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Scuola di Dottorato in Formazione della persona e mercato del lavoro

– Ciclo XXVI –

YOUTH UNEMPLOYMENT: REASSESSING THE ROLE OF EDUCATION AND LABOUR MARKET INSTITUTIONS

A COMPARATIVE ANALYSIS ACROSS COUNTRIES AND GENERATIONS

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Chapter I

EXPLAINING CROSS-NATIONAL VARIATION IN YOUTH UNEMPLOYMENT

SUMMARY: 1. Introduction - 2. International stylized facts - 3. Determinants of youth unemployment - 3.1 Shape of labour market institutions: regulation, policies and industrial relations - 3.2 Shape of educational and school-to-work transition institutions: Training contracts in selected countries - 4. Traineeships: a comparative analysis across countries

1. Introduction

Youth have been more and more at the centre of the public debate of the recent years, complicit the fact that, starting from 2009, the economic crisis hit younger generations disproportionately and almost six years later still exhibit its persistent effects on their labour market prospects.

Different data manifestly show the increasingly difficult conditions of young people. From the widespread high youth unemployment showing no sign of decreasing, to the discouraged youth seeing no prospects and postponing their entrance either in the active society or in school and university, to the demographic pyramid showing youth shares wearing thinner and thinner, the balance is rather grim for youth. If the crisis has exacerbated young difficulties in the labour market and, more in general, in the society, the roots of this phenomenon go back far beyond the crisis, being structurally embedded in the cultural, economic and institutional characteristics of the countries.

Young people hard times are often compared (and sometimes opposed) to the conditions of other generations, adults and elderly in particular, that, though strongly affected by the economic crisis, are proving to be more resilient, given a (generally) stronger “safety net” provided by greater stability and protection. Adding to this, the ageing population is putting pressure not only on public finances, mining the robustness of social security systems and welfare states, but also on the fundamental inter-generational solidarity. Despite the great consensus existing on the fact that larger activity and employment rates for all age groups are beneficial for the society as a whole, some recent policy proposals in Europe, alarmed by the risk of a “lost generation”, seem a revival of the old “lump sum of labour” theory predicting youth and old as substitute and competitors for a fixed amount of jobs in the labour market.

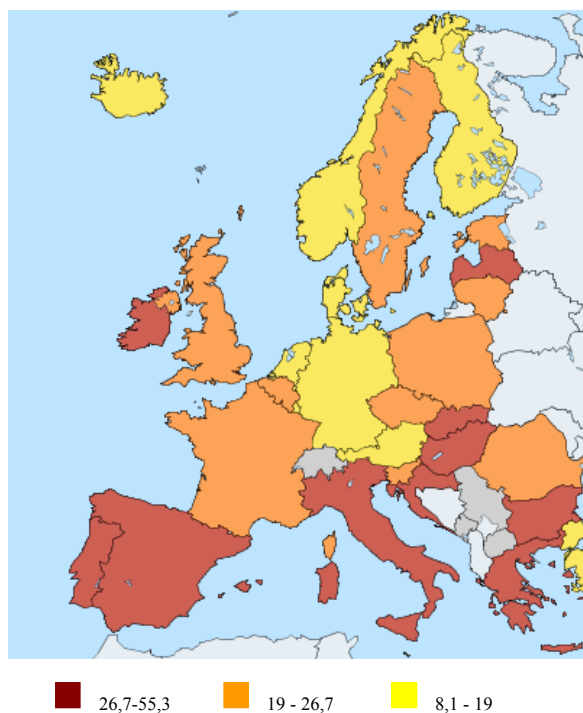
In this view, the present contribution aims at reassessing the institutional determinants of youth unemployment in the industrialised countries pertaining to the OECD from 1980 to 2009, in order to shed light on the long-term institutional factors hindering (or vice versa improving) youth labour market outcomes, with a focus, besides traditional labour market institutions, on the role of school-to-work transition. Empirically, the research stresses the importance of filling the skills and productivity gap by experiencing work during studies, especially by means of training contracts.

Besides the analysis of the institutional determinants of youth unemployment and in view of the above mentioned recent policy proposals calling for job sharing between young and elderly, this contribution aims at reassessing at the comparative cross-national and within-country levels the nature of the youth/old relationship in the labour market, with the aim of testing if evidence of the “boxed economy” prediction has to be found or if such dualism is only imaginary.

