russian statistical data service (Rosstat)[94] for 77 Russian regions from 1995 to 2010. We drop Ingushetia, Chechnya and Chukotka because of the unavailability of data, and 9 autonomous districts (Nenets, Komi-Perm, Taimyr/Dolgano-Nenets, Khanty-Mansijsk, Yamalo-Nenets, Aginsk Buryat, Evenk, Ust-Ordyn Buryat, and Koryak) which are administratively parts of other regions. The dependent variables are real wages, real income and the annual unemployment rate. Descriptive statistics of all variables are presented in Table 5 in the appendix. In order to make wages and income comparable between regions and for different years, we calculate real wages and real income as a ratio of nominal income and wages to subsistence level in corresponding region. There are no subsistence level data for 2000; we interpolated this year as an average of 1999 and 2001.

To find the relationship between migration rates and economic indicators we consider the available data on migration which is the number of registered migrants. A person is considered to be a migrant in these statistics if they have relocated and changed their residence registration address. We consider both internal and external migration together and separately. Figure 1 presents the dynamics of internal migration in Russia. We can see that the volume of migration is decreasing over time and it has stabilized at around 2 million people per year in 2000s[95].

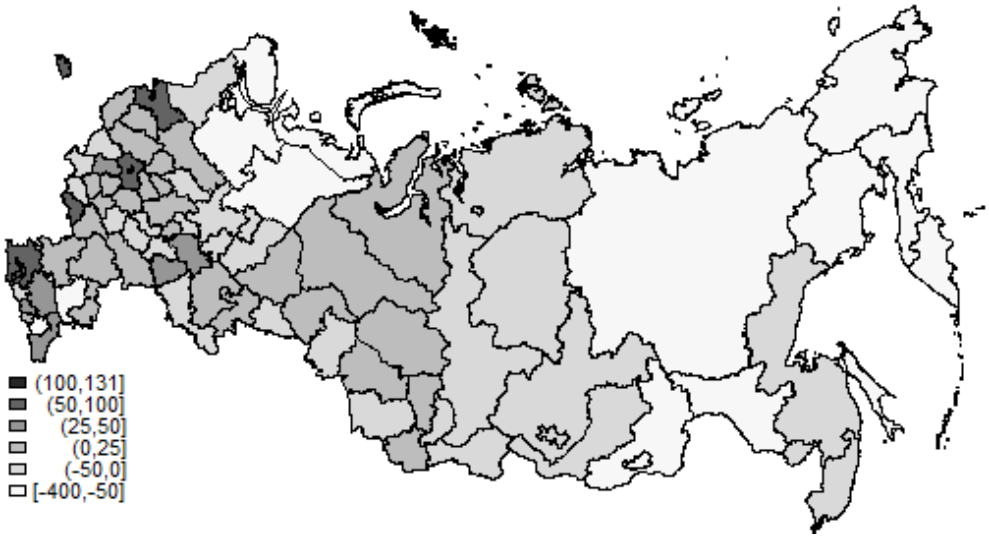
[94] www.gks.ru, Russian Regions.
[95] However, it is only the number of registered migrants. Not all people register when they move. Therefore, we do not know actual number.

Figure 1. *Internal migration in Russia 1995-2010.*



The main direction of migration flows in Russia is from east to west (see Figure 2) and this is called *westward drift* in the literature (Mkrtchyan, 2004). Two of the eight federal districts in Russia have positive net migration rate; the Central district (which includes Moscow), and the North West district (which includes Saint Petersburg).

Figure 2. *The average migration rate per 10 000 people 1997-2009*



4. Results

4.1. Wages

First we look at 2001-2010, when a decline in inter-regional differences for wage was observed, as Guriev and Vakulenko (2012) show. Then we estimate the β-convergence model. Table 6 in the appendix presents Moran's I statistics for wage. We reject the hypothesis of zero spatial autocorrelation values at 5% significance level for all years. Therefore, the spatial lag in the model is reasonable. Table 2 presents the results of the wage equation. We find β-convergence for wages. The spatial lag and the first time lag for wages are significant for different specifications of the model. To interpret spatial models we have to calculate direct and indirect effects and their sum, which is called as total effect. In spatial panel dynamic models, we obtain average total effect (ATE) for each explanatory variable by simply computing $\beta/(1-\rho)$ [96] (LeSage, Pace, 2009). In our case ATE for time lag of dependent variable in Table 2 column (1) is approximately 0.69, i.e. 0.398/(1-0.426). Therefore, it is less than 1, which argue β-convergence for wages. Net external migration and net internal migration are insignificant in all specifications of the model. However, if we consider them separately, the result is different. Emigration is significant and has positive coefficient[97], it leads to a wage increase in the sending region as people move from regions with lower wages to regions with higher wages (Guriev & Vakulenko, 2013). As a result such moving tends to equalize wages in different regions. Nevertheless, immigration is insignificant. The results of the Sargan test and the Arellano-Bond test for autocorrelation are presented in the last lines of Table 2. We cannot reject the hypotheses that there is no second order autocorrelation and that the over identifying restrictions are valid at 5% significance level.

The ATE for time lag is less than one, therefore, there is β-convergence for all specifications. This coefficient for time lag becomes smaller when we exclude spatial lag from the model (Table 2, column 6). The model without spatial lag has problem with Sargan test.

[96] These are coefficients from equation (3).

[97] We do not consider direct and indirect effects estimates (LeSage, Pace, 2009), because we are interested in effect of migration on convergence, but not on level of the dependent variable. More detail see section 5.4.

Table 2. **Results for wage 2001-2010.**

VARIABLES	(1) Asymmet-ric influence with external migration	(2) Asymmet-ric influence	(3) Net migration	(4) Net overall migration	(5) Without migration	(6) Asymmet-ric influence without spatial lag
Time lag: wage (t-1)	0.398***	0.412***	0.438***	0.461***	0.461***	0.589***
	(0.095)	(0.102)	(0.107)	(0.113)	(0.113)	(0.056)
Spatial lag	0.426***	0.438***	0.356***	0.369***	0.363***	
	(0.110)	(0.101)	(0.132)	(0.122)	(0.125)	
Emigration (t-1)	0.011*	0.006				0.028***
	(0.007)	(0.005)				(0.010)
Immigration (t-1)	0.002	0.009				-0.020**
	(0.005)	(0.006)				(0.009)
Net external migration rate (t-1)	0.006		0.007			0.016***
	(0.005)		(0.005)			(0.006)
Net internal migration rate (t-1)			-0.008			0.589***
			(0.006)			(0.056)
Net migration rate (t-1)				0.001		
				(0.002)		
Population growth	-0.672**	-0.659**	-0.478*	-0.510*	-0.471*	-0.305
	(0.328)	(0.320)	(0.270)	(0.267)	(0.246)	(0.346)
Share of young (log)	-0.323**	-0.251**	-0.324**	-0.223**	-0.220**	-0.480**
	(0.132)	(0.115)	(0.132)	(0.109)	(0.105)	(0.196)
Share of old (log)	-0.292*	-0.226	-0.380**	-0.322**	-0.304**	-0.471***
	(0.173)	(0.141)	(0.183)	(0.157)	(0.141)	(0.172)
Number of students (log)	0.120***	0.113***	0.116***	0.107***	0.110***	0.318***
	(0.038)	(0.037)	(0.037)	(0.033)	(0.036)	(0.075)
Time dummies and constant	Yes	Yes	Yes	Yes	Yes	Yes
Observations	770	770	770	770	770	770
Number of regions	77	77	77	77	77	77
Number of instruments	67	66	66	65	64	47
AR(2), p-value	0.90	0.99	0.91	0.74	0.74	0.52
Sargan test, p-value	0.14	0.15	0.13	0.12	0.15	0.001

Robust standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

The results for 1995-2010 are presented in Table 7 in the appendix and estimates for 2005-2010 are shown in Table 8 in the appendix. For 1995-2010 and 2005-2010 years emigration is

significant and has a positive sign. Therefore, the results for wages are consistent with the neoclassical theoretical model.

4.2. Income

Table 6 in the appendix presents Moran's I statistics for per capita income. We cannot reject the hypothesis of zero spatial autocorrelation for income at 5% significance level from 1997. However, we include spatial lag of dependent model in the model. The results for the income equation are presented in Table 3. The coefficient for time lag is significant and average total effect for it is less than one, therefore there is a β-convergence. The emigration is significant and has positive sign as in wage equation with asymmetric influence of migration (Table 3, column 2). The immigration is also significant and has a negative sign (Table 3, column 2). Net migration rate is significant and has negative sign (Table 3, column 4). These results are consistent with the neoclassical model. Emigration increases per capita income in sending regions. Higher immigration leads to lower income per capita in a region. The net external migration is insignificant for all specifications. This is due to the low level of registration of external migrants. There are many unregistered and illegal immigrants in Russia. The results of the Sargan test and the Arellano-Bond test for autocorrelation are presented in the last lines of Table 3. Our instruments are valid and there is no second order autocorrelation. Result without a spatial lag is presented in Table 3, column 6. This specification has problem with Sargan test. However, the total average effect for time lag coefficient is approximately 0.68 for different specifications and it is similar to time lag coefficient, which is 0.6 (Table 3, column 6).

Table 7 and Table 9 in the appendix show results for 1995-2010 and for 2005-2010 respectively. The immigration is significant and has negative sign for 1995-2010 time span. The emigration is significant and has positive sign for 2005-2010 when we also control for sectoral structure of the economy. We can conclude that results for income is explained by neoclassical paradigm.

Table 3. ***Results for income per capita 2001-2010.***

VARIABLES	(1) Asymmetric influence with external migration	(2) Asymmetric influence	(3) Net migration	(4) Net overall migration	(5) Without migration	(6) Asymmet-ric influence without spatial lag
Time lag: Income (t-1)	0.490***	0.491***	0.487***	0.492***	0.499***	0.607***
	(0.061)	(0.060)	(0.063)	(0.063)	(0.066)	(0.063)
Spatial lag	0.281***	0.278***	0.288***	0.288***	0.288***	
	(0.087)	(0.087)	(0.091)	(0.092)	(0.100)	
Emigration (t-1)	0.009	0.010*				0.009
	(0.006)	(0.005)				(0.008)
Immigration (t-1)	-0.012	-0.013**				-0.011
	(0.008)	(0.007)				(0.009)
Net external migration rate (t-1)	-0.001		-0.001			-0.001
	(0.004)		(0.004)			(0.005)
Net internal migration rate (t-1)			-0.009			
			(0.006)			
Net migration rate (t-1)				-0.005**		
				(0.002)		
Federal transferts per capita (log)	0.004	0.005	0.004	0.004	0.006	0.008
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
Investments per capita (log)	0.017	0.015	0.015	0.019	0.019	0.032*
	(0.015)	(0.016)	(0.015)	(0.017)	(0.016)	(0.019)
Population growth	-1.151***	-1.154***	-1.175***	-1.169***	-1.317***	-1.015***
	(0.337)	(0.333)	(0.332)	(0.335)	(0.344)	(0.327)
Share of young (log)	-0.303	-0.326	-0.324*	-0.276	-0.345*	-0.744***
	(0.198)	(0.206)	(0.197)	(0.210)	(0.195)	(0.237)
Share of old (log)	-0.085	-0.100	-0.065	-0.045	-0.174	-0.182
	(0.124)	(0.125)	(0.116)	(0.113)	(0.106)	(0.206)
Number of students (log)	0.111**	0.111**	0.115**	0.114**	0.092*	0.094*
	(0.050)	(0.050)	(0.050)	(0.049)	(0.048)	(0.053)
Time dummies and constant	Yes	Yes	Yes	Yes	Yes	Yes
Observations	634	634	634	634	634	634
Number of regions	73	73	73	73	73	73
Number of instruments	69	68	68	67	66	49
AR(2), p-value	0.72	0.71	0.70	0.69	0.53	0.44
Sargan test, p-value	0.18	0.19	0.19	0.18	0.17	0.04

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

4.3. Unemployment

Table 6 in the appendix presents Moran's I statistics for unemployment. We reject the hypothesis of zero spatial autocorrelation at 5% level. Therefore, we need to include a spatial lag in the model. The results for the unemployment equation are presented in the Table 4. The time lag of the dependent variable and the spatial lag are significant in all specifications. The average total effect of coefficient for time lag is approximately 0.74, i.e. less than one. There is a β-convergence for the unemployment rate. The spatial lag is positive. Therefore, unemployment rates for nearby regions are positively correlated. However, all migration variables are insignificant. The results of the Sargan test and the Arellano-Bond test for autocorrelation are presented in the last lines of Table 4. Our instruments are valid and there is no second order autocorrelation. There is a problem with Sargan test only for specification in the last column (Table 4).

The results are the same for 2005-2010 (Table 10 in the appendix). Results for 1995-2010 (Table 7 in the appendix) are unconvincing. There are significant variables of migration, however, the model has problem with Sargan test. Also time lag of dependent variable is insignificant in Table 7 column 6. The unemployment rate has highly volatile dynamic during 1995-2010. Therefore, it is better to consider and interpret shorter and more stable periods.

Table 4. ***Results for unemployment 2001-2010*****.**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Asymmetric influence with external migration	Asymmetric influence	Net migration	Net overall migration	Without migration	Asymmetric influence without spatial lag
Time lag: Unemployment (t-1)	0.314***	0.312***	0.326***	0.331***	0.345***	0.336***
	(0.066)	(0.066)	(0.062)	(0.063)	(0.065)	(0.071)
Spatial lag	0.577***	0.564***	0.549***	0.519***	0.517***	
	(0.189)	(0.196)	(0.188)	(0.195)	(0.193)	
Emigration (t-1)	0.018	0.005				0.005
	(0.026)	(0.010)				(0.014)
Immigration (t-1)	-0.036	-0.024				-0.000
	(0.028)	(0.017)				(0.016)
Net external migration rate (t-1)	0.013		0.016			
	(0.023)		(0.028)			
Net internal migration rate (t-1)			-0.026			

			(0.030)			
Net migration rate (t-1)				-0.003		
				(0.005)		
Population growth	-1.760	-1.640	-1.757	-1.630	-1.670	-1.255
	(1.375)	(1.345)	(1.335)	(1.269)	(1.224)	(1.240)
Share of young (log)	0.693	0.717	0.769	0.783	0.750	1.454**
	(0.491)	(0.510)	(0.506)	(0.521)	(0.523)	(0.623)
Share of old (log)	-0.299	-0.257	-0.271	-0.268	-0.352	-0.062
	(0.338)	(0.347)	(0.304)	(0.320)	(0.311)	(0.537)
Number of students (log)	-0.086	-0.091	-0.047	-0.049	-0.050	-0.059
	(0.109)	(0.119)	(0.084)	(0.096)	(0.107)	(0.100)
Time dummies and constant	Yes	Yes	Yes	Yes	Yes	Yes
Observations	770	770	770	770	770	770
Number of regions	77	77	77	77	77	77
Number of instruments	67	66	66	65	64	46
AR(2), p-value	0.24	0.26	0.28	0.27	0.24	0.37
Sargan test, p-value	0.25	0.23	0.34	0.28	0.22	0.05

Robust standard errors in parenthesesn *** p<0.01, ** p<0.05, * p<0.1

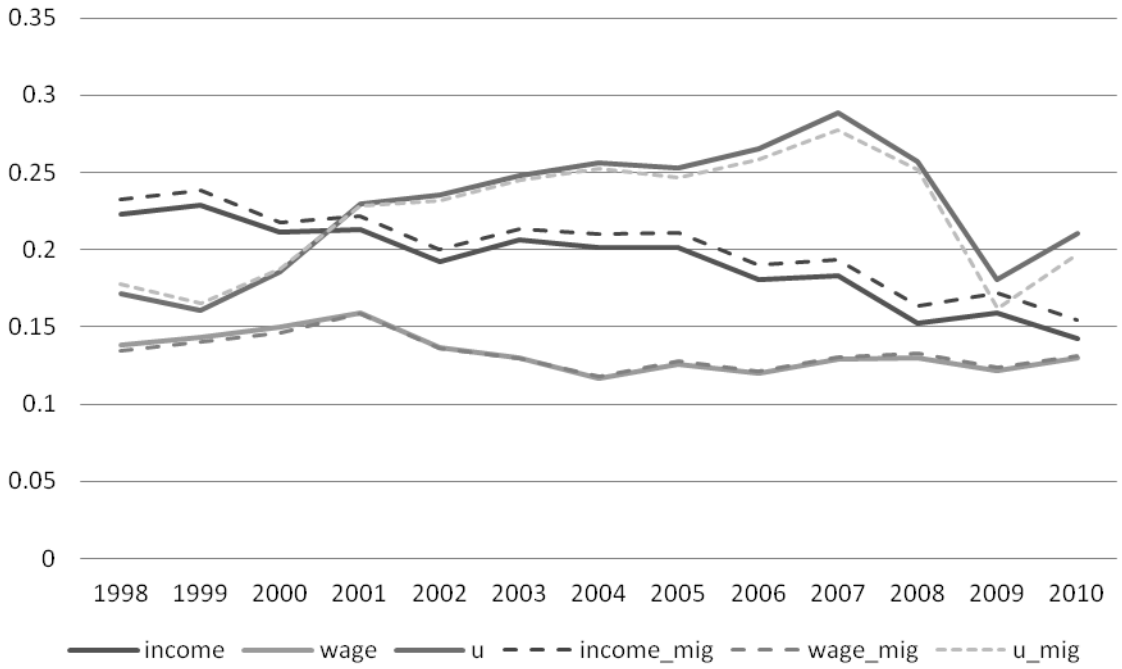
4.4. Migration and convergence

There is another concept of convergence called σ -convergence or relative convergence. In this concept regions converge if inter-regional variance (Gini, Theil index, etc.) of real indicators decreases over time. Gluschenko (2009) shows that σ -convergence can be used to evaluate regional inequality in contrast to β-convergence. In order to evaluate the lessening of inequality due to migration we look at the Gini coefficient (alternatively standard deviation can be used). Figure 3 shows the dynamic of the Gini coefficient for real wages, real income and the unemployment rate. The Gini coefficient for income decreases over time, which means that differences in incomes decline. The Gini coefficient for wages has been decreasing since 2000 and the Gini coefficient for unemployment rate has been decreasing since 2007.

Using results of equation (3) with asymmetric influence of migration, we exclude the influence of immigration and emigration on wages, income and the unemployment rate. The dashed line in the Figure 3 are the Gini coefficients without migration, i.e. this is hypothetical

inter-regional differences with zero migration. The difference between the solid and dashed lines is insignificant[98]. Therefore, the impact of migration on σ -convergence is very small.