2. International stylized facts

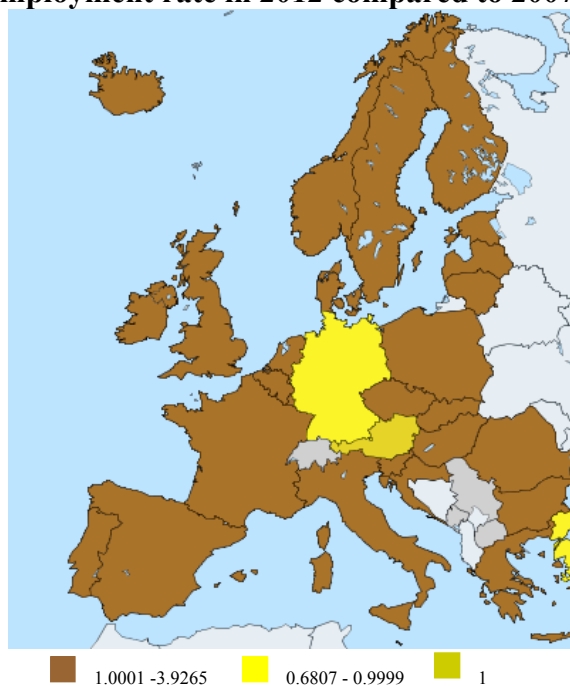
Starting from the ‘90s, young people in the industrialized countries have been facing increasing difficulties in the labor markets compared to the previous decades, culminated in the recent economic crisis, which caused the youth unemployment rate to increase more than double of that of adults, and that, according to statistics, is still higher than pre-crisis levels almost everywhere.

Figure 1 - Youth unemployment rate in 2012



Source: Eurostat

Figure 2 - Youth unemployment rate in 2012 compared to 2007



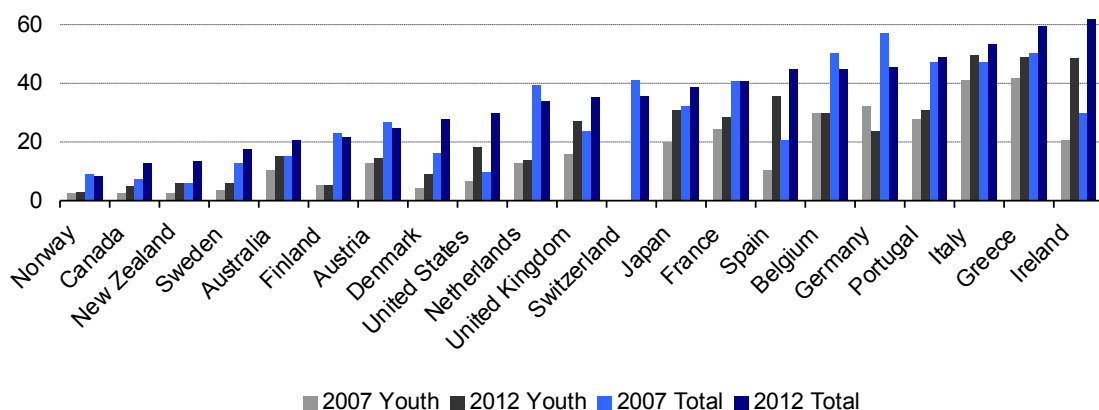
Source: Eurostat

As Figure 1 shows youth unemployment rate varies greatly across countries, ranging from 8% in Germany to over 50% in Greece (2012).

Youth unemployment is dangerously high in Southern European countries, especially in Spain (53% in 2012) and Greece (55%), but also in Italy (35% in 2012, it reached 40% in September 2013) and Portugal (38%). Conversely, youth unemployment is lower than 10% in Germany (8%), Austria (8,7%), Norway (8,6%), Switzerland (8,4%, source: OECD) and the Netherlands (9,5%) and below 20% in Finland and Belgium, while it is slightly higher than 20% in the United Kingdom (21%) and France (24,5%). In other developed non-European countries, youth unemployment rate in 2012 was 11,7% in Australia, 14,3% in Canada, 7,9% in Japan, 17,7% in New Zealand and 16,2% in the United States (source OECD).

Figure 2 shows youth unemployment rates in 2012, compared to 2007. Almost six years after the start of the crisis, most of these countries still register youth unemployment rates higher (up to 4 times) the pre-crisis level (brown colored countries), with the notable exception of Germany (in yellow), where youth unemployment in 2012 was even lower than in 2007 and Austria, where it was equal to pre-crisis level. Across non European industrialised countries, only in Japan youth unemployment is returned to pre-crisis level. On the contrary, in the majority of the other countries youth unemployment is still from two to four times higher than before the crisis. As a consequence, long-term unemployment rate (over 12 months) both for youth and at the total level soared in many countries from 2007 to 2012 (Figure 3), though with some exceptions.

Figure 3 - Long-term unemployment rates (15-24 years old and total). 2007 - 2012



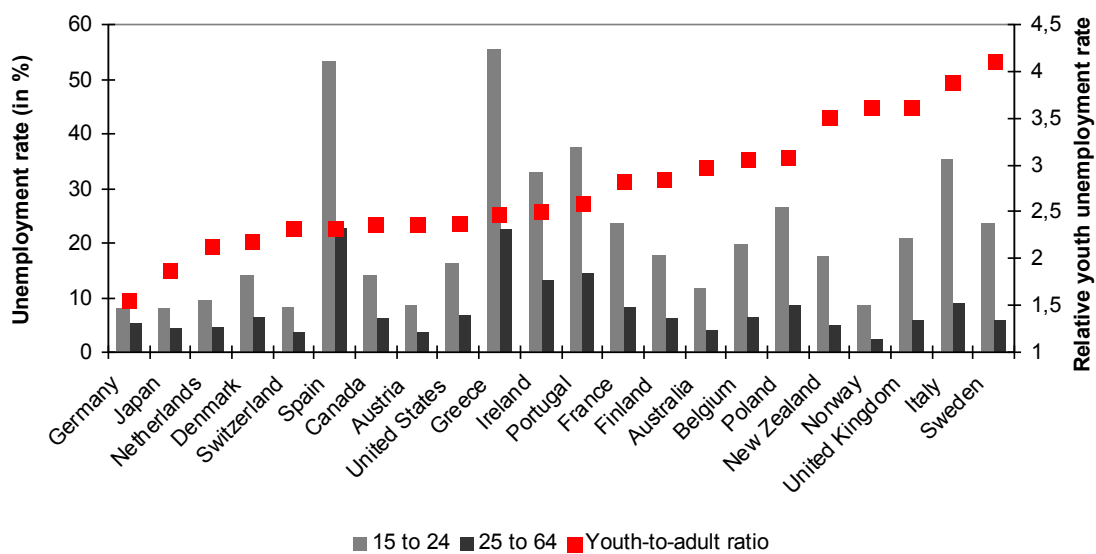
Source: Elaboration on OECD data

In 2012, compared to 2007, longer cues out of employment are to be found almost everywhere, with the notable exception of Norway, Finland, Austria, the Netherlands, Belgium and Germany, where young and total long-term unemployment rates are equal or lower than pre-crisis levels.

The share of long-term unemployment represents an important signal of the degree of labour market dynamism, i.e. the extent to which people can easily exit from the status of unemployment and find a new job. Dynamism in this sense is important for keeping skills updated and avoiding scar, stigma effects and discouragement. Since youth are yet to start their careers, it is therefore crucially important for them to avoid long periods outside employment. During the crisis, however, dynamism collapses due to decrease in the demand of labour by firms, pushing up long-term unemployment. As Figure 3 shows, long-term unemployment for youth is generally much lower than total levels, obviously because youth have just entered the labour market, and also because of higher youth mobility, driving them to change job more frequently, to move to an other city more easily and therefore to experience shorter unemployment spells. However, some exceptions can be found. In fact, differently from other countries, in Italy and Greece youth are not less likely to be long-term unemployed than the average, registering instead similar shares of long-term unemployment.

As explained in the literature review, large consensus exists on the fact that young people have been hit the most by the crisis because of larger share of temporary contracts compared to adults and older workers. Notwithstanding this general evidence, it is possible to identify differences across countries in the extent to which youth have been disproportionately affected.