Figure 3. *Dynamic of Gini coefficient for real wages, real income and unemployment rate with and without migration*



However, there are at least three reasons for such results. First, we consider only the number of registered migrants, which does not present true migration figures in Russia as not all people register when they change their place of residence. This aspect complicates the counting of migrants and the estimation of their effect on economic indicators. The second reason is generating different effects due to migration. In the theoretical section two main concepts which explain the effects of migration on labor market indicators were explained. Demand and supply side effects may compensate each other and the overall effect of migration can be insignificant. The last explanation for our results is the complexity of

[98] We construct confidence interval using command gconc for Stata (Kolenikov S., Sajaia Z., 2010). However, confidence intervals for true Gini coefficients are wide and they include Gini coefficients for estimated values (without migration). Therefore, we argue that there is no differences between them.

separating different causes of regional convergence. However, we control for the time dynamic of the variables and the spatial interaction between regions.

5. Conclusion

In this paper we analyze the influence of migration on the regional convergence of labor market indicators and per capita income in Russia. In 2000s in Russia there was a significant decrease in regional differences according to these indicators. One of the potential causes may be labor mobility. However, even according to different theories there is no unequivocal answer to this question. The result depends on model assumptions, the types of markets, the qualifications of the migrants etc. Most of these assumptions are difficult to check because of the unavailability of data. Much empirical research argues that this is an empirical question and we need to calculate the figures we observe and try to explain results using one of the theories.

This is an empirical paper. We consider a conditional β-convergence model with migration similar to Barro and Sala-i-Martin (1991), but on panel data and with spatial effects. We try to solve the endogeneity problem using variables with lags for instruments in the Blundell-Bond system GMM approach. We control for different sources of convergence for per capita income. We find a significant negative effect of net migration on wages and income. This effect is explained by emigration, which increases wages and income in the sending region. We also find negative effect of immigration on income. The regression results indicate that emigration and immigration do not work symmetrically. Our result is consistent with the neoclassical theory where the effect of labor demand side dominates the labor supply side effect that may be linked to externalities, changes in consumption and investment or selective migration. However, the impact of migration is small. In order to evaluate the lessening of inter-regional inequality due to migration we look at the Gini coefficient for real and hypothetical values of wage, income and unemployment rate assuming zero migration. Comparing the Gini coefficients for wages, per capita income and the unemployment rate with and without migration, we get the result that the difference is insignificant. Therefore, we conclude that migration does not lead to interregional σ-convergence. There could be

three reasons for such effects. First, the number of internal migrants is small: only 2% of the total population, where 1% is inter-regional migration[99]. However, this is only the number of registered migrants. We do not know true values of migration. Second, there are a lot of different effects as different theories predict. Through these direct and indirect effects the overall impact of migration is small due to mutually compensating forces. Third, it is difficult to separate the effects of different sources of regional convergence. Guriev and Vakulenko (2012) show fiscal redistribution does not play a major role in convergence. The main source of income convergence is convergence in capital income due to capital mobility, the development of financial and real estate markets. Our results add to the conclusion that labor mobility did not play a significant role in wage, income and unemployment rate σ-convergence in Russia 1995-2010. Solution at least one of the above-mentioned problems may be possible improvements of the research agenda.

Finally, some policy implication can be drawn from this analysis. The migration flows in Russia are not the factor reducing inter-regional disparities. One of the explanation of this fact may be low labor mobility, especially inter-regional labor mobility. Therefore, the government should create economically favorable environment, i.e. develop rental housing, improve the system of mortgages and other important factors of migration which are discussed in correspondent papers (Guriev and Vakulenko, 2013, etc.). Another important thing is the improvement of the quality of statistical information about number of internal and particularly external migrants. We can't provide adequate assessment without actual figures. Special surveys could help to clarify the situation on local labor markets.

[99]For comparison, it is 13.7%, 14.6% and 4.6% in the USA, Canada, and Japan accordingly for the period 2000-2006. Source: statistical services of these countries.

References

Araghi M. K. and Rahmani T. Regional Economic Growth, Migration, and Convergence in Iran (2011). Society of Interdisciplinary Business Research (SIBR) 2011 Conference on Interdisciplinary Business Research. Available at SSRN: http://ssrn.com/abstract=1867846

Arellano M., Bond S. (1991) 'Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations', *The Review of Economic Studies*, Vol. 58, No. 2, 277-297.

Barro, R.J. and Sala-i-Martin, X. (1991) 'Convergence across states and regions', Brookings Papers on Economic Activity, vol. 22, No.1, pp.107–182.

Basile R., Girardi A., Mantuano M. (2012) 'Migration and Regional Unemployment in Italy', *The Open Urban Studies Journal*, 5, 1-13.

Bernard A.B., Durlauf S.N. (1996) 'Interpreting tests of the convergence hypothesis', *Journal of Econometrics*, 71,161-173.

Blundell R., Bond S. (1998) 'Initial conditions and moment restrictions in dynamic panel data morels', *Journal of Econometrics*, Vol. 87, No. 1, pp.115–143.

Bunea D. (2011) 'Cross-country internal migration and convergence in Romania', *Annales Universitatis Apulensis Series Oeconomica*, 13(2), 508-521.

Čadil, Kadeřábková (2006) 'Migration and convergence: some empirical evidence from the Czech Republic', Central and East European International Studies Association (CEEISA) 4th Convention, University of Tartu, Estonia.

Capasso, S., Carillo, M.R. and De Siano, R. (2011) 'Migration Flows, Structural Change, and Growth Convergence: A Panel Data Analysis of Italian Regions', Department of Economic Studies 'Salvatore Vinci' University of Naples 'Parthenope', Discussion Paper, No. 7/2011. Naples, Italy.

Cardenas, M. and Ponton, A. (1995) 'Growth and convergence in Colombia: 1950–1990', *Journal of Development Economics*, Vol. 47, No. 1, pp.5–37.

Cashin, P. and Sahay, R. (1996) 'Internal migration, center-state grants, and economic growth in the states of India', Staff Papers – International Monetary Fund, Vol. 43, No. 1, pp.123–171.

Dustmann, C., Frattini, T. and Preston, I. (2008) 'The Effect of Immigration along the Distribution of Wages', CReAM Discussion Paper Series 0803, Centre for Research and Analysis of Migration (CReAM), Department of Economics, University College London, London, UK.

Elhorst P. J. (2003) 'The mystery of regional unemployment differentials: theoretical and empirical explanations', *Journal of Economic Surveys*, 17(5), 709–748.

Elhorst P. J., Piras G., Arbia G. (2010) 'Growth and convergence in a multi-regional model with space-time dynamics', *Geographical Analysis*, 42(3):338-355.

Etzo I. (2008) 'Internal migration and growth in Italy', MPRA Paper 8642, University Library of Munich, Munich.

Fratesi, U. and Riggi, M.R. (2007) 'Does migration reduce regional disparities? The role of skill-selective flows', RURDS, Vol. 19, No. 1, pp. 78-102.

Gezici, F. and Hewings, G.J.D. (2004) 'Regional convergence and the economic performance of peripheral areas in Turkey', RURDS, Vol. 16, No. 2, pp. 113-132.

Gluschenko, K. (2009) 'Methodologies of Analyzing Inter-Regional Income Inequality and their Applications to Russia', MPRA Paper No. 18443, posted 11. November 2009 13:07 UTC [online] http://mpra.ub.uni-muenchen.de/18443/

Guriev, S. and Vakulenko, E. (2012) 'Convergence among Russian Regions', CEFIR/NES Working Paper No. 180. Moscow, Russia.

Guriev, S. and Vakulenko, E. (2013) 'Breaking out of Poverty Traps: Internal Migration and Interregional Convergence', Working papers by Centre for Economic Policy Research, No. 9675. London, UK.
Hierro M., Maza A. (2010) 'Per capita income convergence and internal migration in Spain: Are foreign-born migrants playing an important role?' *Papers in Regional Science*, Wiley Blackwell, vol. 89(1), 89-107.
Huber, P. and Tondl, G. (2012) 'Migration and Regional Convergence in the European Union', WIFO Working Papers 419. Wien, Austria.
Kadochnikov S. M., Fedyunina A.A. (2013) 'Economic growth due to export externalities: a spatial econometric analysis for Russian regions', 2003-2008. *Int. J. of Economic Policy in Emerging Economies 2013* - Vol. 6, No. 4, pp. 358 – 374.
Kholodilin K., Oshchepkov A. Y., Siliverstovs B. (2012) 'The Russian regional convergence process: Where is it leading?' *Eastern European Economics*, vol. 50, No. 3, 5-26.
Kırdar, M.G. and Saracoğlu, D.S. (2008) 'Migration and regional convergence: an empirical investigation for Turkey', *Papers in Regional Science*, Vol. 87, No. 4, p. 545-566.
Kolenikov S. & Sajaia Z. (2010) 'GCONC: Stata module to compute generalized measures of concentration', Statistical Software Components S457104, Boston College Department of Economics, revised 03 Feb 2010. Chestnut Hill, USA.
Kolomak E. (2013) 'Spatial inequalities in Russia: dynamic and sectorial analysis', *Int. J. of Economic Policy in Emerging Economies 2013* - Vol. 6, No.4, pp. 375 – 402.
Kukenova M., Monteiro J.-A. (2008) 'Spatial Dynamic Panel Model and System GMM: A Monte Carlo Investigation', MPRA Paper 13404, University Library of Munich, Germany.
Krugman, P. (1991) 'Increasing returns and economic geography', *Journal of Political Economy*, Vol. 99, No. 3, pp. 483-499.
Kwon, G. and Spilimbergo, A. (2005) 'Russia's Regions: Income Volatility, Labor Mobility, and Fiscal Policy', IMF Working Paper No. WP/05/185. Washington, DC USA.
Larramona, G. and Sanso, M. (2006) 'Migration dynamics, growth and convergence', *Journal of Economic Dynamics & Control*, Vol. 30, No. 11, pp.2261–2279.
LeSage J.P., Pace R.K. (2009) 'Introduction to spatial econometrics', CRC Press Taylor & Francis Group, Boca Raton
Lugovoy O., Dashkeyev, I. Mazayev, D. Fomchenko, E. Polyakov. (2007) 'Analysis of Economic Growth in Regions: Geographical and Institutional Aspect', Consortium for Economic Policy Research and Advice, Moscow: IET.
Maza, A. (2006) 'Migrations and regional convergence: the case of Spain', *Jahrbuch f¨ur Regionalwissenschaft*, Vol. 26, No. 2, pp.191–202.
Mkrtchyan, N.V. (2004) 'Migration in Russia: Western Drift, Newsletter of the Center for Demography and Human Ecology', Institute of Economic Forecasting, INP RAS, No. 87. Moscow, Russia.
Nakamura R. (2008) 'How do Agglomeration Economies and Migration explain the Change of Interregional Income Disparities?' 48th Congress of the ERSA.
Niebuhr, A., Granato, N., Haas, A. and Hamann, S. (2012) 'Does labour mobility reduce disparities between regional labour markets in Germany?' *Regional Studies*, Vol. 46, No. 7, pp. 841-858.
Østbye S. and Westerlund O. (2007) 'Is Migration Important for Regional Convergence? Comparative Evidence for Norwegian and Swedish Counties', 1980–2000. *Regional Studies*, Vol. 41.7, pp. 901–915.
Peeters L. (2008) 'Selective In-migration and Income Convergence and Divergence across Belgian Municipalities' *Regional Studies*, Vol. 42.7, pp. 905–921.

Persson, J. (1994) 'Convergence in Per Capita Income and Migration Across the Swedish Counties 1906–1990', p. 35, Stockholm University, Institute for International Economic Studies, Seminar Papers. Stockholm, Sweden.
Phan, D. and Coxhead, I. (2010) 'Inter-provincial migration and inequality during Vietnam's transition', *Journal of Development Economics*, Vol. 91, No. 1, pp.100–112.
Rappaport, J. (2005) 'How does labor mobility affect income convergence?', *Journal of Economic Dynamics & Control*, Vol. 29, No. 3, pp. 567–581.
Rattsø, J. and Stokke, H. (2010) 'Regional Income Convergence, Skilled Migration and Productivity Response: Explaining Relative Stagnation in the Periphery', Department of Economics, Norwegian University of Science and Technology, Working Paper Series, 9809. Trondheim, Norway.
Raymond J.L., García B. (1996) 'Distribución regional de la renta y movimientos migratorios', *Papeles de Economía Española* 67, 185–201.
Roses, J.R. and Sanchez-Alonso, B. (2004) 'Regional wage convergence in Spain 1850–1930', *Explorations in Economic History*, Vol. 41, No. 3, pp. 404–425.
Shioji, E. (2001) 'Composition effect of migration and regional growth in Japan', *Journal of the Japanese and International Economies*, Vol. 15, No. 1, pp.29–49.
Soto, R. and Torche, A. (2004) 'Spatial inequality, migration, and economic growth in Chile', *Cuadernos de economia*, Vol. 41, No. 124, pp.401–424.
Terrasi M. (1999) 'Convergence and divergence across Italian regions', T*he Annals of Region Science*, 33, 491-510.
Toya, H., Hosono, K. and Makino, T. (2004) 'Human Capital, Migration, and Regional Income Convergence in the Philippines', Institute of Economic Research, Hitotsubashi University (Tokyo) Discussion Paper Series, No. 18. Tokyo, Japan.
Wolszczak-Derlacz J. (2009a) 'Does migration lead to economic convergence in the enlarged European market?' Bank and Credit, *National Bank of Poland's Journal on Economics and Finance*, Vol. 40 No.4, p.71-89.
Wolszczak-Derlacz, J. (2009b) 'The Impact of Internal and International Migration on Regional Convergence in Poland in: Współczesne migracje: dylematy Europy i Polski (Contemporary migrations: European and Polish dilemma)', University of Warsaw. Warsaw, Poland.

Appendix

Table 5. *Definition of variables and their descriptive statistics.*

Variable	Description	Number of observations	Mean	Std. Dev.	Min	Max
Population	Number of population, 10,000 people	1248	183.88	160.73	4.91	1150.00
Emigration	Number of emigrants per 1000 habitants	1248	8.89	7.48	2.40	101.92
Immigration	Number of immigrants per 1000 habitants	1248	7.01	3.41	1.98	26.76
Net internal migration rate	Net internal migration per 1000 habitants	1248	-1.88	5.98	-80.61	8.24
Net external migration rate	Net external migration per 1000 habitants	1092	-0.76	6.02	-65.32	13.68
Unemployment rate		1248	10.12	4.63	0.80	32.40
Income	Per capita income with respect to subsistence level (log)	1248	0.63	0.36	-0.34	1.86
Wage	Wage with respect to subsistence level (log)	1248	0.76	0.34	-0.34	2.06
Share of young	Share of people less than working-age (log)	1248	2.93	0.20	2.51	3.58
Share of old	Share of people greater than working-age (log)	1248	2.96	0.26	1.65	3.31
Students	Number of students per 10,000 population (log)	1231	-1.21	0.56	-6.33	0.23
Share of agricultural workers	Number of agricultural workers with respect to employers	468	0.12	0.06	0.00	0.28
Share of mining workers	Number of mining workers with respect to employers	468	0.02	0.03	0.00	0.17
Share of workers in education	Number of workers in education with respect to employers	468	0.10	0.02	0.06	0.23
Share of workers in health	Number of workers in health with respect to employers	468	0.07	0.01	0.05	0.17
Transfers	Transfers to the equalization of fiscal capacity per capita (log)	708	7.45	1.33	-3.51	10.78
Investments per capita	Investments per capita (log)	1246	9.11	1.38	5.73	12.82

Table 6. *Moran's I statistics for unemployment rate, per capita income and wages.*

	Unemployment rate		**Per capita income**		**Wage**	
year	**I**	**z**	**I**	**z**	**I**	**z**
1995	0.087***	5.234	0.03**	2.291	0.053***	3.433
1996	0.093***	5.527	0.034***	2.518	0.032***	2.32
1997	0.139***	7.911	0.017*	1.6	0.052***	3.374
1998	0.124***	7.173	-0.004	0.463	0.036***	2.555
1999	0.207***	11.453	-0.024	-0.595	0.04***	2.772
2000	0.191***	10.685	-0.017	-0.213	0.047***	3.234
2001	0.157***	8.931	0.001	0.779	0.049***	3.384
2002	0.136***	7.89	-0.002	0.595	0.051***	3.582
2003	0.163***	9.318	-0.009	0.22	0.046***	3.367
2004	0.168***	9.496	-0.013	0.006	0.057***	3.894
2005	0.125***	7.494	-0.007	0.324	0.051***	3.539
2006	0.161***	9.086	0	0.697	0.054***	3.63
2007	0.156***	8.858	-0.011	0.09	0.046***	3.172
2008	0.121***	7.143	0.006	1.01	0.036***	2.59
2009	0.074***	4.573	0.012*	1.332	0.014*	1.416
2010	0.066***	4.2	0.002	0.785	0.048***	3.23

Notes: I is Moran's I statistics. Z is z statistics for testing hypothesis Ho: I=0.
Significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 7. *Results for wages, per capita income and unemployment rate 1995-2010.*

VARIABLES	(1) Wage	(2) Wage with spatial term	(3) Income	(4) Income with spatial term	(5) Unemploy-ment	(6) Unemploy-ment with spatial term
Y^{100} (lag)	0.455***	0.330***	0.611***	0.533***	0.283***	0.135
	(0.025)	(0.072)	(0.058)	(0.058)	(0.053)	(0.147)
Spatial lag		0.337**		0.211**		0.861***
		(0.143)		(0.083)		
Emigration (t-1)	0.044***	0.027**	0.009	0.008	0.064***	0.029
	(0.010)	(0.011)	(0.007)	(0.006)	(0.016)	(0.040)
Immigration (t-1)	-0.034***	-0.019	-0.012	-0.017*	-0.071***	-0.071**
	(0.010)	(0.016)	(0.009)	(0.009)	(0.019)	(0.036)
Net external migration rate (t-1)	0.023***	0.016**	-0.000	0.001	0.032**	0.024
	(0.007)	(0.008)	(0.005)	(0.005)	(0.015)	(0.035)
Population growth	-0.017	-0.586	-0.984***	-1.136***	0.195	0.047
	(0.303)	(1.122)	(0.328)	(0.347)	(1.317)	(1.019)
Share of young (log)	-1.045***	-0.685***	-0.704***	-0.341*	1.724***	0.180
	(0.235)	(0.226)	(0.210)	(0.195)	(0.318)	(0.910)
Share of old (log)	-0.596***	-0.510**	-0.221	-0.176	0.569*	-0.692
	(0.207)	(0.205)	(0.160)	(0.113)	(0.316)	(1.096)
Number of students (log)	0.296***	0.193**	0.105**	0.125**	0.035	-0.004
	(0.086)	(0.097)	(0.052)	(0.053)	(0.136)	(0.168)
Transfers per capita (log)			0.008	0.005		
			(0.007)	(0.006)		
Investment per capita (log)			0.033*	0.018		
			(0.019)	(0.014)		
Constant, time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,001	1,001	695	695	1,001	1,001
Number of regions	77	77	73	73	77	77
Number of instruments	56	81	50	71	56	81
AR(2), p-value	0.29	0.55	0.46	0.70	0.14	0.85
Sargan test, p-value	0.01	0.37	0.06	0.23	0.00	0.53

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

[100]Y is wage, income or unemployment rate correspondingly for (1)-(6) column.