Figure 4 - Youth and adult unemployment rates and youth relative ratio. 2012



Source: Elaboration on OECD data

Figure 4 shows youth and adult unemployment rates (bars) and the ratio between the two rates (red squares) in selected OECD countries in 2012. The already noted wide heterogeneity in youth unemployment rates is comprehensibly mirrored in the adult unemployment data, as a signal of structural and macroeconomic differences among the labor markets and the economies, however, some differences exist. Looking in fact at the youth relative unemployment rate, i.e. at the ratio between young and the adult data, what emerges is the negative Italian record (overtaken by Sweden), where young people are over four times more likely to be unemployed than the adult counterpart. On the contrary, at the top of the inter-generational equality one can find Germany, representing the only case where youth unemployment rate is nearly equal to that of adults.

3. Determinants of youth unemployment

Some determinants of youth conditions in the labour market can be considered as structural, being not directly connected to cyclical factors, but being instead inborn to the condition of youth or to the aggregate economy (macro-structural factors).

Demographics has been considered as a central structural determinant of youth unemployment. Even though this is not the case today, since most developed countries are rather facing a dramatic ageing of the population and a reduction of the youth

relative cohort-size, the baby boomers era economic literature included demographics as one of the causes of youth unemployment. The fact that the more young people are in the labour markets and the more jobs will be needed to accommodate them has been extensively explained. Other structural reasons for youth unemployment and joblessness' seem to be deeply-rooted in the youth age. In this view, key structural factors could be the high mobility and short job tenure (low-seniority) of the young, also linked to the fact that young people are generally hired on a temporary basis, becoming more sensitive to the economic cycle according to the "last-in, first-out" mechanism. Moreover, the long permanence of youth by family's household is connected to lower job mobility which is, in turn, connected to higher equilibrium unemployment.

Besides structural causes, one of the most important determinants of youth unemployment, as well as of the overall level of unemployment, is the economic cycle. Indeed, notwithstanding the fact that the business cycle affects overall unemployment, there is strong consensus on the observation that youth are disproportionately hit in economic downturns and youth unemployment is one of the most highly sensitive variables in the labour market.

Other than general economic conditions and age-specific characteristics, labour market and educational institutions have been mainly addressed to explain the wide heterogeneity existing across countries, as well as the disparity between youth and adults labour market conditions.

In what follows it will be shown from a descriptive point of view how countries differ, from an institutional side. The analysed variables will then serve as explanatory variables in the empirical analysis in order to assess more firmly their role for youth unemployment.

3.1. Shape of labour market institutions: regulation, policies and industrial relations

Differences in labour market performances across countries can be better explained "structurally", by looking at their institutional frameworks. The debate on the role of labour market institutions took off with the observation of divergent labour market outcomes across Europe and the United States. Starting from the famous OECD Jobs

Study of 1994, these pieces of evidence provided a strong and lasting basis for the spread of several (mainly empirical) works, all supporting the mainstream view that institutions interfere with labour market mechanism, creating unemployment. In particular, the related economic literature has identified a number of policy and institutional determinants of unemployment.

One main source of institutions interacting with the labour market is the regulation of labour, which includes employment laws, industrial relations and social security.

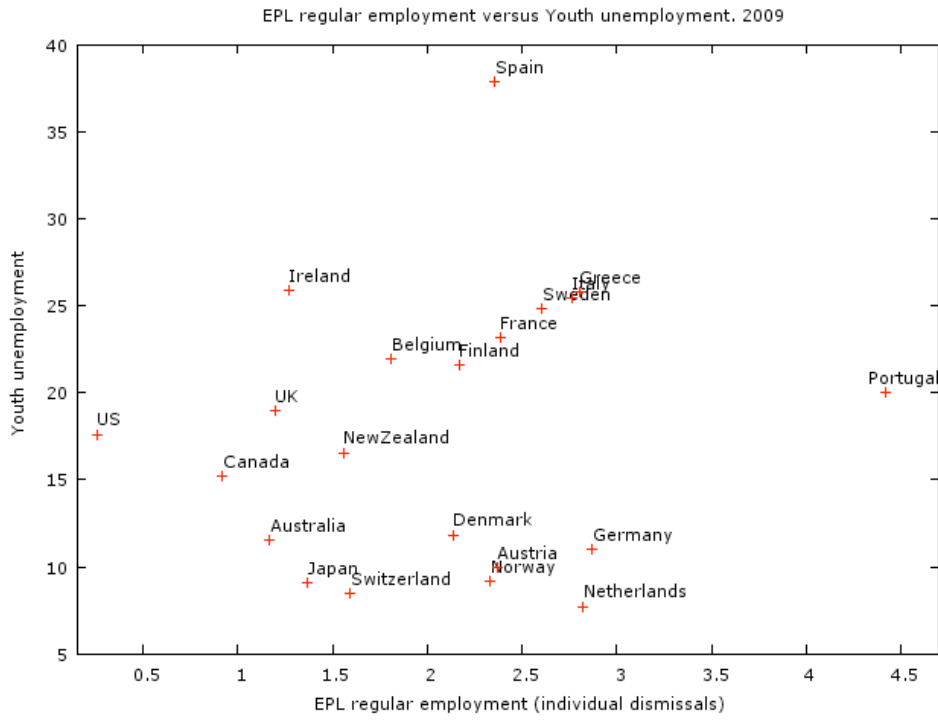
Among these regulations, the employment protection legislation has been strongly indicated as a possible determinant of the disproportionately higher youth unemployment rates, especially in the debate on the dualism between “overprotected adults” and “youth without protections”. Indeed the thesis of the “segregation” of the so called “atypical” workers (workers with temporary contracts) attributes the high youth unemployment rate to the employment protection disproportion between adults and youth. In a context where labor market insiders have obtained high job protection levels, that are difficult to root up, for outsiders the contractual flexibility represents at the same time the chance to enter the labor market and the possible risk of leaving it in short time. The employment protection legislation literature underlined the indirect consequences of excessive or asymmetric job protection, such as the extensive use of atypical labour contract and the rise in the labour market dualism between outsider and insider. This process led to a disproportional effect on new entrants – mainly youth, immigrants and women - raising the relative incidence of temporary employment. However, in Europe with the only exception of Spain, temporary jobs have been demonstrated to be stepping stone into stable employment rather than dead end jobs.

The OECD indexes the degree of rigidity of labour regulations according to three topics: protection of regular employment, strictness of regulation on fixed-term contracts and on collective dismissals. The higher the index, the stricter the regulation and the more rigid the labor market. Interestingly, from 2013, the OECD indexes also the strictness of regulation for temporary work agency employment (included in the EPL index for temporary work).

Even though a vast literature claimed for the important role of hiring and firing regulations on unemployment, evidence is mixed, with several empirical studies showing no direct link between restrictive employment protection legislation and

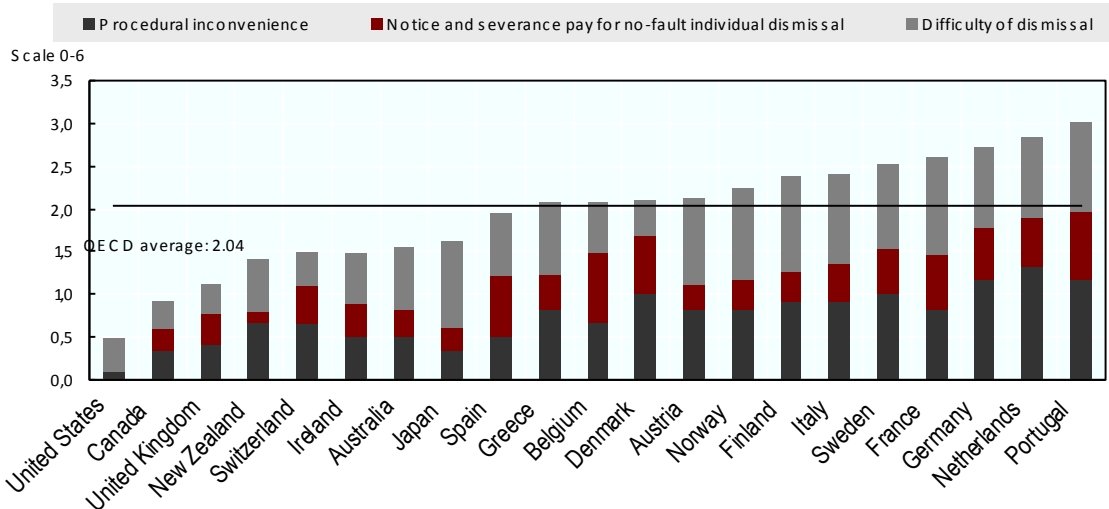
unemployment. Figure 5 shows no correlation between the stringency of the employment regulation and youth unemployment rate in selected OECD countries in 2009.