Table 8. ***Results for wages 2005-2010.***

VARIABLES	(1)	(2)	(3)	(4)
	Asymmetric influence	Net migration	Net overall migration	Without migration
Wage (t-1)	0.190**	0.206***	0.197***	0.194***
	(0.074)	(0.067)	(0.068)	(0.066)
Spatial lag	0.755***	0.713***	0.728***	0.725***
	(0.108)	(0.093)	(0.097)	(0.088)
Emigration (t-1)	0.008**			
	(0.003)			
Immigration (t-1)	0.009			
	(0.006)			
Net internal migration rate (t-1)		-0.001		
		(0.003)		
Net migration rate (t-1)			-0.001	
			(0.001)	
Population growth	-0.342	-0.142	-0.150	-0.152
	(0.235)	(0.219)	(0.211)	(0.199)
Share of agricultural workers	-0.201	-0.176	-0.195	-0.196
	(0.249)	(0.214)	(0.217)	(0.219)
Share of mining workers	1.231	2.192	2.060	2.116
	(1.391)	(1.745)	(1.739)	(1.575)
Share of workers in education	-2.149***	-1.629***	-1.694***	-1.628***
	(0.605)	(0.619)	(0.574)	(0.583)
Share of workers in health	-1.341	-1.771	-1.732	-1.766
	(0.998)	(1.580)	(1.531)	(1.498)
Constant, time dummies	Yes	Yes	Yes	Yes
Observations	468	468	468	468
Number of regions[101]	78	78	78	78
Number of instruments	40	39	39	38
AR(2), p-value	0.73	0.96	0.97	0.98
Sargan test, p-value	0.20	0.11	0.13	0.18

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

[101]In this specification we consider also Chukotka Autonomous Okrug.

Table 9. *Results for per capita income 2005-2010.*

VARIABLES	(1)	(2)	(3)	(4)
	Asymmetric influence	Net migration	Net overall migration	Without migration
Income (t-1)	0.393***	0.397***	0.396***	0.399***
	(0.084)	(0.086)	(0.086)	(0.084)
Spatial lag	0.399***	0.375**	0.384***	0.368**
	(0.152)	(0.147)	(0.147)	(0.145)
Emigration (t-1)	0.005*			
	(0.003)			
Immigration (t-1)	0.002			
	(0.006)			
Net internal migration rate (t-1)		-0.003		
		(0.003)		
Net migration rate (t-1)			-0.001	
			(0.001)	
Transfers per capita (log)	0.008	0.006	0.005	0.006
	(0.014)	(0.015)	(0.015)	(0.014)
Investments per capita (log)	0.024	0.029	0.029	0.030
	(0.028)	(0.026)	(0.026)	(0.026)
Population growth	-0.700**	-0.618*	-0.610*	-0.601
	(0.313)	(0.357)	(0.364)	(0.370)
Share of agricultural workers	-0.063	-0.079	-0.081	-0.105
	(0.114)	(0.148)	(0.149)	(0.147)
Share of mining workers	-1.552	-1.270	-1.154	-0.999
	(1.247)	(1.316)	(1.335)	(1.045)
Share of workers in education	-2.549***	-2.375***	-2.387***	-2.373***
	(0.807)	(0.810)	(0.817)	(0.753)
Share of workers in health	-1.355	-1.255	-1.288	-0.936
	(1.740)	(1.595)	(1.609)	(1.411)
Constant, time dummies	Yes	Yes	Yes	Yes
Observations	389	389	389	389
Number of regions	71	71	71	71
Number of instruments	42	41	41	40
AR(2), p-value	0.76	0.70	0.71	0.79
Sargan test, p-value	0.04	0.05	0.05	0.06

Robust standard errors in parentheses;*** p<0.01, ** p<0.05, * p<0.1

Table 10. *Results for unemployment rate 2005-2010.*

VARIABLES	(1)	(2)	(3)	(4)
	Asymmetric influence	Net migration	Net overall migration	Without migration
Unemployment (t-1)	0.139**	0.139***	0.137***	0.138***
	(0.054)	(0.051)	(0.050)	(0.051)
Spatial lag	0.851***	0.837***	0.849***	0.855***
	(0.099)	(0.098)	(0.099)	(0.101)
Emigration (t-1)	0.006			
	(0.018)			
Immigration (t-1)	-0.003			
	(0.016)			
Net internal migration rate (t-1)		-0.004		
		(0.013)		
Net migration rate (t-1)			0.002	
			(0.006)	
Population growth	-1.013	-0.974	-0.972	-0.921
	(0.856)	(0.839)	(0.827)	(0.841)
Share of young (log)	0.490	0.506	0.467	0.428
	(1.008)	(0.978)	(0.965)	(0.989)
Share of old (log)	0.489	0.493	0.410	0.412
	(0.605)	(0.600)	(0.610)	(0.634)
Number of students (log)	0.114	0.118	0.138	0.148
	(0.205)	(0.204)	(0.202)	(0.209)
Share of agricultural workers	-2.796*	-2.784*	-2.937*	-2.899*
	(1.502)	(1.532)	(1.597)	(1.628)
Share of mining workers	-1.173	-1.572	-1.633	-1.157
	(4.923)	(4.621)	(5.156)	(5.459)
Share of workers in education	11.756***	11.513***	11.391***	11.254***
	(3.928)	(3.723)	(3.707)	(3.524)
Share of workers in health	12.461***	12.300***	12.014***	11.605***
	(4.544)	(4.332)	(4.133)	(3.876)
Constant, time dummies	Yes	Yes	Yes	Yes
Observations	468	468	468	468
Number of regions	78	78	78	78
Number of instruments	43	42	42	41
AR(2), p-value	0.11	0.11	0.11	0.10
Sargan test, p-value	0.48	0.52	0.57	0.57

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

7. **Determinants of Job Satisfaction in Young Russian Workers**[*]

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Abstract

A growing economic literature regards the analysis of job satisfaction; however, as for young people the investigations are still scarce. In this paper we analyse job satisfaction among Russian young workers by using the data collected for four items, the first of which concerns the general satisfaction about the job; the other three items concern specific aspects of job satisfaction with respect to work condition, earning, and opportunity for professional growth. The corresponding response variables are categorical with five ordered categories, from "absolutely unsatisfied" to "absolutely satisfied". The longitudinal dataset also contains personal information about the respondents (gender, age, marital status, number of children, educational level, etc.). We estimate ordered logit models of job satisfaction with individual fixed effects for a panel data of Russian young workers, carrying out separate analyses for the general job satisfaction variable and three variables on specific aspects of job satisfaction. If wages adjusted to fully compensate workplace disamenities, we would expect that differences in job satisfaction across individuals would not be systematically related to wage differentials, ceteris paribus. But this is not the case for our panel: for all but one of the samples considered there is at least one job satisfaction variable with a significantly positive wage effect. We, therefore, interpret this result as a failure of the theory of compensating wage differentials in the Russian youth labour market. There is the interesting exception, though, that compensating wage differentials do seem at work among the older subjects in the panel. Our estimates also show strong gender and location effects.

JEL Classification: J28, J81

Key words: job satisfaction, young people, Russia

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Introduction

The economic literature shows a growing analysis of determinants and features of job satisfaction, but as for young people the investigations are still scarce and mainly focussed on developed countries (Bruno et al. 2013 studies the job-satisfaction of Italian young workers on survey data). In this paper we analyse job satisfaction among Russian young workers.

The job satisfaction of Russian workers has been studied in papers such as Linz (2003) and Linz and Semykina (2012), both based on cross-sectional data, and Senik (2004) based on panel data. Frijters et al. (2006), focused on life satisfaction in Russia. All the above studies pool workers of any age in the data, maintaining constant marginal effects across young and adult workers.

The data used in this paper have been collected for four items, the first of which concerns the general satisfaction about the job; the other three items concern specific aspects of job satisfaction with respect to work condition, earning, and opportunity for professional growth. The corresponding response variables are categorical with five ordered categories, from "absolutely unsatisfied" to "absolutely satisfied". The longitudinal dataset (2006-2010/2011) also contains personal information about the respondents that we deal with as covariates: gender, age, marital status, number of children, educational level, and working leave. In order to analyse the above data, we employed a fixed-effect ordered logit estimator (Das and Van Soest 1999, Ferrer-i-Carbonell and Frijter 2004; Baetschmann et al. 2011).

The paper structure is the following. The next section surveys the existing estimation strategies in the job satisfaction literature. Section 2 presents the theoretical framework, while the dataset is described in Section 3 and the following section is dedicated at highlighting the key research question and to discuss the factors (potentially) affecting job satisfaction. Section 5 contains the econometric model and the results are summarized in Section 6. Final remarks are presented in the last Section.

1. Existing Estimation Methods

A non-structural approach to the analysis of job satisfaction may be based on linear projections of the declared satisfaction scores. For example, Hanglberger (2011) to assess the

short- and long-term well-being effects of changes in working conditions uses the Least Squares Dummy Variables estimator (LSDV) on the BHPS data set. Chadi and Hetschko (2013) applies OLS methods, checked for robustness by propensity score matching estimators, to German survey data (GSOEP).

We choose to follow a structural approach, which recognizes that underlying the declared satisfaction scores there is a family of possibly heterogeneous individual utility functions and, as such, is more suitable for a causal analysis. This brings into play non-linear panel data methods for the estimation of latent regression models, along with the well-known incidental parameter problem, which warns from using individual indicators to accommodate latent heterogeneity in panel data models with small clusters of individuals. The following is a list of the most common solutions to the incidental parameter problem in the panel-data literature. One may estimate the latent regression model by a random effect (RE) ordered probit with the individual components modelled à la Mundlak, through a linear combination of regressors taken in group means (Wooldridge 2010). Senik (2004) applies this method to the 1994-2000 waves of the RLMS data to investigate the impact of income distribution on the job satisfaction of Russian workers. The same method is applied by Salvatori (2010) to the ECHP data to estimate the impact of labour market policies on the well-being of European permanent and temporary workers. A convenient estimation strategy, related to the RE ordered probit à la Mundlak, is based on a fixed effect (FE) extension of the linear approach to ordered response models described in Van Praag et al. (2004) and (2006), also known as probit OLS (POLS). Papers using FE POLS as the main estimator are Green and Leeves (2011) on Australian data; Bruno et al (2013) on Italian survey data of young workers and Pagán (2013) on the SHARE data for 11 European countries. RE POLS can always be implemented as an alternative to FE POLS. Indeed, Van Praag et al. (2004) advocate the use of the former for two reasons: 1) if valid, it is more efficient and 2) it can identify effects of time-constant variables, such as gender. It must be considered, however, that RE POLS is less robust than FE POLS to correlated individual effects. In addition, if the time constant variable of interest is qualitative with a few categories, such as gender, its impact can be assessed at the most general level, that is on the whole set of coefficients, carrying out separate FE estimators on the subsamples corresponding to each category (see Bruno et al. 2013). Van

Praag et al. (2006) show that ordered probit and POLS estimates are almost identical up to a proportionality coefficient. Bruno et al. (2013) demonstrate that the probit analogous of the FE POLS is the RE Ordered Probit à la Mundlak. All the foregoing methods share the disadvantage of modelling the unobserved individual heterogeneity through group means, which is restrictive in non-linear models. Two popular panel-data methods that obviate this problem are both based on the Chamberlain conditional logit estimator, where the individual effects are conditioned out in the log-likelihood function: the fixed-effect ordered logit minimum distance estimator by Das and Van Soest (1999), and its popular variant by Ferrer-i-Carbonell and Frijter (2004). Recent applications of the latter estimator are Bockerman et al. (2011) on linked-employer-employee Finnish data and de Graaf Zijl (2012) on Dutch data. Baetschmann et al. (2011), though, prove that the various ways through which the Ferrer-i-Carbonell and Frijter's method has been implemented leads to inconsistent estimators. They, therefore, rectify the method to make it consistent and computationally simpler. For all these reasons we base our econometric strategy on the estimator by Baetschmann et al. (2011). Among a few studies applying this estimator, Buddelmeyer et al. (2013) applied it to Australian data.

2. The Theoretical Model

Job disamenities are important factors of job satisfaction. In this section we focus on what effects can be identified in a job satisfaction model incorporating job disamenities as latent variables.

Let $u = U(w, D, Z, \mu_u)$ denote the utility function of an employee, where w, D and Z are, respectively, the wage, the $k_D \times 1$vector of job disamenities and the $k_Z \times 1$ vector of employee's observed characteristics, $\mu_u = \alpha + \varepsilon$ is a latent variable comprising a zero-mean, uncorrelated, idiosyncratic component, ε, and a possibly correlated latent heterogeneity component, α. The utility function is increasing in the wage and decreasing in the job disamenities, that is $\partial_w U > 0$ and $\partial_D U < 0$.

The theory of compensating wage differentials predicts that higher job disamenities are compensated by higher wages and so postulates the existence of a relationship between

the market wages and the job disamenities, the so called hedonic wage equation, $w = w(D, X, \mu_w)$, where $\partial_D w > 0$, X, is a vector of wage determinants that may partly overlap with z and μ_W is a latent heterogeneity component. The hedonic wage equation represents the combinations of job disamenities and wages offered by the firms to the workers. In competitive markets it is an envelope of zero profit conditions. Given the hedonic wage equation, workers maximize their utility functions sorting into the jobs with the desired amount of disamenities. More formally, plugging the wage equation into the utility function gives

$$u = U\left[w(D, X, \mu_w), D, Z, \mu_u\right]$$

and if job disamenities are optimally chosen by the workers, we have the system of k_D equations equations

$$\partial_w U \cdot \partial_D w + \partial_D U > 0 \qquad (1)$$

Bockerman et al. (2011) show that, with a linear utility function and a linear wage equation, the constraints implied by the foregoing system make *D* disappear from the reduced form utility function incorporating $w(D, X, \mu_w)$:

$U\left[w(D, X, \mu_w), D, Z, \mu_u\right] \equiv U^*(D, X, Z, \mu_w, \mu_u)$.

In fact, if $u = \beta_0 + \beta_w w + \beta_Z' Z + \beta_D' D + \mu_u$ and $w = \lambda_0 + \lambda_X' X + \lambda_D' D + \mu_W$, then

$$\begin{aligned} u &= \beta_0 + (\beta_w \lambda_D' + \beta_D')D + \beta_w \lambda_X' X + \beta_Z' Z + \beta_W \mu_W + \mu_u \\ &= \beta_0 + \beta_w \lambda_X' X + \beta_Z' Z + \beta_W \mu_W + \mu_u, \end{aligned} \qquad (2)$$

where the second equality follows from System (1). Based on Equation (2), Bockerman et al. (2011) argue that if compensating wage differentials are at work and job disamenities are observed, the *D* variables are redundant in a satisfaction regression excluding the wage and including X and Z. Their approach does not require that the wage variable be included into the regression and as such dispenses with accommodating the endogeneity of wages, stemming from the correlation of w and μ_w. We cannot replicate the test by Bockerman et al. (2011) since job disamenities are latent in our specification. Nonetheless, a test dual to Bockerman et al.'s can be applied in our case. To elaborate, Equation (2) has the strong implication that u and (w, D) are mean independent conditional on X, Z and μ_W, which is

operational in a panel framework if we further assume that μ_w is time-constant. Indeed, Equation (2) establishes that in the presence of compensating wage differentials the wage is redundant in a job satisfaction regression excluding the job disamenities and including X, Z along with fixed effects absorbing α and $\beta_W \mu_W$, which can be easily tested within a job satisfaction model including the wage as an explanatory variable. If wage differentials, instead, are not related to job disamenities, we expect to estimate a significantly positive wage effect, $\partial_w U$. If wage differentials only partially compensate for job disamenities, then the estimated wage effect can be affected by an attenuation bias due to the positive correlation between *w* and *D* and $\partial_D U < 0$ (for a similar approach see also Lalive 2002 and Clark 2003).

3. Characteristics of the Database and Descriptive Statistics

Our analysis is based on results of the Russian Longitudinal Monitoring Survey (the RLMS) – the household-based survey designed for measurement of individual and household economic wellbeing. The survey is conducted by the National Research University Higher School of Economics and ZAO "Demoscope" together with Carlina Population Center (University of North Carolina) and the Institut of Sociology RAS. The questionnaire contains different modules of questions regarding individual and household characteristics. Also it should be mentioned, that the sets of questions differ from wave to wave. However, in this paper we use only information collected in every round of the survey. We use individual data about young people from 15th, 16th, 17th, 18th and 19th waves of the survey. These waves were conducted in 2006, 2007, 2008, 2009 and in the end of 2010 – beginning of 2011 years, respectively[102]. Although the target number of respondents is constant for every wave, the set of respondents differ from wave to wave: some of them move to another address or refuse to participate in further rounds and vanishes from the set of respondents. By young people we mean persons whose age was between 16 and 26 years during the 19th wave of the survey. We fix the age at the time of last wave for keeping respondents "young" till the end of the examined time period. Obviously, it limits the number of observation, which can be used for

[102] We do not use data collected during earlier waves of the survey due to problem of sample exhaustion.

analysis (Table A1 in Appendix). However such kind of limitation is inevitable if we want to keep the data homogeneous.

Table 1 - *Conditional score for each item given the covariates*

		item			
covariate	**modality**	**1**	**2**	**3**	**4**
marital status	single	2.583	2.581	1.878	2.075
	together	2.567	2.514	1.740	2.001
children	0	2.606	2.604	1.860	2.084
	1	2.519	2.446	1.711	1.935
	>1	2.373	2.190	1.532	1.889
educational level	lower	2.512	2.397	1.833	2.010
	base	2.557	2.512	1.781	2.002
	high	2.665	2.743	1.877	2.156
gender	male	2.601	2.534	1.875	2.083
	female	2.551	2.560	1.750	1.995
age	<=23	2.528	2.524	1.775	2.025
age.high	>23	2.632	2.577	1.851	2.053
working status	on leave	2.437	2.408	1.751	1.953
	working	2.586	2.559	1.814	2.044
hours	<=40	2.614	2.631	1.777	2.100
	>40	2.523	2.437	1.851	1.954
wages(ppp)	<=10,000	2.408	2.416	1.495	1.832
	>10,000	2.751	2.687	2.141	2.254
living	capital	2.615	2.613	1.882	2.058
	city	2.571	2.570	1.740	2.065
	other	2.501	2.396	1.743	1.967
year	2006	2.459	2.433	1.607	1.889
	2007	2.537	2.447	1.791	2.021
	2008	2.529	2.529	1.885	1.967
	2009	2.557	2.607	1.798	2.074
	2010	2.633	2.576	1.826	2.081
Overall		**2.575**	**2.548**	**1.809**	**2.037**

Legend: item 1 = general job satisfaction; item 2 = satisfaction concerning work condition; item 3 = satisfaction concerning earnings; item 4 = satisfaction concerning opportunity for professional growth.