Figure 5 - EPL index for regular employment and youth unemployment rate. 2009



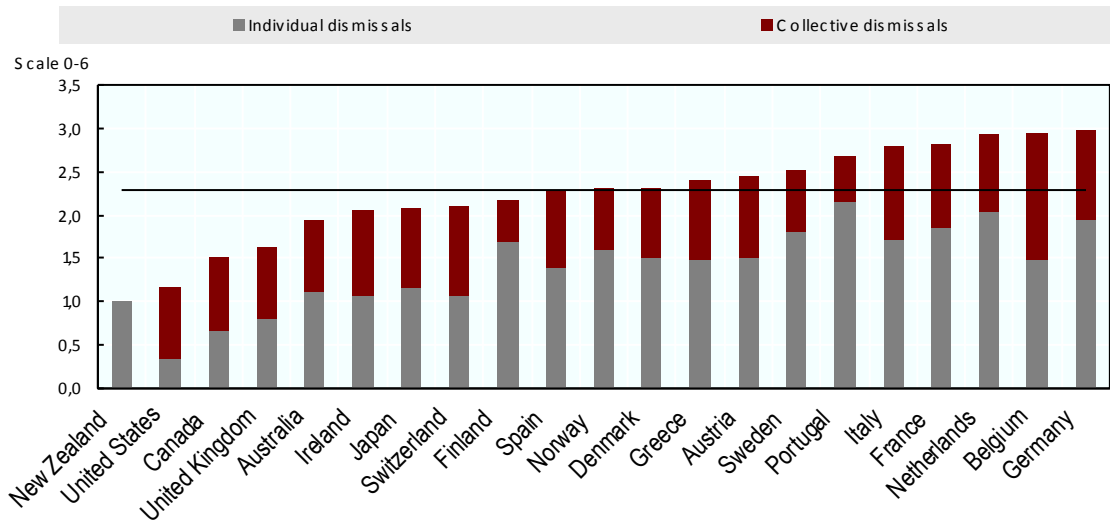
Source: Elaboration on OECD data

Figure 6 – Protection of permanent workers against individual dismissal



Source: OECD

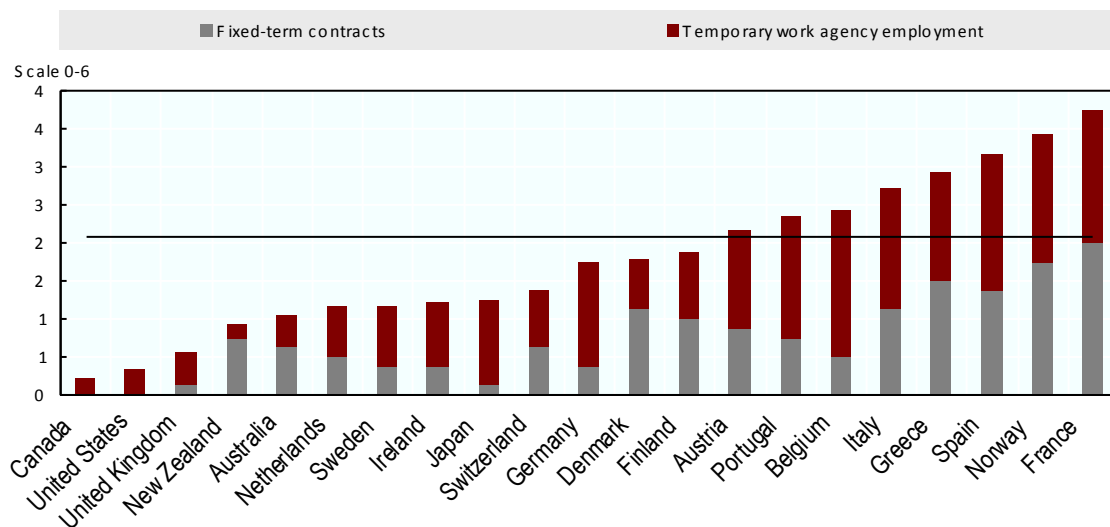
Figure 7 – Protection against individual and collective dismissals



Source: OECD

As Figures 6 and 7 show, flexibility on the exit side of the labour market, both in terms of individual and collective dismissals, is traditionally higher (below OECD average) in Anglo-Saxon countries, Switzerland and Japan, and lower in continental European countries, something that brought to the idea that the European-American divide in labour market performance was caused by the excessive rigidity characterizing the former labour market.