Note: all items range from 0 (absolutely unsatisfied) to 4 (absolutely satisfied). The score is the weighted average of the numbers from 0 to 4 with weights equal to the conditional frequencies given each covariate configuration.

The sample size is 1938 observations after removing observations with missing data. We use four types of variables as characteristics of job satisfaction: satisfaction about the job

as a whole, about work conditions, about earnings and about opportunity for professional growth. These variables are categorical and change their values from "absolutely unsatisfied" to "absolutely satisfied", respectively corresponding to the lowest and highest value of the dependent variable. We use as covariates respondent's personal characteristics: age, gender, marital status, number of children, educational level and working leave (as for their distributions, see table A2 in Appendix). As additional descriptive statistics we present the conditional score for each item given covariate (Table 1).

We highlight that one of the most relevant factor affecting all items is related to wages (expressed in ppp). If we distinguish individuals with a wages inferior or superior with respect to the median threshold (near 10,000 in ppp) we find significant higher values of the conditional scores for those with higher wages. In addition, we should note that the lowest satisfaction is with respect to earnings (item 3) and (even if better) opportunity for professional growth (item 4). As for most of the other covariates, the conditional scores of job satisfaction (for each item) are quite similar (with slightly higher values for "single", "male", persons not "on leave", with a "higher educational level" and living in "capitals"), while the values are highest in absence of children and they decline with the number of children (especially with a number of children higher than 1).

4 Key Research Question and Factors Affecting Job Satisfaction

As anticipated by the theoretical model presented in Section 2, our key research question is to test the validity or not of the theory of compensating wage differentials and, more generally, to investigate the role of wage levels in determining job satisfaction.

We distinguish three types of factors influencing the job satisfaction level: job characteristics, personal characteristics of the respondent and external factors including family characteristics and place of residence type. Let us discuss assumptions about the role of these factors starting from most important - in our point of view - job characteristics. The main idea here is that better working conditions lead to higher satisfaction level. As mentioned above, wage level is most important factor in this situation and the higher wage leads to higher

satisfaction level in case of rejection of our main hypothesis stated in Section 2. For length of the working week we expect negative influence: people are happier when they work less, especially young people, who need more time for education and socialisation. However, taking into account the fact that usually the length of working week is fixed for an employee, we can receive insignificant influence on satisfaction level due to low variability of this characteristics in our sample. It is also useful to take into account the working status of the respondent (i.e. whether respondent works or is on leave) in order to verify potential different effects on satisfaction.

Another group of characteristics influencing the job satisfaction includes personal characteristics of the respondent. We think that the same job can lead to different satisfaction levels for different people. We discuss three types of personal characteristics in this paper: age of the respondent, his/her education and gender. For age, the proposition about nonlinear dependence is usual. In our research, we can come to the conclusion that influence is linear because of the fact, that all respondents are young in our sample – maximal difference in age between the respondents is 11 years. In this situation linear approximation can give reliable results and help to avoid the problem of multicollinearity and reduce the number of estimated parameters. Another important respondent characteristic is educational level of the respondent. We think that on the one hand, expectations from the work are lower for respondents with lower education, on the other hand, their dissatisfaction with life in general and work can be higher due to lesser number of opportunities to change their work. However, we should also consider that young people with higher education could be less satisfied due to overeducation (or bad matching). We distinguish three groups of respondents: people with graduate and postgraduate education, people with secondary and secondary professional education and people with lower educational level. Also, we should take into account possible influence of respondent's gender. We think that the same factors can influence on the satisfaction level for women and men in the different ways. This proposition is common for majority of papers about job.

The third group of factors includes external characteristics of the respondent's life. The first part of this set of factors consists of family characteristics of the respondent including his/her marital status and the presence of children in the family. We think that

married people with children have higher level of needs and as a result wait more from their work; consequently, job satisfaction level for these respondents would be lower. However, the presence of (a higher number of) children could increase job satisfaction in terms of a higher perceived utility of having a job (and an income to use also for children) with respect to be unemployed (a condition that can be dramatic especially in presence of children)[103]. The last factor employed in our analysis is type of the respondent's residence place. We expect that people living in big cities will be more satisfied with their job because they have more opportunities for finding the suitable work than people living in villages.

5. The Econometric Model

We consider an econometric model in which each observed ordinal response is seen a discretized version of a certain type of satisfaction conceived as continuous a latent variable depending on fixed effects (for the unobserved heterogeneity) and the covariates. In particular, for each response variable $j = 1, \dots, J$, the latent variable for subject $i = 1, \dots, n$ at occasion $t = 1, \dots, T$ satisfies the model:

$$y_{ijt}^{*} = \alpha_{ij} + x_{it}^{'}\beta_j + \varepsilon_{ijt}\,, \qquad i = 1, \dots, n, \qquad j = 1, \dots, J, \qquad t = 1, \dots, T,$$

where ε_{ijt} are independent random error terms with standard logistic distribution. Then the ordinal observed variables y_{ijt} are obtained by discretizing the latent variables according to a series of cutpoints $\tau_0, \dots, \tau_{c-1}$ where c is the number of ordered response categories, from 0 to $c-1$; we have that:

$$y_{ijt} = f(x) = \begin{cases} 0, & -\infty < y_{ijt}^{*} \leq \tau_1, \\ \vdots & \\ c-1, & \tau_{c-1} \leq y_{ijt}^{*} < \infty. \end{cases}$$

[103] Obviously, also country specific conditions could play a key role. Here we just recall few information about few "rules" and the Russian system of support for families with children: (i) every healthy men aged 18-27 years should pass military service; men with two children are exempt from military service; (ii) Russian woman caring for a newborn baby (up to three years) can not be fired; after the birth of her second child family receives a so-called "maternity capital", which can be used, for example, to improve housing conditions. Some of the above mentioned conditions could explain a positive effect of the number of children on job satisfaction, especially for younger people. At the same time they may be less important for "older" people, where the presence of a higher number of children may strongly limit the career growth without possibility of the existing benefits to compensate career loss.

In order to estimate the model we adopt the method described in Baetschmann et al. (2011) based on maximizing a log-likelihood function based on all the possible dichotomizations of the response variables. In particular, for dichotomization d, with $d = 1, \ldots, c-1$, we transform the every response variable y_{ijt} in the binary variable $z_{ijt}^{(d)} = \mathbf{1}\{y_{ijt} \geq d\}$, where $\mathbf{1}\{\cdot\}$ denotes the indicator function equal to 1 if its argument is true and to 0 otherwise. It is easy to observe that the above assumptions imply the following logit model on these dichotomized variables:

$$\log \frac{p\left(z_{ijt}^{(d)} = 1 \middle| \alpha_{ij}, x_{it}\right)}{p\left(z_{ijt}^{(d)} = 0 \middle| \alpha_{ij}, x_{it}\right)} = \alpha_{ij} + x_{it}' \beta_j$$

Therefore, with reference to each response variable j, with $j = 1, \ldots, J$, the log-likelihood that is maximized to estimate the parameter vector β_j has the following expression:

$$l(\beta_j) = \sum_{d=1}^{c-1} l^{(d)}(\beta_j),$$

where $l^{(d)}(\beta_j)$ is the conditional log-likelihood based on the above logistic model for the dichotomized variables $z_{ijt}^{(d)}$. Standard errors may be computed as usual by a sandwich formula.

The estimator based on the maximization of $l(\beta_j)$ has desirable properties. In particular, it is consistent for β_j even if the unit specific effects α_{ij} are generated from a distribution correlated with the covariates. Moreover, differently from a random-effects approach, such a distribution needs not to be specified. On the other hand, as any other fixed-effects approach, the estimation approach here adopted does not allows to estimate the effect of time-fixed covariates or covariates (e.g., age) which are collinear with time dummies when these are included; the approach may also lack efficiency with respect to a random-effects approach.

6. Econometric Results

We first present results for the overall sample followed by separate analyses by distinguishing by gender, residence places and age of the respondents. We conclude the section interpreting our results as tests of compensating wage differentials, in the light of Section 3.

As for the overall sample (Table 2), wages seems to be the most important covariate, since it significantly (and positively) affects the responses to all four questions. Satisfaction with respect to earnings is also significantly affected by the last time dummy (negatively); a possible explanation is related to the lag in the impact of the financial crisis and "great recession" on the perception of a lower "security on the job" and in terms of higher uncertainty about the future earnings perspectives.

Table 2 - *Parameter estimates for the overall sample*

	job in general			work condition			earnings			opportunity of growth		
covariate	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**
marital.together	-0.087	0.178	0.623	-0.063	0.177	0.723	-0.208	0.171	0.223	-0.264	0.182	0.148
n.children	-0.061	0.207	0.767	0.071	0.204	0.729	0.188	0.188	0.316	0.223	0.189	0.239
education.base	-0.028	0.270	0.917	0.253	0.292	0.387	-0.206	0.302	0.494	-0.076	0.266	0.776
education.higher	0.073	0.370	0.843	0.462	0.395	0.242	-0.325	0.393	0.409	-0.213	0.358	0.551
work.leave	-0.172	0.257	0.503	-0.044	0.251	0.861	0.315	0.250	0.208	0.046	0.226	0.839
hours	0.005	0.010	0.608	-0.003	0.009	0.741	0.006	0.009	0.494	0.005	0.009	0.590
wages	**0.035**	**0.012**	**0.004**	**0.032**	**0.011**	**0.004**	**0.080**	**0.017**	**0.000**	**0.030**	**0.011**	**0.007**
2007	-0.047	0.181	0.794	-0.127	0.178	0.475	0.026	0.173	0.881	0.106	0.161	0.510
2008	-0.037	0.183	0.839	0.028	0.186	0.879	0.089	0.188	0.635	-0.121	0.171	0.478
2009	-0.056	0.184	0.763	0.071	0.183	0.698	-0.231	0.196	0.239	0.122	0.181	0.502
2010	-0.033	0.203	0.871	-0.182	0.205	0.375	**-0.459**	**0.215**	**0.033**	0.007	0.199	0.971

Note: in "bold" significant at 10%, in "bold and italic" significant at 5%

As for the separate analysis for the gender (Table 3), we find that the pattern is interestingly different: for women the only significant covariate is wages that positively affects the opinion about job satisfaction with respect to any of the four aspects. A possible explanation is related to the "unpaid work" that is mainly realised by women and that produce

- especially for them - a higher opportunity cost of the "paid work" with a consequent higher job satisfaction determined by higher wage levels.

Table 3 - *Separate parameter estimates for the men and women*

men

	job in general			work condition			earnings			opportunity of growth		
covariate	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**
marital.together	-0.093	0.265	0.727	-0.137	0.285	0.629	-0.283	0.264	0.283	**-0.525**	**0.281**	**0.062**
n.children	-0.090	0.249	0.717	0.128	0.256	0.616	0.233	0.255	0.361	0.171	0.253	0.499
education.base	-0.211	0.385	0.583	0.257	0.377	0.495	-0.610	0.372	0.101	-0.136	0.327	0.677
education.higher	-0.118	0.614	0.847	0.569	0.660	0.388	***-1.300***	***0.548***	***0.018***	-0.708	0.555	0.202
work.leave	-0.517	0.899	0.565	0.217	0.610	0.722	0.073	1.091	0.947	-1.672	1.400	0.232
hours	-0.004	0.014	0.778	0.000	0.015	0.989	0.000	0.014	0.980	0.002	0.014	0.899
wages	0.014	0.019	0.456	0.004	0.017	0.802	***0.072***	***0.020***	***0.000***	0.025	0.019	0.183
2007	0.091	0.272	0.737	0.073	0.257	0.777	-0.019	0.238	0.936	-0.010	0.251	0.968
2008	0.203	0.279	0.467	0.342	0.278	0.219	0.057	0.265	0.829	0.004	0.269	0.987
2009	0.106	0.277	0.703	0.187	0.269	0.488	**-0.521**	**0.277**	**0.060**	0.238	0.274	0.387
2010	0.238	0.307	0.439	-0.012	0.302	0.970	-0.450	0.303	0.137	0.089	0.307	0.772

women

	job in general			work condition			earnings			opportunity of growth		
covariate	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**
marital.together	-0.075	0.242	0.758	-0.047	0.223	0.833	-0.156	0.226	0.490	-0.089	0.253	0.726
n.children	-0.003	0.364	0.994	0.126	0.351	0.720	0.186	0.294	0.526	0.337	0.324	0.298
education.base	0.213	0.356	0.549	0.410	0.451	0.363	0.752	0.489	0.124	-0.103	0.427	0.809
education.higher	0.323	0.469	0.490	0.511	0.548	0.351	0.789	0.583	0.176	-0.100	0.516	0.847
work.leave	-0.160	0.306	0.601	-0.038	0.303	0.900	0.303	0.284	0.285	0.068	0.273	0.803
hours	0.012	0.013	0.360	-0.005	0.012	0.698	0.012	0.012	0.321	0.008	0.013	0.519
wages	***0.051***	***0.017***	***0.003***	***0.059***	***0.017***	***0.001***	***0.090***	***0.029***	***0.002***	***0.037***	***0.015***	***0.016***
2007	-0.161	0.244	0.510	-0.310	0.246	0.208	0.028	0.250	0.912	0.198	0.215	0.357
2008	-0.217	0.247	0.380	-0.230	0.252	0.361	0.081	0.270	0.763	-0.232	0.227	0.306
2009	-0.184	0.252	0.466	-0.021	0.251	0.933	-0.018	0.275	0.949	0.034	0.250	0.891
2010	-0.222	0.272	0.414	-0.291	0.277	0.293	-0.490	0.307	0.111	-0.053	0.274	0.846

Note: in "bold" significant at 10%, in "bold and italic" significant at 5%

As for man the situation is more complex and less clear. For them, being in a couple negatively affects the opinion about satisfaction with respect to opportunity for professional

growth; this can be also explained by the fact that married people could have a lower geographical mobility for searching better career opportunities. Having a higher education has a negative effect on the opinion about job satisfaction with respect to earnings, maybe due to overeducation[104] (or bad matching) phenomena; finally, job satisfaction with respect to earnings is positively affected by wage levels, and negatively by the time dummy for the year 2009.

By distinguishing young people living in capitals, in cities or in other situations (mainly rural areas), we find quite a diversified picture (Table 4). As for subjects living in capitals, the covariate wages (in ppp) has a significant positive role for all types of satisfaction (but with respect to work condition); in other terms a higher job satisfaction for those living in capitals is strongly related to higher wage levels (in ppp); in addition, the educational level has a certain importance on affecting job satisfaction in the case of higher educated subjects; in particular, tertiary level of education negatively affects job satisfaction with respect to job in general and with respect to earnings[105]. As for subjects living in capitals, no covariate seems to have a significant effect on their opinion about job satisfaction about work condition; On the contrary, for subjects living in the cities, this latter item is significantly and negatively affected by marital status and hours of work, and positively by base educational level[106]. Finally, for subjects living in "other places with respect to capitals and cities", it is worth noting the significant and positive effect of wages for two items (2nd and 3rd), confirming again a key role of wage levels in affecting job satisfaction. In addition, the 3rd item, concerning satisfaction with respect to earnings, is significantly and negatively affected by the time dummies (2007-2010), likely due to a structural worsening in the perspectives of rural areas with respect to capitals and cities, also as a consequence of a different geographical and sectoral impact of the international financial crisis and the consequent "great recession".

Table 4 - *Separate analysis for the capital/city/other*

[104] It consists on graduate people that find a job for which it is not necessary or useful to be graduated.

[105] This can be partly explains by the existence of "bad matching" (or overeducation) and a consequent inadequate return for the individual (and family) investment in tertiary education.

[106] In addition, the negative and significant of the 2010 time dummy shows the impact of the crisis on job satisfaction with respect to the job in general for young people living in the cities.

capital

	job in general			work condition			earnings			opportunity of growth		
covariate	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**
marital.together	0.230	0.273	0.398	0.240	0.281	0.392	-0.125	0.248	0.613	-0.049	0.264	0.854
n.children	-0.080	0.294	0.784	0.076	0.334	0.821	0.150	0.279	0.590	0.206	0.281	0.465
education.base	**-0.677**	**0.406**	**0.095**	-0.476	0.441	0.281	***-0.952***	***0.386***	***0.014***	-0.407	0.364	0.263
education.higher	-0.559	0.482	0.246	-0.104	0.537	0.846	***-1.232***	***0.497***	***0.013***	-0.533	0.458	0.244
work.leave	-0.049	0.387	0.900	0.088	0.400	0.826	0.410	0.329	0.213	-0.039	0.319	0.902
hours	0.007	0.014	0.592	0.004	0.012	0.757	0.006	0.012	0.630	0.004	0.012	0.775
wages	**0.029**	**0.015**	**0.051**	0.020	0.014	0.159	***0.066***	***0.016***	***0.000***	**0.028**	**0.014**	**0.054**
2007	0.255	0.272	0.350	-0.062	0.252	0.804	0.344	0.240	0.152	***0.559***	***0.224***	***0.013***
2008	0.166	0.262	0.525	0.181	0.278	0.515	0.390	0.265	0.141	0.191	0.245	0.434
2009	0.013	0.268	0.962	-0.007	0.272	0.978	-0.081	0.264	0.758	0.310	0.265	0.243
2010	0.079	0.297	0.791	-0.325	0.313	0.298	-0.126	0.298	0.673	0.158	0.291	0.586

city

	job in general			work condition			earnings			opportunity of growth		
covariate	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**
marital.together	-0.418	0.333	0.210	***-0.684***	***0.343***	***0.046***	-0.306	0.360	0.394	-0.552	0.399	0.167
n.children	0.110	0.408	0.787	0.238	0.349	0.496	0.167	0.334	0.617	0.497	0.352	0.158
education.base	0.349	0.449	0.437	**0.760**	**0.420**	**0.071**	0.431	0.526	0.413	0.356	0.522	0.495
education.higher	0.547	0.716	0.445	0.706	0.764	0.355	0.695	0.751	0.355	0.164	0.715	0.819
work.leave	0.240	0.523	0.646	0.150	0.449	0.738	0.177	0.576	0.758	0.745	0.537	0.165
hours	-0.012	0.023	0.595	***-0.048***	***0.024***	***0.049***	0.004	0.020	0.859	-0.024	0.020	0.224
wages	0.048	0.030	0.104	0.024	0.025	0.344	0.059	0.048	0.217	0.041	0.029	0.167
2007	-0.319	0.345	0.355	0.201	0.370	0.586	0.381	0.357	0.286	-0.212	0.335	0.526
2008	-0.546	0.375	0.145	-0.150	0.393	0.703	0.292	0.410	0.477	-0.489	0.370	0.187
2009	-0.564	0.362	0.119	0.125	0.389	0.747	-0.038	0.426	0.928	-0.447	0.376	0.234
2010	**-0.675**	**0.393**	**0.085**	0.168	0.391	0.669	-0.548	0.478	0.251	-0.335	0.420	0.425

other

	job in general			work condition			earnings			opportunity of growth		
covariate	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**
marital.together	-0.290	0.340	0.393	0.085	0.317	0.788	-0.127	0.365	0.728	-0.300	0.327	0.360
n.children	-0.137	0.450	0.760	-0.168	0.381	0.659	0.382	0.459	0.405	-0.058	0.392	0.883
edu.base	1.075	0.842	0.202	1.188	0.883	0.178	0.302	0.660	0.647	0.424	0.558	0.448
edu.higher	1.102	1.158	0.341	1.201	1.101	0.275	0.411	1.046	0.695	0.518	1.174	0.659
work.leave	**-0.861**	**0.453**	**0.057**	-0.451	0.455	0.321	0.445	0.490	0.363	-0.293	0.408	0.472

hours		0.019	0.018	0.299	0.019	0.018	0.294	0.023	0.017	0.162	***0.043***	***0.020***	***0.036***
wages		0.027	0.033	0.418	***0.063***	***0.030***	***0.036***	***0.153***	***0.030***	***0.000***	0.023	0.030	0.435
	2007	-0.381	0.358	0.287	**-0.599**	**0.359**	**0.095**	***-0.936***	***0.333***	***0.005***	-0.470	0.310	0.130
	2008	0.004	0.371	0.991	-0.135	0.347	0.696	***-0.858***	***0.342***	***0.012***	-0.390	0.341	0.253
	2009	0.238	0.378	0.529	0.052	0.351	0.882	***-1.018***	***0.379***	***0.007***	0.314	0.348	0.366
	2010	0.303	0.400	0.450	-0.320	0.394	0.416	***-1.241***	***0.404***	***0.002***	-0.020	0.367	0.957

Note: in "bold" significant at 10%, in "bold and italic" significant at 5%

Finally, we separately consider individuals that are at most 23 years old at the last interview from the other individuals.[107] The results highlight that job satisfaction of younger subjects are much more sensible to wages; a possible explanation is related to the higher opportunity cost of younger individuals due to a higher potential investment in schooling and other educational or training activities. Interestingly, the wage is never significant for the older subjects, which supports fully compensating wage differentials for this category of workers (we will discuss this issue more in general at the end of this section). In addition, the marital status ("together") negatively affect younger, possibly for the consequent lower geographical mobility. As for the covariate "number of children", it should be noted that, while it has not a significant effect on overall sample, it has a significant effect for the sample of younger people; in particular, the presence of (a higher number of) children positively affect the job satisfaction (with respect to all items) in the case of younger workers; as already mentioned in section 5, a possible explanation refers to the comparative higher perceived value/utility (and satisfaction) of having a job and a labour income (with respect to be unemployed) when it crucially permit a better life and education for children. However, for "older" workers the satisfaction with the job in general is negatively affected by the presence of children, highlighting the need for a deeper investigation[108]. In addition, for younger to be in "work leave" negatively affect the satisfaction with the job in general; while for older the

[107] It should be considered that 17-18 is the age (in Russia) when people finished secondary school, 22-23 is the age, when some young people received specialist or master degree. Obviously, there is heterogeneity and while some young people work also during their tertiary educational period, others search and find a job only after completing their education.

[108] As mentioned in a previous note, the Russian system of support for families with children could play a key role. We also find results for different specifications of the econometric model, e.g. distinguishing younger and older according to gender. All results are available upon request.

satisfaction with respect to work condition is positively affected by the working hours. As for this latter group it should be mentioned the positive and significant effect of having a tertiary education on job satisfaction with respect to job in general and with respect to work condition[109]. Finally, 2009-2010 dummy variables negatively affect younger satisfaction with respect to earnings, while for older all time dummies have a positive effect on job satisfaction with respect to opportunity of professional growth.

Table 5 - *Separate analysis for younger and older subjects*

younger

	job in general			work condition			earnings			opportunity of growth		
covariate	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**
marital.together	**-0.516**	**0.275**	**0.061**	-0.200	0.289	0.488	***-0.664***	***0.276***	***0.016***	-0.294	0.302	0.331
n.children	***0.720***	***0.334***	***0.031***	**0.624**	**0.363**	**0.086**	***0.781***	***0.317***	***0.014***	***0.797***	***0.305***	***0.009***
education.base	-0.225	0.368	0.541	-0.168	0.357	0.637	-0.107	0.412	0.795	-0.196	0.358	0.584
education.higher	-0.065	0.561	0.907	-0.086	0.608	0.888	-0.842	0.585	0.150	-0.557	0.526	0.289
work.leave	**-0.702**	**0.386**	**0.069**	-0.255	0.387	0.511	0.311	0.415	0.453	-0.340	0.333	0.308
hours	0.000	0.015	0.976	-0.006	0.014	0.654	0.003	0.013	0.827	0.006	0.013	0.606
wages	***0.059***	***0.019***	***0.002***	***0.055***	***0.018***	***0.002***	***0.142***	***0.022***	***0.000***	***0.064***	***0.020***	***0.001***
2007	-0.128	0.218	0.556	-0.271	0.226	0.230	-0.132	0.213	0.537	0.132	0.199	0.506
2008	-0.133	0.252	0.597	-0.215	0.246	0.383	-0.288	0.233	0.217	-0.279	0.239	0.244
2009	-0.234	0.261	0.370	-0.390	0.262	0.136	***-0.657***	***0.261***	***0.012***	-0.088	0.258	0.733
2010	-0.157	0.314	0.618	-0.506	0.313	0.106	***-1.114***	***0.304***	***0.000***	-0.247	0.303	0.414

older

	job in general			work condition			earnings			opportunity of growth		
covariate	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**	**est.**	**s.e.**	**p-value**
marital.together	0.025	0.387	0.949	-0.116	0.424	0.784	0.408	0.312	0.191	-0.288	0.320	0.369
n.children	**-0.744**	**0.427**	**0.081**	-0.418	0.411	0.310	-0.060	0.321	0.852	-0.060	0.356	0.867
education.base	0.417	0.668	0.532	0.961	0.655	0.142	-0.064	0.613	0.917	0.118	0.497	0.812
education.higher	***1.469***	***0.803***	***0.068***	***3.000***	***0.888***	***0.001***	0.490	0.800	0.541	0.260	0.720	0.718
work.leave	-0.081	0.414	0.845	0.267	0.375	0.476	0.432	0.405	0.286	0.334	0.381	0.380
hours	0.008	0.021	0.698	**0.035**	**0.020**	**0.087**	0.015	0.018	0.419	0.002	0.017	0.892
wages	0.014	0.019	0.468	0.028	0.019	0.125	0.049	0.032	0.124	0.015	0.016	0.372

[109] This result, partly contrasting with previous result on overall sample, show a positive role - as for this older group - of investment in higher education also in terms of job satisfaction (but excluding the satisfaction with respect to earnings and opportunity of professional growth).

2007	1.595	1.955	0.414	0.555	2.119	0.794	0.140	2.240	0.950	***0.853***	***0.260***	***0.001***
2008	1.631	1.952	0.403	0.577	2.099	0.783	0.429	2.247	0.849	***0.741***	***0.263***	***0.005***
2009	1.496	1.950	0.443	0.500	2.121	0.814	0.013	2.247	0.996	***0.838***	***0.272***	***0.002***
2010	1.477	1.956	0.450	0.081	2.132	0.970	-0.230	2.252	0.918	***0.760***	***0.289***	***0.009***

Note: in "bold" significant at 10%, in "bold and italic" significant at 5%

We can now interpret our results in the light of the discussion in Section 3. For all but one of the samples considered, there is at least one response variable whose estimated wage effect turns out significantly positive. This finding is at odds with wage differentials fully compensating for latent workplace disamenities. Partially compensating wage differentials could in fact obscure even larger pure wage effects. There is only the interesting exception given by the older subjects in the sample, for whom we find that wage differentials has no explanatory power for differentials in job satisfaction, however this variable is defined. This seems to support a theory of compensating wage differentials for the more experienced subjects in the Russian youth labour market.

7. Final Remarks

We have estimated ordered logit models of job satisfaction with individual fixed effects for a panel data of Russian young workers, carrying out separate analyses for the general job satisfaction variable and three variables on specific aspects of job satisfaction. Along with the overall sample we have also considered some sub-samples.

The wage turns out to play a prominent role as an explanatory variable in our model specifications. Indeed, for all but one samples considered there is at least one job satisfaction variable with a significantly positive wage effect. We interpret this result as a failure of the theory of compensating wage differentials in the Russian youth labour market. Interestingly, compensating wage differentials seem at work only among the older subjects; our estimates also show strong gender and location effects. This paper is a first attempt to investigate job

satisfaction for young Russian and a need for deeper analyses surely exists[110]. However, according to our analysis, few general and specific policy implications already emerged. In particular, a general policy implication refer to the opportunity to improve and extend the definition of the policy objectives regarding the (youth) labour market by also including performance indicators regarding several dimensions of job quality and job satisfaction, in addition to the traditional performance indexes (employment/unemployment and NEET rates). In addition, our results could also favour a better definition of specific policy interventions and public services for young people in general and, especially, for some specific segments, like young women, young with children and those living out of capital and cities.

[110] For example, our research could be extended along two directions: (i) by relaxing the assumption of strictly exogenous wages and (ii) by including into the analysis measures of job disamenities.

References

Addabbo, T. and G. Solinas (2012), Non-standard employment and quality of work: toward new forms of measurement, in Addabbo T. and G. Solinas (eds.), *Non-standard employment and quality of work: the case of Italy*, AIEL Series in Labour Economics, Springer Verlag, Heidelberg.

Allen, J. and R. van der Velden (2001), Educational mismatches versus skill mismatches: effects on Wages, job satisfaction and on-the-job search, *Oxford Economic Papers*, 53(3), pp. 434–52.

Baetschmann, G., Staub, K. and R. Winkelmann (2011), Consistent estimation of the fixed effects ordered logit model, *IZA Discussion Paper* no. 5443.

Bandeen-Roche, K., Miglioretti, D.L., Zeger, S.L., Rathouz, P.J. (1997), Latent Variable Regression for Multiple Discrete Outcomes, *Journal of the American Statistical Association*, **92**, pp. 1375-1386.

Bardasi, E. and M. Francesconi (2004), The impact of atypical employment on individual wellbeing: evidence from a panel of British workers, *Social Science and Medicine*, 58 (9), pp. 1671–1688

Bartolucci, F., Bacci, S., and Gnaldi, M. (2012a), MultiLCIRT: Multidimensional latent class Item Response Theory models, R package version 2.0, *available from CRAN at*: http://CRAN.R-project.org/package=MultiLCIRT.

Bartolucci, F., Farcomeni, A., Pennoni, F. (2012b), *Latent Markov Models for Longitudinal Data*, Chapman and Hall/CRC.

Bentolila, S., J. J. Dolado and J. F. Jimeno (2012), Reforming an insider-outsider labor market, *IZA Journal of European Labor Studies*, **1**:4.

Berton, F., Devicienti, F. and L. Pacelli (2011), Are temporary jobs a port of entry into permanent employment? Evidence from matched employer-employee data, *International Journal of Manpower*, 32(8), pp. 879-899.

Berton, F., Richiardi, M. and S. Sacchi (2009), *Flex-insecurity. Perchè in Italia la flessibilità diventa precarietà*, Il Mulino, Bologna.

Blanchflower, D. G. (2000), Self-employment in OECD countries, *Labour Economics*, 7, pp. 471–505.

Blanchflower, D. G. and A. J. Oswald (1999), Well-being, insecurity and the decline of American job satisfaction, presented at the Cornell University conference, May 1999, Dartmouth College, *mimeo*.

Böckerman, P., Ilmakunnas P. and E. Johansson Job security and employee well-being: Evidence from matched survey and register data, *Labour Economics*, 18, pp. 547–554

Boeri, T. (2011), Institutional reforms and dualism in European labor markets, in Card, O. and O. Ashenfelter (eds.), *Handbook of Labor Economics*, Volume 4, Part B, Chap. 13, pp. 1173-1236.

Booth, A. L., Francesconi, M. and J. Frank (2002), Temporary jobs: stepping stones or dead ends? *Economic Journal*, 112 (480), pp. F189–F213.

Bradley, D. E. and J. A. Roberts (2004), Self-Employment and job satisfaction: Investigating the role of self-efficacy, depression, and seniority, *Journal of Small Business Management*, Vol. 42, 1, pp. 37-58.

Bruno, G. S. F., Caroleo F. E. and O. Dessy (2013a), Stepping stones versus dead end jobs: Exits from temporary contracts in Italy after the 2003 reform, *Rivista Internazionale per le Scienze Sociali*, 1, pp. 31-62.

Bruno, G. S. F., Caroleo F. E. and O. Dessy (2013b), Temporary contracts and young workers' job satisfaction in Italy, *IZA DP No. 7716*. Forthcoming in D. Sciulli and M. Malo (Eds.) *Disadvantaged Workers: Empirical Evidence and Labour Policies*, AIEL Series in Labour Economics, Springer Verlag, Heidelberg.

Buddelmeyer, H., McVicar, D. and M. Wooden (2013) Non-Standard 'Contingent' Employment and Job Satisfaction: A Panel Data Analysis, Melbourne Institute WP No. 29/13.
Chadi, A. and C. Hetschko (2013), Flexibilization without hesitation? Temporary contracts and workers' satisfaction, IAAEU DP No. 04/2013.
Clark, A. E. (1996), Job Satisfaction in Britain, *British Journal of Industrial Relations*, vol. 34, 2, pp. 189-217.
Clark, A. E. and A. J. Oswald (1996), Satisfaction and comparison income, *Journal of Public Economics*, 69, pp. 57-81.
Clark, A.E. , A. J. Oswald and P. Warr (1996), Is job satisfaction U-shaped in age?, *Journal of Occupational and Organizational Psychology*, 60, pp. 57-81.
Clark, A. E. (1997), Job Satisfaction and Gender: Why Are Women So Happy at Work, *Labour Economics*, 4, pp. 189–217.
Clark, A. E., (2006) Looking for labour market rents with subjective data. DELTA, mimeo.
Das, M. and A. Van Soest (1996), A panel data model for subjective information on household income growth, *Journal of Economic Behavior and Organization*, 40, pp. 409-426.
de Graaf-Zijl, M. (2012), Job satisfaction and contingent employment, *De Economist*, 160, pp. 197–218.
Dempster, A.P., Laird, N.M., Rubin, D.B. (1977), Maximum likelihood from incomplete data via the EM algorithm (with discussion), *Journal of the Royal Statistical Society, Series B*, **39**, pp. 1-38.
Elder, S. (2009), *ILO school-to-work transitions*, International Labour Office, Geneva.
Eurofound (2007), *Job satisfaction and labour market mobility*, Dublin.
Eurofound (2012), *Trends in job quality in Europe*, Publications Office of the European Union, Luxembourg.
European Commission (2001), *Employment in Europe*, Employment and social affairs directorate. Office for Official Publications of the European Union, Luxemburg.
European Commission (2007), *Toward common principles of flexicurity: More and better jobs through flexibility and security*, Office for Official Publications of the European Communities, Luxemburg.
Ferrer-i-Carbonell, A. and P. Frijters (2004), How important is methodology for the estimates of the determinants of happiness?, *The Economic Journal*, 114, pp. 641-659.
Freeman, R. (1978), Job satisfaction as an economic variable, *American Economic Review*, 68, p. 135-141.
Frijters, P., Geishecker, I., Haisken-DeNew J. P. and M. A. Shields (2006). Can the large swings in Russian satisfaction be explained by ups and downs in real income? *Scandinavian Journal of Economics*, 108, 433-458.
Gottschalk, P. and T. Maloney (1985), Involuntary terminations, unemployment and job matching: a test of job search theory, *Journal of Labor Economics*, pp. 109-123.
Green, C. and J. S. Heywood (2011), Flexible contracts and subjective well-being, *Economic Inquiry*, 49, pp. 716–29.
Green, C. and G. D. Leeves (2013), Job security, financial security and worker well-being. New evidence on the effects of flexible employment, *Scottish Journal of Political Economy*, Vol. 60, 2, pp. 121-138.
Green, F. (2007), *Demanding work: The paradox of job quality in the affluent economy*, Princeton University Press, Princeton.
Hamermesh, D. (1997), Economic aspects of job satisfaction, in Ashenfelter, O. and W. Oates (eds.), *Essays in Labor market Analysis*, Wiley, Oxford.
Heitmüller, A. (2005) "A Note on Decompositions in Fixed Effects Models in the Presence of Time-Invariant Characteristics." IZA DP no. 1886

Jahn, E. J., Riphahn, R. T. and C. Schnabel (2012), "Feature: Flexible forms of employment: boon and bane", *The Economic Journal*, 122, pp. F115–F124.
Lalive R. (2002) Do wages compensate for workplace amenities? Mimeo, University of Zurich.
Linz, S. J. (2003) Job satifaction among Russian workers, *International Journal of Manpower*, 24, 626-652.
Linz, S. J. and A. Semykina (2012), What makes workers happy? Anticipated rewards and job satisfaction, *Industrial Relations*, 51, 811-844.
Kaiser, L. C (2007), Gender-Job Satisfaction Differences across Europe: An Indicator for Labor Market Modernization, *International Journal of Manpower*, 28 (1), pp. 75-94.
Mandrone, E. (2008), La riclassificazione del lavoro tra occupazione standard e atipica: l'indagine Isfol-Plus 2006, *Collana studi Isfol* n. 2008/1.
Mandrone, E. (ed) (2012*), Labour Economics PLUS Empirical Studies*, ISFOL Temi e Ricerche n. 3, Rome.
Mandrone, E and M. Marocco (2012a), Atipicità, flessibilità e precarietà: una lettura economica e giuridica attraverso l'indagine ISFOL-PLUS, *ISFOL Working Paper*.
Mandrone, E and M. Marocco (2012b), L'atipicità e i suoi derivati, www.lavoce.info.
Origo, F. and L. Pagani (2009), Flexicurity and job satisfaction in Europe: The importance of perceived and actual job stability for well-being ay work, *Labour Economics*, 16(5), pp. 547-555.
Oswald, A. J. (1997), Happiness and economic performance, *Economic Journal*, 107(445), pp. 1815-31.
Pagán, R. (2013), "Job satisfaction and domains of job satisfaction for older workers with disabilities in Europe", *Journal of Happiness Studies*, 14, pp. 861-891.
Pagán, R. and M. A. Malo (2009), Job satisfaction and disability: lower expectations about jobs or a matter of health?, *The Spanish Economic Review*, 11, pp. 51-74.
Schwarz,G. (1978), Estimating the dimension of a model, *Annals of Statistics*, **6**, pp. 461–464.
Semykina, A., & Wooldridge, J. M. (2010). Estimating panel data models in the presence of endogeneity and selection. *Journal of Econometrics, 157*, 375-380.
Senik, C. (2004), When information dominates comparison: Learning from Russian subjective panel data. *Journal of Public Economics*, 88, 2099-2123.
Sousa-Poza, A. and Sousa-Poza A. A. (2003), Gender differences in job satisfaction in Great Britain, 1991-2000: permanent or transitory?, *Applied Economics Letters*, 10(11), pp. 691-694.
Van Praag, B. M. S. and A. Ferrer-i-Carbonell (2004), *Happiness quantified: A satisfaction calculus approach*, Oxford Universty Press, Oxford.
Van Praag, B. M. S. and A. Ferrer-i-Carbonell (2006), An almost integration-free approach to ordered response models, *Tibergen Institute Discussion Paper*. 2006-047/3.
Van Praag, B. M. S. and A. Ferrer-i-Carbonell (2008), A multi- dimensional approach to subjective poverty', in: Kakwani, N. and J. Silber (eds.), *Quantitative Approaches to Multidimensional Poverty Measurement*, Palgrave, Macmillan, NY.
Wooden, M. and D. Warren (2004), Non-standard employment and job satisfaction: evidence from the HILDA survey, *The Journal of Industrial Relations*, 46(3), pp. 275-297.
Wooldridge, J. M. (2010), *Econometric Analysis of Cross Section and Panel Data*, The MIT Press, Cambridge, MA.