Figure 8 – Strictness of regulation on temporary work: fixed-term contracts and temporary work agency employment



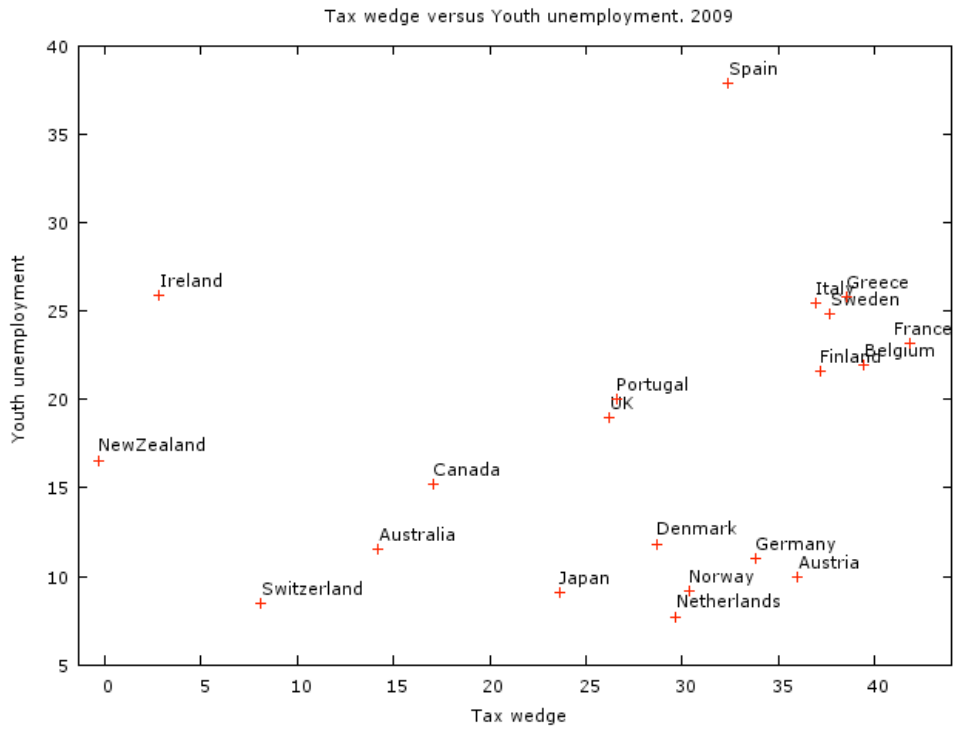
Source: OECD

Besides *outward* flexibility, an other aspect entailing different levels of regulations among countries is represented by *inward* flexibility, i.e. the extent to which it is easy for employers to hire people through fixed-term contracts and temporary agency work. Despite the attention put on the negative role of labour protection asymmetries, a cross-country comparison reveals that this relationship is not straightforward, as in the case of Germany. Indeed, the German labour market is characterized by a relatively high degree of rigidity with regards to regular employment protection (Figures 6 and 7) and a relatively low rigidity concerning the regulation of temporary work (Figure 8), thus suggesting a theoretically high dualism between insiders and outsiders in the country. Despite this fact, it is well known that young Germans enjoy the lowest unemployment rate in Europe and among the industrialized economies. Rather than making more difficult for youth to find a job, in Germany this disproportion is not producing a dualistic labor market, as can be seen from the rather unique equivalence between adult and youth unemployment rates.

This observation represents a starting point for the empirical analysis of the determinants of youth unemployment suggesting that other arguments other than regulation are likely to better explain the youth unemployment phenomenon.