Appendix

Table A1: *frequency of each interview configuration: 1 for interviewed in a certain year, 0 otherwise*

2006	2007	2008	2009	2010	frequency
0	0	0	0	1	902
0	0	0	1	0	54
0	0	1	0	0	53
0	1	0	0	0	18
1	0	0	0	0	17
Total with 1 interview					**1044**
0	0	0	1	1	160
0	0	1	0	1	49
0	0	1	1	0	33
0	1	0	0	1	24
0	1	0	1	0	9
0	1	1	0	0	14
1	0	0	0	1	8
1	0	0	1	0	4
1	0	1	0	0	12
1	1	0	0	0	10
Total with 2 interviews					**323**
0	0	1	1	1	155
0	1	0	1	1	28
0	1	1	0	1	25
0	1	1	1	0	25
1	0	0	1	1	9
1	0	1	0	1	5
1	0	1	1	0	13
1	1	0	0	1	9
1	1	0	1	0	13
1	1	1	0	0	7
Total with 3 interviews					**289**
0	1	1	1	1	84
1	0	1	1	1	28
1	1	0	1	1	10
1	1	1	0	1	26
1	1	1	1	0	21
Total with 4 interviews					**169**
1	1	1	1	1	113
Total with 5 interviews					**113**
Total					**1938**

Table A2: *distribution of the covariates*

covariate	modality/ indicator	2006	2007	2008	2009	2010	overall
marital status	single	0.626	0.567	0.557	0.474	0.443	0.498
	together	0.374	0.433	0.443	0.526	0.557	0.502
children	yes	0.180	0.227	0.285	0.319	0.345	0.303
n.children	mean	0.193	0.243	0.311	0.345	0.397	0.338
	s.d.	0.428	0.465	0.516	0.531	0.592	0.545
n.minors	mean	0.193	0.241	0.306	0.336	0.391	0.332
	s.d	0.428	0.464	0.511	0.526	0.590	0.542
education	lower	0.151	0.154	0.151	0.133	0.116	0.133
	base	0.748	0.709	0.674	0.639	0.604	0.647
	higher	0.102	0.138	0.175	0.228	0.280	0.221
gender	male	0.462	0.456	0.462	0.469	0.494	0.476
	female	0.538	0.544	0.538	0.531	0.506	0.524
age	mean	21.223	21.872	22.342	23.287	24.001	23.101
	s.d.	1.621	1.807	2.114	2.133	2.364	2.364
working status	on leave	0.052	0.067	0.075	0.074	0.077	0.073
	working	0.948	0.933	0.925	0.926	0.923	0.927
hours	mean	41.377	41.555	41.124	41.241	41.817	41.516
	s.d.	7.748	7.424	8.426	7.817	7.207	7.625
wages	means	6.321	8.413	11.005	11.381	13.407	11.440
	s.d.	4.439	4.867	7.639	7.022	8.344	7.690
living	capital	0.475	0.450	0.486	0.490	0.490	0.483
	city	0.249	0.261	0.270	0.278	0.272	0.270
	other	0.275	0.289	0.244	0.232	0.238	0.247
n. obs		**305**	**436**	**663**	**759**	**1635**	**3798**

8. **The effect of Employment on Leaving Home in Italy**

Mazzotta Fernanda, Lavinia Parisi

Abstract

The paper examines simultaneously the leaving home and the employment decision of young Italians (aged 18-34). Stylized facts and previous studies have shown that when studying leaving home decision in Italy the probability of finding a job should also be analysed. The sample consists of young Italians (aged 18-34) drawn from European Union Statistics on Income and Living Conditions (EU-SILC) for the period 2004-2011, thus the time span gives us the possibility to look at individuals before and after the economic crisis. Moreover, the paper analyses the association between the economic status of the family of origin and the nest-leaving decision. We have estimated a bivariate probit model for the probability of leaving home and being employed allowing the error terms to be correlated. Results have shown that employment is a key factor to escape from parental home. According to the existing literature, individuals from richer family have higher probability of leaving home. As expected, after 2008 young Italians are less likely to leave parental home and to be employed.

JEL Classification: E24, J12, I20

Key words: Nest-leaving, Employment, Family Background, Italy

Introduction

The transition of young adults from their parental home to other living arrangements has linked to many economic and social outcomes such as school completion, starting a job and also forming a family as possible. Young Italians tend to enter the labour market rather later than youth in other nations; they live with their parents rather longer than their peers elsewhere; they form a partnership via marriage or cohabitation later, and now they also tend to have their first child later (Billari and Tabellini 2010). This pattern has been defined as the "latest- late transition to adulthood" (Rondinelli, Aassve, and Billari 2006).

The first aim of this paper is to analyse two important steps to adulthood all together namely the leaving home decision of young Italians (aged 18-34) and the probability of being employed after leaving.

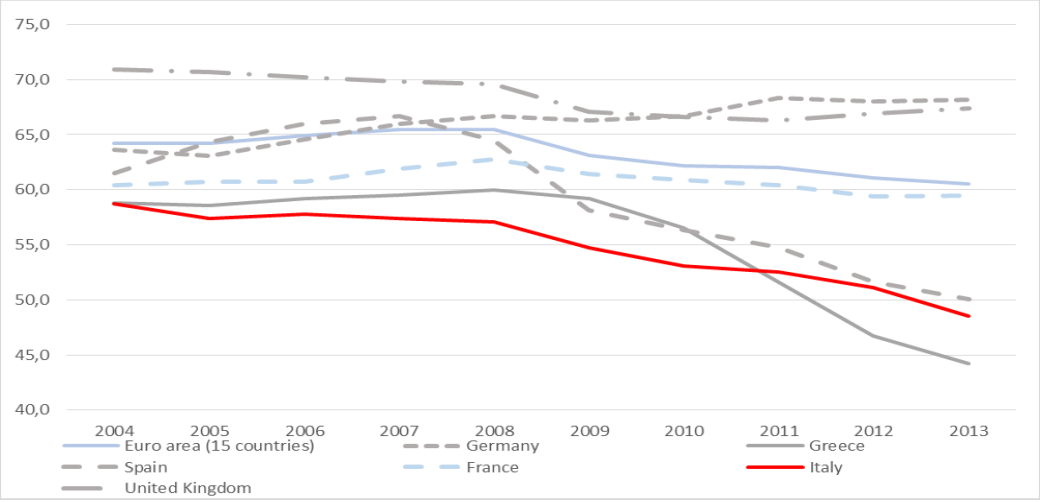
Billari and Tabellini (2010) consider that the peculiarity of the Italian pattern of transition to adulthood is due to two different explanations; the first one emphasizes culture or cultural change, the second focuses on economic and institutional factors that are peculiar to Italy. Our study focuses mainly on the latter and in particular we argue that the decision of leaving home and the probability of being employed could be due to the economic status of the family of origin (Iacovou 2010; Farace, Mazzotta, and Parisi 2014).

The decision of delay nest leaving has important economic consequences: first, it may affect young adults' reservation wages, their participation rates and their wage trajectories. Billari and Tabellini (2010) show that Italians who leave the parental home earlier in life earn a higher income in their mid-30s. They estimate that leaving home one year earlier would increase income by about as much as 1.5 additional years of education. Individuals who become adult later have less incentive to work, less motivation, they are less independent-minded, and they have less ability to learn (Alessie, Brugiavini, and Weber 2005). Second, leaving home later in life can affect marriage and fertility: Rondinelli (2006) state that the timing of home-leaving is quite homogeneously concentrated at relatively late ages among lowest-low fertility countries. Third, staying at home could be a protection against poverty: Parisi (2008) finds that in Southern European Countries, young people are more likely to enter poverty after they have left home compare to young people at home.

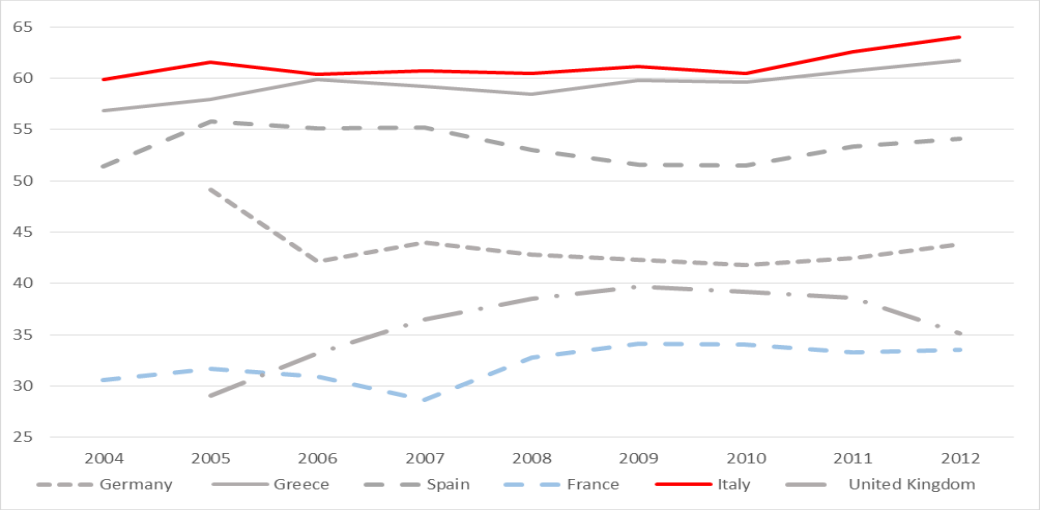
Figure 1 shows some stylized facts for Italy compare with some other European countries and when available the EU-15 mean. First, Italy shows the highest percentage of young people living with their parents (above 60% in all the year considered, Fig.1).

Figure 1 *Employment and unemployment rate, and share of individual living with their parents for Italy, France, United Kingdom, Spain, Greece, Germany and Euro 15 (when available).*

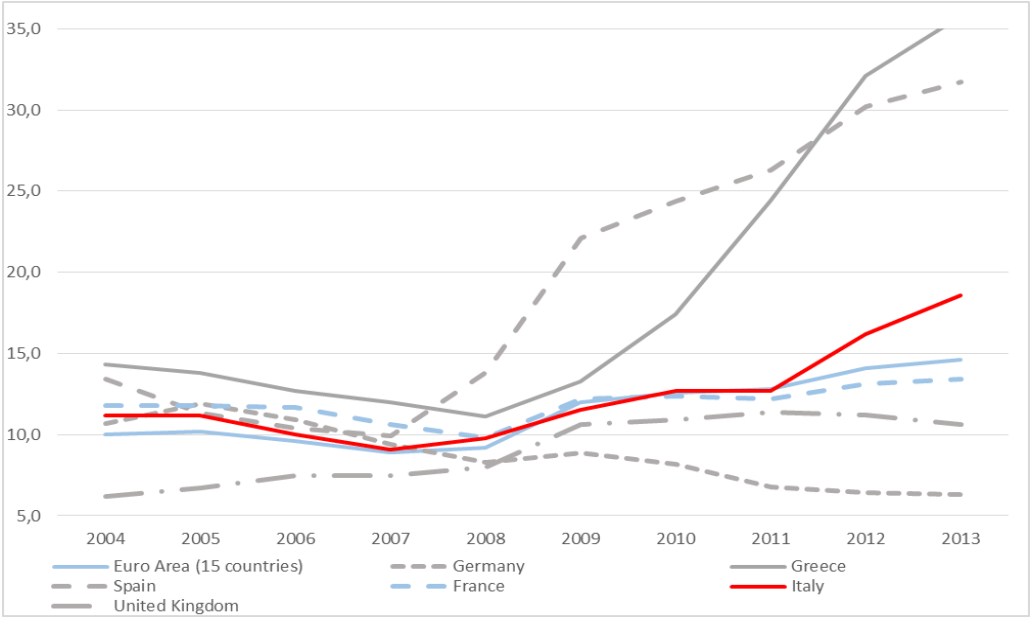
Employment rate (15-39)



Share of individual living with their parents(18-39)



Unemployment rate (15-39)

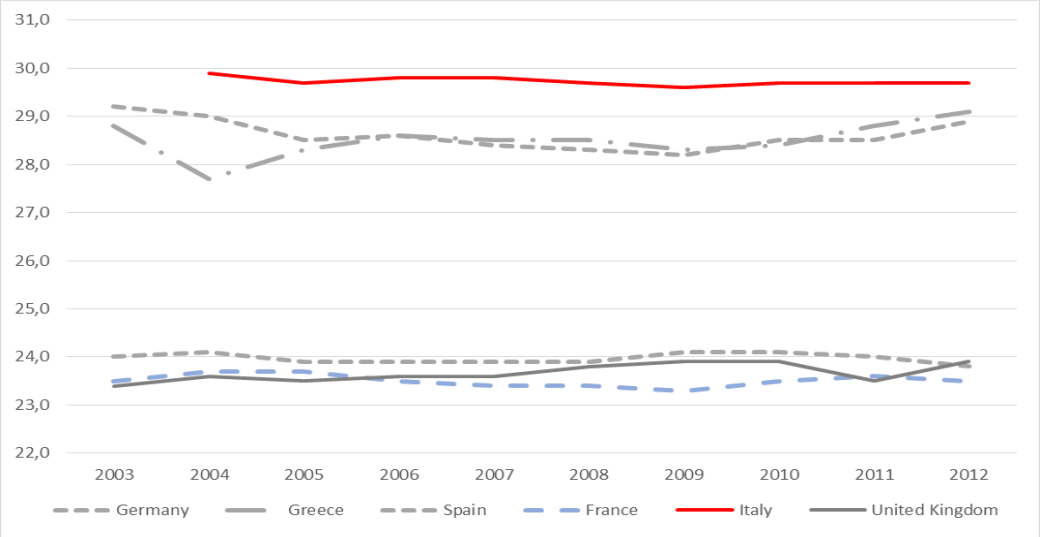


There are several reasons why young Italians leave home later than their European counterparts do. The decision could be due to factors such as a high rate of unemployment or high housing prices. In addition, living in the parental home may increase the utility of both parents and children. On the one hand, children may prefer to live in their parental home because of the care provided by their parents. This applies even if they have already found employment or have formed a stable relationship, whether cohabiting or marriage. On the other hand, parents may greatly value having children at home longer and so they offer transfers to keep their own children at home as long as possible (Manacorda and Moretti 2006) Also young adults may stay at home in order to help to reduce the poverty risk of their parents (Sanchez and Mercader-Prats 1998).

Second, Fig. 1 shows that as employment rate decreases, the share of young people living with their parents increases in Italy and this evidence is important above all after the economic crisis: employment rate is stable until 2008, after then it sharply decreases until 2012. Thus, employment seems to be a key factor explaining leaving home pattern in Italy.

Figure 2 shows the average age of leaving home and the results present some peculiarity. With regard to Italy, the average age of leaving home does not change across years while it increases in France, and other Southern European Countries, finally it decreases in Germany and UK. Italy, however, has the highest average age in each year under consideration.

Figure 2 *Average age at leaving home for Italy compare to some other European countries.*



Stylized facts and previous studies have shown that when studying leaving home decision, the probability of finding a job has to be considered too. Moreover it is also clear (Fig.1) that there are some differences before and after the economic crisis, in particular it seems that after 2008 employment rate decreases and, at the same time, the share of young Italians staying at home increases. We use a bivariate probit model to analyse simultaneously the decision to leave home and to be employed. Results show that employment is one of key factor to escape from parental home. Moreover, individual from richer family are more likely to leave given that they are more likely to find a job. The paper is structured as follows: next section describes theoretical and empirical framework, Section 3 describes data and the analysis sample, Section 4 presents the method while the last section shows results and discussion.

1. Theoretical and empirical framework on leaving home and employment

Several studies have analysed the decision of leaving home both from a theoretical and from an empirical point of view. Voluntary nest leaving can be explained by three different approaches (White, (1994). The first one is about *life-course*: a wider variety of transition and counter-transition are age related outcomes[111], such as school completion, career initiation and family formation. Quite all the empirical studies include individual aspects to capture life course explanation of leaving home. The second one is about *macrostructural and institutional factors*: employment, wage, cost of housing, social support, demographic contest, culture affect the probability of leaving. For instance (O' Higgins 2006)) following Card & Lemieux (2000) model, analyse whether aggregate economic factors (namely labour demand index and a wage index) contributed (or did not contribute) to the evolution of the transition processes, for Italy. He also considers four transition processes: employment, educational participation, marriage and living arrangement. He finds substantial differences in the responses of young people of different ages. Other authors (S. O. Becker et al. 2005; Fogli 2004) argue that moving-out decisions are irreversible and therefore higher job insecurity tends to decrease the probability of leaving the parental nest. Giuliano (2004) argues that the more liberal attitudes brought by the sexual revolution have allowed Southern Europeans to cohabit with their parents without having to give up their sexual activity. Finally, the third explanation concerns r*ational choice/exchange perspectives and preferences*: children are assumed to assess the costs and benefits of living with their parents compared to alternative living arrangements and to choose the arrangement that offers the most highly valued benefits (e.g. (McElroy and Horney 1981; Ermisch 1999; Manacorda and Moretti 2006; McElroy 1985; Rosenzweig and Wolpin 1993). This framework suggests that parents are altruistic toward their children i.e., their utility is a function of the utility of their own child as well as their own consumption of housing and other goods. For Italy, for instance, Manacorda and Moretti (Manacorda and Moretti 2006) use a non-cooperative model and focus on the role that preferences and intra-household transfers play in shaping living arrangements. They show that

[111] In general, for Italians born between 1966 and 1970, the median ages at various events were as follows, for men and women, respectively: for completing education: 19.2 and 19.3; for first job: 21.4 and 24.0; for leaving home: 27.2 and 25.1; for first birth: 33.4 and 29.3 (Mencarini, Mazzuco, and Rettaroli 2015).

if cohabitation is a *good* for parents and a *bad* for children, parents will be willing to trade off some of their consumption in order to bribe their children, that is, to compensate those children who remain at home by offering them higher consumption in exchange for their presence at home. One testable implication of their model is that, all else equal, an exogenous rise in parental income should be associated with a rise in the probability of co-residence (opposite to (Rosenzweig and Wolpin 1993; Rosenzweig and Wolpin 1994). Decision of co-residence could depend also from parents' needs, as outlined by Cameron and Cobb-Clark (2001) for Indonesia. They find that coresidency appears to be a result of evolving household structure, rather than an explicit form of support for elderly.

With regards to employment, the probability of being employed according to the search theory (Mortensen 1986; Barron and Mellow 1981) depends from the probability to receive an offer and the likelihood that this offer has been accepted. The acceptance of the wage offer depends on the probability that the wage offer received is higher than the reservation wage or minimum acceptable wage offer. Consequently, the probability of being employed is affected by the following: all the variables that influence the labour market conditions and the opportunities to receive higher wage offer; the distribution of the wage offers; all the variables that influence the individual's reservation wage (preferences, expectation, marginal cost and marginal benefit of search activity). As regards leaving home, we can divide the variables affected employment condition in three categories: individual characteristics (such as age, sex education and so on), market characteristics (such as geographical area, type of job, sector and so on), finally the costs and the job search intensity.

As we stated above, the focus of this paper is on parental background. There are many studies focussing on the association between leaving home and parental characteristics.

For instance, Rosezweig and Wolpin (1993) formulate an altruistic, imperfect foresight overlapping generation model incorporating human capital investments, inter-household transfer and decision concerning household residence. As the monetary transfer costs are lower when the child live at home, parents prefer to have children at home if their income is low and they need to transfer money to them. For the same reason a rise in parental income increases the chances for children to living at home. Rosezweig and Wolpin test their model using U.S. National Longitudinal Survey. They assume that parents are altruistic while adult

offspring are indifferent to residence state. They find that cohabitation rates tend to fall as parental income rises (Rosenzweig and Wolpin 1993; Rosenzweig and Wolpin 1994), this suggest that for U.S. fathers privacy is a normal good:as income increases and privacy increases the cohabitation decreases.

Becker et al. (2005) assume that parents are partially altruistic toward their children and they will provide financial help to an independent child when his\hers income is low relative to the parents. However, if a child live at home, he\she will have access to a greater share of total family income than granted to him\her through financial transfers in the state of independence. Their analysis identifies parental altruism as the very source of the ambiguous impact of higher income on the child's residential status. An unintuitive conclusion follows from the comparison of the altruistic versus non-altruistic cases: parents will no longer give transfers to independent children when altruism is absent, thus an increase of parents' income raises the child's current income threshold for independence and makes children less willing to leave.

Ermisch (1999), for UK, suggests that parental income positively influences the decision of living home, if the parents have a sufficiently high preference for cohabitation and if children are relative poor respect to parents, parental income should have a negative effect on the probability of leaving. Moreover Ermisch (1999) finds that a young person's own unemployment increase departure to live alone or with friends/others. Unemployment spells also dramatically increase the rate of return to the parental home among these apart from parents.

Parisi (Parisi 2008) focuses on four southern European countries, she finds that leaving home to enter couple living arrangements increased young people's risks of entering poverty in Portugal and Spain but not in Italy and in Greece, moreover higher parental income is associated to higher probability to leave home.

Iacouvou (2010) examines the factors influencing young people's decision to leave parental home in Europe, focusing on the role of income: the young person's own income, and the income of his or her parents. In all groups of countries, the young person's own income is positively associated with the probability of leaving home. However, the effects of parental income are more complex. Everywhere, higher parental income is associated with a lower

likelihood of leaving home to live with a partner at young ages, and a greater likelihood at older ages. But whereas in Nordic countries, higher parental incomes accelerate home leaving to partnership at all ages after the late teens, this effect is not seen until a much later age in Southern Europe, and not until after age 35 for Southern European men. This is consistent with existing theory about cross-country differences in the nature of family ties, suggesting that parents' preferences for independence versus family closeness differ between countries, and contribute (together with differences in young people's socioeconomic situations) to the widely differing patterns of living arrangements observed across Europe.

One of the most recent study, (Angelini and Laferrère 2012) takes advantage of the retrospective data collected in the third wave of the Survey of Health, Ageing and Retirement in Europe (SHARE). It tests the prediction of the theoretical model in an historical perspective. They analyse the leaving home for different cohort focusing on the impact of parental resources on the decision to leave the nest. They use a model based on altruism distinguishing two channels: the first one consider the fact that parents help their children to pay for expenses when independent. The second focuses on the fact that parents subsidising child's consumption when she\he co-resides more than would be when she\he is independent, this is because either they are more altruistic in the former situation, or because it is cheaper to transfer in the first case. Thus, the model allows for both a positive and a negative effect of parental income on nest leaving. In fact they find that high skilled non constrained parents help their daughters to settle, while the most constrained parents cannot keep their daughters at home. Low educated sons of high-skilled and technicians parents are helped to move out compared to middle and working-class children. Finally, high educated sons of high-skilled workers leave later than those of low-skilled workers.

Finally, Ayllon (2014) uses a dynamic trivariate probit model for poverty, employment, and leaving parental home in Europe. Her model allows for feedback effects between the three processes. That way she can properly deal with the endogeneity problems that arise when studying life transitions that are possibly taking place in a sequential manner. The main results show that economic hardship today increases *in itself* the likelihood of being poor tomorrow among young individuals. However, in Italy, fewer young people live in economic hardship but they have greater difficulties in leaving it behind. Moreover, she finds that

leaving home and employment are closely related phenomena in the cases of Mediterranean and Continental Europe. However, she uses quite dated survey (ECHP) and she cannot observe the situation during the economic crisis given their date stopped at 2001. We can overcome both drawbacks of her study.

Family background influences also the duration of unemployment among children and consequently the permanence in parental home (Farace, Mazzotta, and Parisi 2014). The theoretical and empirical literature defines three channels of transmission: the family's financial and cultural circumstances (as education), and family networks. The first two channels affect both the opportunity to access better education and support their children's job search efforts. At the micro level, economic theory (G. Becker 1965) provides a framework to analyse the association underlying the positive correlations between parents' and children's education and consequently parents' and young people's income. The intergenerational mobility literature has explored this link. The strong link between parents' and children's incomes means that Italy is one of the least mobile OECD countries, trailing only the United Kingdom in terms of intergenerational earnings elasticity (OECD 2009; Checchi, Ichino, and Rustichini 1999; Mocetti 2007).

Family background can also influence the offspring's reservation wages, accepted starting salaries and the decision of whether to accept a given wage offer. For instance, high family income enables parents to provide financial support during their offspring's employment search. According to standard job search theory, increasing benefits during the search raises the young person's reservation wage and accepted starting salary. Consequently, wealthier families can mitigate liquidity constraints, allowing their children to devote less effort to (and also extending) the job search process (i.e., allowing them to be unemployed for a longer period) to achieve a better match in the labour market. However, individuals from less advantaged families are credit constrained hence, they might be forced to accept any job offer and reduce their unemployment duration. This interpretation would suggest a positive relationship between higher family socioeconomic status and unemployment duration and then delay leaving parental home. Clearly, financial support and education are not the only channels through which family members can influence the employment prospects of youths. In the Italian case, networks play an important role by providing information on the quality of

education and jobs, thereby increasing the children's opportunities. Farace *et al.* (2014) analyse the unemployment duration of children as affected by their family background. They find a residual effect of parental economic condition on unemployment duration that could be the result of educational quality and/or network effects. Children from the wealthiest families may be able to afford high-quality school and university and also may have better information and search strategies, thereby reducing their unemployment duration. According to the evidence, leaving home is positively correlated with the probability of finding a job, thus higher family income can have an ambiguous effect on the unemployment duration and consequently on leaving home, fasten or delay entry in a job.

2. Methods

The model used in this paper is a type of first-order Markov approach. It takes into account pairs of observations in two consecutive years t and t + 1 for each individual (i = 1, ...,N); where t is the year when a young person lives with his\hers parents and t + 1 is the year when he\she has left home.

$$L^*_{it+1} = \beta y_t + \alpha_0 Gender_{t+1} + \alpha_1 Age_{t+1} + \alpha_2 Education_{t+1} + \alpha_3 Heatlh_{t+1} + \alpha_4 Employment\ condition_{t+1} + \alpha_5 Marital\ Status_{t+1} + \alpha_6 Territorial\ Area_{t+1} + \alpha_7 Crisis + \alpha_8 Crowd\ Index_t + \alpha_9 House's\ price_{t+1} + e_i \quad (1)$$

$$E^*_{it+1} = \lambda y_t + \gamma_0 Gender_{t+1} + \gamma_1 Age_{t+1} + \gamma_2 Education_{t+1} + \gamma_3 Heatlh_{t+1} + \gamma_4 Employment\ condition_t + \gamma_6 Territorial\ Area_{t+1} + \gamma_7 Crisis + u_i \quad (2)$$

where

$L_{it} = 1$ *if* $(L^*_{it} > 0)$, $L_{it} = 0$ *otherwise* (3)

$E_{it} = 1$ *if* $(E^*_{it} > 0)$, $E_{it} = 0$ *otherwise* (4)

$Corr(e, u) = \rho$ (5)

Equation (1) is the probability of leaving home at time t+1 (L_{t+1}), equation (2) is the probability of being employed at time t+1 (E_{t+1}). We estimate a bivariate probit model that is a simulation method to maximum likelihood estimation of the multivariate probit regression model. The model controls for unobservable factors that influence both the probability to leave home and to be employed and allows these factors to be correlated Rho (ρ). Rho, in fact, indicate if there is a further correlation besides those showed by the coefficient α_4 in equation (1). ρ accounts for unobserved heterogeneity between employment and leaving home: when positive (negative) it means that unobservable that make young people more likely to be employment make them more (less) likely to be emancipated.

The independent variable of main interest is household income (y_t). We are interested to test whether β and λ are greater than zero or not. Net total disposable household income is constructed by Eurostat as the sum of net personal income at t+1 (all income variables are collected retrospectively). The net household income is divided by a scaling factor taking into account the economies of scale within the household. This scaling factor reflects the number of adults and children amongst whom the income has to be shared and it is the modified OECD equivalent scale (provided in the survey).

When income is used as an explanatory variable (yt) different specifications of the income measure are provided: a categorical income measure (four dummy variables for different income categories where the boundaries are expressed in terms of fraction of the median i.e. 60%, 100%, 150%) and a logarithmic transformation of the income.

The estimates include the economic status of the origin family (i.e. income at time t). Ayllon (2014) argued that economic hardship in the family of origin does not seem to precipitate leaving the parental home. Nevertheless, an explanation for it is difficult to unravel. In those contexts where family ties are strong, young individuals may feel more responsible for their parents' well-being and thus remain in the parental home to offer help and companionship. Moreover individuals from poorer backgrounds may have not only fewer opportunities in the labour market but also fewer residential emancipation possibilities. If it is so, we could expect a positive sign of β.

On the other hand, Manacorda and Moretti (2006) find a positive relation between parental income and cohabitation: as cohabitation is a normal good for Italian parents, parental preferences might contribute to explain the remarkably high rate of cohabitation between Italian children and their parents. Even if alternatives explanations cannot be entirely ruled out. For example, it's impossible to completely rule out the possibility that cohabitation is undesirable for Italian parents, but children prefer to live with richer parents because of the potential gains from such cohabitation, or it's possible that the rise in parental income makes it possible for children to attend college, by relaxing parents' liquidity constraints[112]. Thus in this context, we could expect a negative sign of β.

Less clear is the association of lagged economic status with employment. On the one hand, amongst those living in the parental home, one may think that economic hardship may precipitate young individuals entering the labour market in order to help his/her family. If that were the case, we could expect a negative sign of λ. On the other hand, it is also well known that poverty is intergenerationally transmitted thus individuals from an economically deprived background have fewer opportunities in the labour market (Ayllón 2014; Farace, Mazzotta, and Parisi 2014). If it is so, we can expect a positive sign of λ.

Moreover, both the probability of leaving home and the probability of being employed depend on explanatory variables that reflect demographic characteristics (see equation 1 and 2).

In order to address the identification issue, equation (1) includes as explanatory variable a crowding index[113], marital status and house prices. Children from larger families are more likely to leave home early, and over-crowded accommodation is a factor that raises the chances of moving out of the parental home. The probability of living in a crowded house (i.e. having a small number of rooms and/or a large number of adults) could be negatively associated with parental income but we believe is not associated directly with the probability of being employed. Marital status is also a factor affecting leaving home decision above all in Italy: Parisi (2008) using ECHP data, finds that for Southern European Countries leaving

[112] This is a potential problem because many Italian children live at home while attending college. Thus the rise in cohabitation rates could be the by-product of a higher probability of school enrolment. To take into account for this, we try to estimate the model also excluding students

[113] The crowding index is defined as the number of adults divided by the number of rooms, excluding the kitchen and bathroom in the household. We would therefore use the Heckman probit to provide consistent estimates of all the parameters.

home and being a part of a couple are strictly correlated. Finally, we also include in our model housing prices (calculated for every year under considerations and for macro area of residence with PPP based at 1998) Ermish (Ermisch 1999)estimates a model on the probability of leaving home including also housing prices. His model predicts that the impact of the price of housing on the probability of living apart is related to the price elasticity of parents' housing demand. When this is less than a critical value (e.g., unity in the case of CES preferences) a higher price of housing reduces the probability that the young adult lives apart from the parents, but the opposite is true if housing demand is above the critical value. These predictions reflect the fact that a higher housing price reduces the child's utility in the parental home as well as when he\she lives away from home. Several studies includes housing prices to predict the probability of leaving home such as Giannelli and Monfardini (2000) Ermisch and Di Salvo (1997) and Becker et al (2005).

Finally, we assume that the household size itself at time t (relative to the number of adults among with the household is shared), housing prices and marital status are not factors directly affecting the probability of being employed (after leaving).

3. Data

The analysis is based on European Union Statistics on Income and Living Conditions (EU-SILC), in particular we use the 5 periods available: 2004-2007, 2005-2008, 2006-2009, 2007-2010, 2008-2011. Longitudinal data aim to analyse individual-level changes over time, observed periodically over a four-year period. Housing information are collected mainly at household level while labour, education and health information are obtained for persons aged 16 and over. Income, at very detailed component level, is collected at personal level.

When examining young people leaving home in Italy, we adopt a wider age range, than in most studies on youth poverty. Therefore, the definition of 'young people' in this paper differs from the one generally used in the literature. Young people are usually 'those who are no longer children, but who belong to an age group many of whose members have not yet completed all the processes of transition to adulthood' (Aassve, Iacovou, and Mencarini 2005 p. 1). 'Youth' is usually considered as starting around 15 years old and ending around 25. In

this paper young people are aged 18–34 years and they are completing most of the steps of transition to adulthood, namely leaving the parental home, starting a job and forming a partnership. To select our sample we consider couple of consecutive years namely 'year *t*' where young people were living with their parents and were at risk of leaving home and 'year *t+1*' where young people have left home. Moreover, we consider young people aged 18–34 years when first observed in year t. A young person is observed for at most 4 consecutives waves (from the 2004). Each individual may contribute more than one pair–year observation (i.e. two consecutive years t and t + 1). The first variable we consider is the probability of leaving home (L_{t+1}). L_{t+1} describes whether young Italians, that were living in the family of origin at t, are still living with their parents at t+1. If the individual is not in the family of origin at t+1 we know exactly his/hers own destination: whether he/she has left home alone, whether he/she has left home to live with a partner, whether he/she has left home and he/she is not in the panel anymore (attrition). Table 1 shows the number of observations and percentage in each destination before and after the economic crisis

.

Table 1: *Destination at t+1*

	At home	Left home with partner	Left home alone	Not in the panel anymore	Total
Before 2008	12,548	285	183	976	13,992
	89.68%	2.04%	1.31%	6.98%	100.00%
After 2008	10,704	174	130	1,562	12,570
	85.16%	1.38%	1.03%	12.43%	100.00%
Total	23,252	459	313	2,538	26,562
	87.54%	1.73%	1.18%	9.56%	100.00%

The number of youths who were living with their parents at time t and who were at risk of leaving home is 26,562 (pooling the individual–pair–year observations). As attrition is

ignored, the sample reduces to 24,024 cases. Four destinations can occur at t+1: young people remaining in parental home, young people leaving home to live with a partner, young people leaving home alone, and young people no longer present in the panel. Before the economic crisis 3.3% of young people were leaving home (considering 2.04% leaving with a partner plus 1.31% leaving alone), the figure reduces to around 2.4% after 2008.

Children leaving home are more likely to be employed, both at t and at t+1, this indicates the fact that in Italy individuals leave parental home only after they find a job. Not surprisingly, after the economic crisis, overall children are less likely to be employed (45.01% vs. 39.95%) however when we look at the selected sample of children leaving home the figure is opposite (63.89% vs. 70.72%). This should become blear according to Becker et al., (2005) and Fogli (2004) that argue that moving-out decisions are irreversible and therefore higher job insecurity tends to decrease the probability of leaving the parental nest, only children with a job would move to other living arrangements rather than parental home.

Table 2*: Economic condition before and after 2008.*

	Before 2008			After 2008		
	All children	ChildrenLeaving Home		All children	ChildrenLeaving Home	
	time t	time t	time t+1	time t	time t	time t+1
Employed	45.01	63.89	75.85	39.95	70.72	78.95
Equivalent Household Income*	17314.14	18355.83	14226.57	17475.19	20268.29	14488.21

*Mean in Euro, real value, GDP deflator in national currency from the April 2012 version of the World Economic Outlook (WEO) database

With regards to the economic conditions we notice that the equivalent household income at t for children leaving parental home, is higher after the economic crisis, instead when looking at the income at time t+1 this is lower. The income at t for children leaving home is mainly based on parental income while at t+1 it is the income of the new family of the young son or daughter who has left home.

5. Results and discussion

Table 3 presents estimates for two specifications of bivariate probit model. The first one (column 1-4) includes the economic status of the family of origin defined as a categorical income measure. Four dummies are included, for different categories of income where the boundaries are expressed in terms of fraction of the median i.e. less than 60%, from 60 up to 100%, from 100 up to 150 and above 150% being the reference category). Column 5-8 presents estimates with economic status expressed as a logarithmic transformation of the household equivalent income. Moreover, each specification has been run including or not the employment condition in the equation of leaving home (using a recursive bivariate probit, see column 3, 4, 7 and 8). Finally, columns 2, 4, 6, and 8, perform the same models but we have a restricted sample i.e. excluding students.

First of all the analysis shows that the correlation between the error terms of the probability of being employed and the probability to leave parental home is positive and significant except when we include the employment condition in columns 3, 4, 7, and 8. We include employment to estimate its effect on the probability of leaving home: employment increases the probability to leave parental home from 1.22% to 2.74% (i.e. 1.52 percentage points) considering the entire sample. This effect reduces when we exclude from the estimates the students (employment increases the probability of leaving home by only 0.1 pp). Thus employment condition and being in education are two important factors in determining the probability of living at parental home moreover, by definition, they are mutually exclusive: children are either employed or student. Given that our children are aged 18-34 students are mostly included in the secondary education category so they are not employed. When we use the restricted sample (i.e. excluding students), the employment condition reduces its effect probably because of less variability.

With regard to our main aim (i.e. the effect of parental background on the probability of leaving home and being employed), we can say that both the coefficient β and λ are positive and highly statistic different from zero. This confirm that leavers are young people from better off family (in line with Parisi 2008 and partly with Angelini and Laferrere (2012) and children from richer families have higher probability to be employed (as in Farace, Mazzotta,

and Parisi 2014). Those children, in fact, may find job with higher salaries thanks to the fact that their parents are able to finance their job search and they may have better networking (as founded Farace, Mazzotta, and Parisi 2014).

Moreover, leavers are young people with higher education: graduates are 1.2 percentage points more likely to leave home. Leaving home increases with age and good health. There is a gender difference in the probability of leaving parental home, in fact men are more likely to stay at home longer, as in Parisi (2008), although this is true only when we control for employment condition and for the restricted sample. This could mean that given the same chances of employment and given that young children are not in education, men have a higher preference to stay at home longer than women do.

The highest effect on the probability of leaving home is the marital status: young people married are 37 (42 for the sample of no-student) percentage points more likely to leave home. Looking at the time dummies, after the economic crisis (2009) there is a reduction in the probability of leaving home. Finally, the probability of nest leaving increases with age but after a maximum (29/30 years old) it starts to decrease (inverted U-shaped).

With regard to the probability of being employed all the variables included in our model are significant and with the expected sign. The economic crisis in Italy reduces the probability of being employed only after 2010 (of about 4 pp). As expected the South part of the country has the lowest probability of being employed (minus 15/17 pp compare to the North of Italy). The probability of being employed increases with age but after a maximum (31 years old for all sample and 27 years for the restricted sample) it starts to decrease (inverted U-shaped). Having good health increases the probability to work. It is peculiar the effect of education given that it appears very different with regard to the sample considered. In particular, considering the sample of all young children, we do find that children with secondary education have a lower probability to find a job than those with compulsory education. When we exclude students, we do find the opposite i.e. the higher the level of education the more likely are the children to find a job. The reason why has been underlined above: the incidence of unemployed children is higher between individual with secondary education by construction, our children are aged 18-34 so the students are almost all in the secondary education category and by definition they are student so not employed. When we exclude

them, the employment condition reduces its effect and we do find the right effect of education.

Finally, there is a strong state dependence on the probability of employment and previous employment condition; the lagged employment variable it is positive and significant.

Table 3: *Probit model (Not conditional Marginal Effect at Mean)*

Variables	All (1)	No-student (2)	All (3)	No-student (4)	All (5)	No-student (6)	All (7)	No-student (8)
Leaving Home								
Eqinc under 60%Me	-0.0099 ***	-0.0150 ***	-0.0066 ***	-0.0111 ***				
Eqinc between 60%&100%Me	-0.0010	-0.0031	0.0006	-0.0010				
Eqinc between 100%&150%Me	-0.0021	-0.0041	-0.0018	-0.0035				
Log of eq.income at t					0.0048 ***	0.0074 ***	0.0026 **	0.0046 **
Time dummy (2004)	0.0140	0.0137	0.0111	0.0125	0.0142	0.0135	0.0112	0.0123
Time dummy (2005)	0.0135	0.0126	0.0115	0.0118	0.0137	0.0125	0.0116	0.0117
Time dummy (2006)	0.0046	0.0016	0.0035	0.0012	0.0047	0.0015	0.0035	0.0010
Time dummy (2007)	0.0068	0.0071	0.0058	0.0067	0.0068	0.0069	0.0058	0.0065
Time dummy (2009)	-0.0084 ***	-0.0126 ***	-0.0076 ***	-0.0121 ***	-0.0087 ***	-0.0129 ***	-0.0078 ***	-0.0123 ***
Time dummy (2010)	0.0030	0.0006	0.0034	0.0012	0.0028	0.0004	0.0032	0.0010
South	-0.0007	-0.0008	0.0023	0.0023	-0.0011	-0.0016	0.0023	0.0021
Centre	-0.0034 *	-0.0052 *	-0.0021	-0.0040	-0.0035 *	-0.0055 *	-0.0021	-0.0041
Male	-0.0018	-0.0051 **	-0.0032 **	-0.0062 ***	-0.0019	-0.0052 **	-0.0033 **	-0.0064 ***
Age	0.0079 ***	0.0088 ***	0.0046 **	0.0072 **	0.0080 ***	0.0089 ***	0.0046 **	0.0071 **
Age squared	-0.0001 ***	-0.0002 **	-0.0001 **	-0.0001 **	-0.0001 ***	-0.0002 **	-0.0001 **	-0.0001 **
Tertiary education a t+1	0.0103 ***	0.0185 ***	0.0119 ***	0.0184 ***	0.0100 ***	0.0181 ***	0.0115 ***	0.0180 ***
Secondary education a t+1	0.0045 **	0.0091 ***	0.0047 ***	0.0081 ***	0.0045 **	0.0091 ***	0.0046 **	0.0080 ***
Good health at t	0.0058 **	0.0078 **	0.0047 **	0.0065 *	0.0059 **	0.0079 **	0.0047 **	0.0065 *
House crowded at t	0.0006	0.0026	0.0006	0.0023	0.0018	0.0044	0.0013	0.0036
Married at t+1	0.3781 ***	0.4179 ***	0.3675 ***	0.4158 ***	0.3759 ***	0.4155 ***	0.3657 ***	0.4138 ***
House's Price	0.0004	0.0005	0.0003	0.0141	0.0004	0.0005	0.0003	0.0149
Employment Condition at t+1			0.0152 ***	0.0005 ***			0.0157 ***	0.0005 ***
								0

obs. P Leaving Home	3.21	4.41	3.21	4.41	3.21	4.41	3.21	4.41
pred. P Leaving Home	1.37	2.10	1.22	1.98	1.40	2.13	1.24	2.00
Employed								
Eqinc under 60%Me	-0.1516 ***	-0.2559 ***	-0.1509 ***	-0.2557 ***				
Eqinc between 60%&100%Me	-0.0606 ***	-0.1197 ***	-0.0601 ***	-0.1196 ***				
Eqinc between 100%&150%Me	0.0002	-0.0354 ***	0.0001	-0.0357 ***				
Log of eq.income at t					0.0753 ***	0.1133 ***	0.0749 ***	0.1131 ***
Time dummy (2004)	0.0850 ***	0.0671 ***	0.0856 ***	0.0676 ***	0.0916 ***	0.0766 ***	0.0920 ***	0.0769 ***
Time dummy (2005)	0.0539 ***	0.0416 ***	0.0544 ***	0.0420 ***	0.0595 ***	0.0511 ***	0.0599 ***	0.0514 ***
Time dummy (2006)	0.0509 ***	0.0431 ***	0.0512 ***	0.0434 ***	0.0539 ***	0.0479 ***	0.0542 ***	0.0481 ***
Time dummy (2007)	0.0477 ***	0.0396 ***	0.0479 ***	0.0399 ***	0.0480 ***	0.0407 ***	0.0482 ***	0.0411 ***
Time dummy (2009)	0.0241 *	0.0371 ***	0.0244 *	0.0373 ***	0.0208	0.0320 **	0.0211	0.0322 **
Time dummy (2010)	-0.0460 ***	-0.0538 ***	-0.0466 ***	-0.0540 ***	-0.0481 ***	-0.0563 ***	-0.0487 ***	-0.0566 ***
South	-0.1524 ***	-0.1702 ***	-0.1522 ***	-0.1703 ***	-0.1654 ***	-0.1897 ***	-0.1652 ***	-0.1897 ***
Centre	-0.0520 ***	-0.0666 ***	-0.0520 ***	-0.0667 ***	-0.0551 ***	-0.0721 ***	-0.0551 ***	-0.0723 ***
Male	0.0657 ***	0.0435 ***	0.0651 ***	0.0432 ***	0.0661 ***	0.0443 ***	0.0654 ***	0.0440 ***
Age	0.1072 ***	0.0413 ***	0.1063 ***	0.0409 ***	0.1066 ***	0.0411 ***	0.1056 ***	0.0406 ***
Age squared	-0.0017 ***	-0.0008 ***	-0.0017 ***	-0.0007 ***	-0.0017 ***	-0.0007 ***	-0.0017 ***	-0.0007 ***
Tertiary education a t+1	-0.0241	0.0393 ***	-0.0243	0.0391 ***	-0.0200	0.0458 ***	-0.0201	0.0456 ***
Secondary education a t+1	-0.0430 ***	0.0412 ***	-0.0431 ***	0.0411 ***	-0.0398 ***	0.0433 ***	-0.0400 ***	0.0431 ***
Good health at t	0.0733 ***	0.1056 ***	0.0733 ***	0.1056 ***	0.0722 ***	0.1027 ***	0.0723 ***	0.1027 ***
Employment Condition at t	0.6627 ***	0.5094 ***	0.6646 ***	0.5105 ***	0.6648 ***	0.5142 ***	0.6667 ***	0.5152 ***
Rho	0.2559 ***	0.2084 ***	0.0328	0.0440	0.2564 ***	0.2091 ***	0.0311	0.0371
Statistics								
N	24024	16619	24024	16619	24024	16619	24024	16619
Ll	-11300.0	-8790.0	-11300.0	-8790.0	-11300.0	-8830.0	-11300.0	-8820.0
obs. P Employed	46.31	66.95	46.31	66.95	46.31	66.95	46.31	66.95
pred. P Employed	45.99	73.32	46.00	73.35	46.05	73.31	46.07	73.34

References

Aassve, Arnstein, Maria Iacovou, and Letizia Mencarini. 2005. *Youth Poverty in Europe: What Do We Know?*. Institute for Social and Economic Research. http://econpapers.repec.org/RePEc:ese:iserwp:2005-02.

Alessie, Rob, Agar Brugiavini, and Guglielmo Weber. 2005. "Saving and Cohabitation: The Economic Consequences of Living with One's Parents in Italy and the Netherlands," January. http://www.nber.org/papers/w11079.

Angelini, Viola, and Anne Laferrère. 2012. "Parental Altruism and Nest Leaving in Europe: Evidence from a Retrospective Survey." *Review of Economics of the Household* 11 (3): 393–420. doi:10.1007/s11150-012-9170-9.

Ayllón, Sara. 2014. "Youth Poverty, Employment, and Leaving the Parental Home in Europe." *Review of Income and Wealth*, May, n/a – n/a. doi:10.1111/roiw.12122.

Barron, John M., and Wesley Mellow. 1981. "Changes in Labor Force Status among the Unemployed - 145630." *The Journal of Human Resources* 16 (3): 427–41. http://www.jstor.org/stable/pdfplus/145630.

Becker, Gs. 1965. "A Theory of the Allocation of Time." *The Economic Journal* 75 (299): 493–517. doi:10.2307/2228949.

Becker, Sascha O., Samuel Bentolila, Ana Fernandes, and Andrea Ichino. 2005. *Youth Emancipation and Perceived Job Insecurity of Parents and Children - dp1836.pdf*. 1836. Discussion Paper. http://repec.iza.org/dp1836.pdf.

Billari, Francesco C., and Guido Tabellini. 2010. "Italians Are Late: Does It Matter?" In *Demography and the Economy*, edited by John B. Shoven, 371–412. University of Chicago Press: the National Bureau of Economic Research. http://papers.nber.org/books/shov08-1.

Card, David, and Thomas Lemieux. 2000. "Adapting to Circumstances (The Evolution of Work, School,and Living Arrangements among North American Youth)." In *Youth Employment and Joblessness in Advanced Countries*, edited by David G. Blanchflower and Richard B. Freeman, 171–214. University of Chicago Press. http://davidcard.berkeley.edu/papers/youth work living.pdf.

Checchi, Daniele, Andrea Ichino, and Aldo Rustichini. 1999. "More Equal but Less Mobile?" *Journal of Public Economics* 74 (3): 351–93. doi:10.1016/S0047-2727(99)00040-7.

Di Salvo, Pamela, and John Ermisch. 1997. "Analysis of the Dynamics of Housing Tenure Choice in Britain." *Journal of Urban Economics* 42 (1): 1–17. doi:10.1006/juec.1996.2009.

Ermisch, John. 1999. "Prices, Parents, and Young People's Household Formation." *Journal of Urban Economics* 45 (1): 47–71. doi:10.1006/juec.1998.2083.

Farace, Salvatore, Fernanda Mazzotta, and Lavinia Parisi. 2014. *Characteristics of Parents and the Unemployment Duration of Their Offspring. Evidence from Italy*. AIEL - Associazione Italiana Economisti del Lavoro. http://econpapers.repec.org/RePEc:ail:chapts:07-08.

Fogli, Alessandra. 2004. "Endogenous Labor Market Rigidities and Family Ties." *Mimeo*. http://www.iza.org/conference_files/lmi2004/fogli_a1859.pdf.

Giannelli, Gianna Claudia, and Chiara Monfardini. 2000. “Joint Decisions on Household Membership and Human Capital Accumulation of Youths: The Role of Expected Earnings and Local Markets,” August. http://papers.ssrn.com/abstract=251992.

Giuliano, Paola. 2004. *On the Determinants of Living Arrangements in Western Europe: Does Cultural Origin Matter?*. Econometric Society. http://econpapers.repec.org/RePEc:ecm:nasm04:68.

Iacovou, Maria. 2010. “Leaving Home: Independence, Togetherness and Income in Europe.” *Advances in Life Course Research*, 15 (4): 147–60. http://www.un.org/en/development/desa/population/publications/pdf/expert/2011-10_Iacovou_Expert-paper.pdf.

Manacorda, Marco, and Enrico Moretti. 2006. “Why Do Most Italian Youths Live with Their Parents? Intergenerational Transfers and Household Structure.” *Journal of the European Economic Association* 4 (4): 800–829. doi:10.1162/JEEA.2006.4.4.800.

McElroy, Marjorie B, and Mary Jean Horney. 1981. “Nash-Bargained Household Decisions: Toward a Generalization of the Theory of Demand.” *International Economic Review* 22 (2). Department of Economics, University of Pennsylvania and Osaka University Institute of Social and Economic Research Association: 333–49.

McElroy, Marjorie B. 1985. “The Joint Determination of Household Membership and Market Work: The Case of Young Men on JSTOR.” *Journal of Labor Economics* 3 (3): 293–316. http://www.jstor.org/stable/2534843?seq=1#page_scan_tab_contents.

Mencarini, Letizia, Stefano Mazzuco, and Rossella Rettaroli. 2015. “Similarities and Differences between Two Cohorts of Young Adults in Italy: Results of a CATI Survey on Transition to Adulthood.” Accessed January 15. http://scholar.google.it/citations?view_op=view_citation&hl=it&user=PUlRJy0AAAAJ&citation_for_view=PUlRJy0AAAAJ:YsMSGLbcyi4C.

Mocetti, Sauro. 2007. “Intergenerational Earnings Mobility in Italy.” *The B.E. Journal of Economic Analysis & Policy* 7 (2). doi:10.2202/1935-1682.1794.

Mortensen, Dale T. 1986. “Chapter 15 Job Search and Labor Market Analysis.” *Handbook of Labor Economics*.

O’ Higgins, Niall. 2006. *STILL WITH US AFTER ALL OF THESE YEARS: Trends in Youth Labour Market Entry, Home-Leaving And Human Capital Accumulation in Italy 1993-2003*. 99. Discussion. http://www.unisa.it/uploads/2551/99_dp.pdf.

OECD. 2009. *Highlights from Education at a Glance 2009*. http://www.oecd.org/education/skills-beyond-school/43619343.pdf.

Parisi, Lavinia. 2008. “Leaving Home and the Chances of Being Poor: The Case of Young People in Southern European Countries.” *Labour* 22 (s1): 89–114. doi:10.1111/j.1467-9914.2008.00414.x.

Rondinelli, Concetta, Arnstein Aassve, and Francesco C. Billari. 2006. “Socio-Economic Differences in Postponement and Recuperation of Fertility in Italy: Results from a Multi-Spell Random Effect Model.” *ISER Working Paper Series*, September. Institute for Social and Economic Research. http://ideas.repec.org/p/ese/iserwp/2006-46.html.

Rosenzweig, Mark R., and Kenneth I. Wolpin. 1993. “Intergenerational Support and the Life-Cycle Incomes of Young Men and Their Parents: Human Capital Investments, Coresidence, and Intergenerational

Financial Transfers." *Journal of Labor Economics* 11 (1- Part 1: Essays in Honor of Jacob Mincer): 84–112. http://www.jstor.org/stable/2535185?seq=1#page_scan_tab_contents.

———. 1994. "Inequality among Young Adult Siblings, Public Assistance Programs, and Intergenerational Living Arrangements." *The Journal of Human Resources* 29 (4 - Special Issue: The Family and Intergenerational Relations): 1101–25. http://www.jstor.org/stable/pdfplus/146135.

Sanchez, Olga Cantó, and Magda Mercader-Prats. 1998. "Child Poverty in Spain: What Can Be Said?" *Innocenti Occasional Papers, Economic Policy Series*. UNICEF Innocenti Research Centre. http://ideas.repec.org/p/ucf/iopeps/iopeps98-24.html.

White, Lynn. 1994. "Coresidence and Leaving Home: Young Adults and Their Parents." *Annual Review of Sociology* 20 (1). Annual Reviews 4139 El Camino Way, P.O. Box 10139, Palo Alto, CA 94303-0139, USA: 81–102. doi:10.1146/annurev.so.20.080194.000501.

Notes

i See, e.g., the report produced by the International Confederation of Free Trade Unions (ICFTU) at its 16th World Congress (1996), or Thorpe (1997).

ii See for example IMF (1996) and OECD (1997).

iii In our opinion, endogeneity issues are also likely to concern the vacancy rate, as well as the institutional variables. It is anyway true that neglect of the issues is quite pervasive in the Bevridge Curve empirical literature.

iv There is actually an exception to this. The index of R&D intensity turned out to be more significant if not logged. A linear specification for this variable was then adopted, and is included in our reported estimates.

v See e.g. Nickell and Layard (1999) or Booth *et al.* (2000).

vi For this reason, we "collapse" the instrument set into a single column.