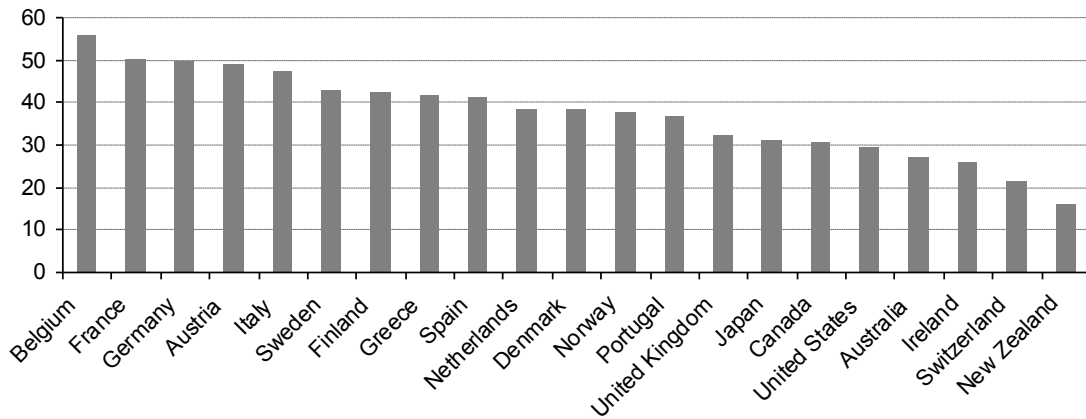
Besides the role of labour regulation, as a factor shaping the wage formation process and the labour utilisation, taxes have been identified as possible determinants of unemployment, with high tax wedges found to increase unemployment and to lower employment prospects, especially for groups at the margin of the labour market. The tax wedge is measured by the OECD as the difference between labour costs to the employer and the corresponding net take-home pay of the employee and it is calculated by expressing the sum of personal income tax, employee plus employer social security contributions together with any payroll tax, minus benefits, as a percentage of labour cost. Figure 9 shows the average tax wedge in relationship to youth unemployment in 2009.

Figure 9 – Average tax wedge and youth unemployment. 2009



Source: Elaboration on OECD data

Figure 10 - Average Tax Wedge (in %). 2012



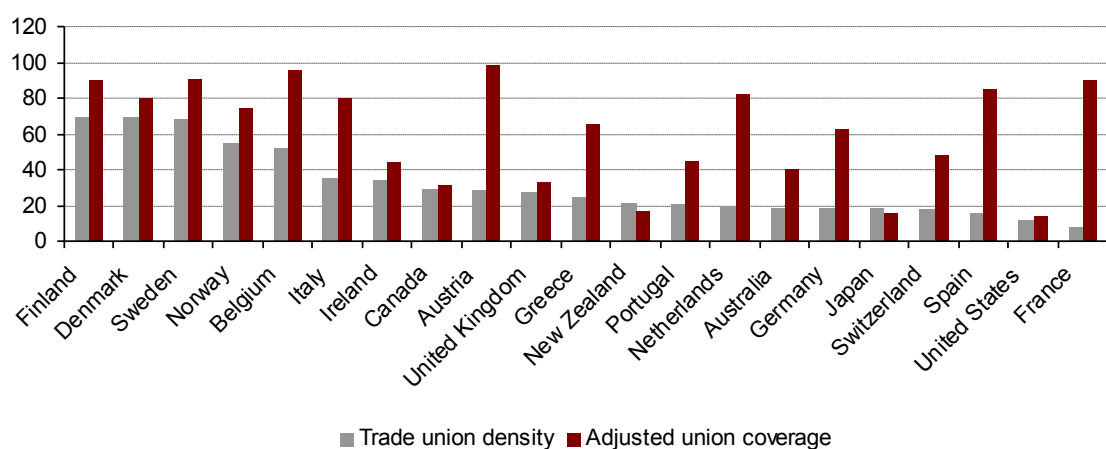
Source: Elaboration on OECD data

In 2012, taxes on an average worker (defined as a single person earning the average income of full-time workers of the country) represented around 35% of their total labour costs across OECD countries. Among the analysed countries, average tax wedge ranges between 16% in New Zealand to 55% in Belgium (Figure 10).

A particularly strong impact of tax wedge is found in countries with powerful trade unions and with a low or intermediate degree of centralisation/co-ordination of the wage

bargaining process. Indeed, union density and the structure of the wage bargaining have also been included as determinants of youth unemployment in the empirical analysis. With regards to union density, the literature on wage-setting institutions has pointed out how a strong presence of trade unions tends to compress wages particularly at the bottom of the wage distribution or tend to price certain individuals out of the labour market. The effect is considered to be bigger for those individuals characterised by a more elastic labour supply, as youth and women, with the consequence of reducing their relative employment, other things equal. Commentators drawn attention also on indirect ways in which unions could influence the labour market, and precisely on the fact that high performance work practices (HPWP) adoption seems to be hindered by the presence of unions. One of the measures used for representing trade union power is trade union density, corresponding to the ratio of wage and salary earners that are trade union members (Figure 11).

Figure 11 - Trade union density and adjusted union coverage (in %). 2009

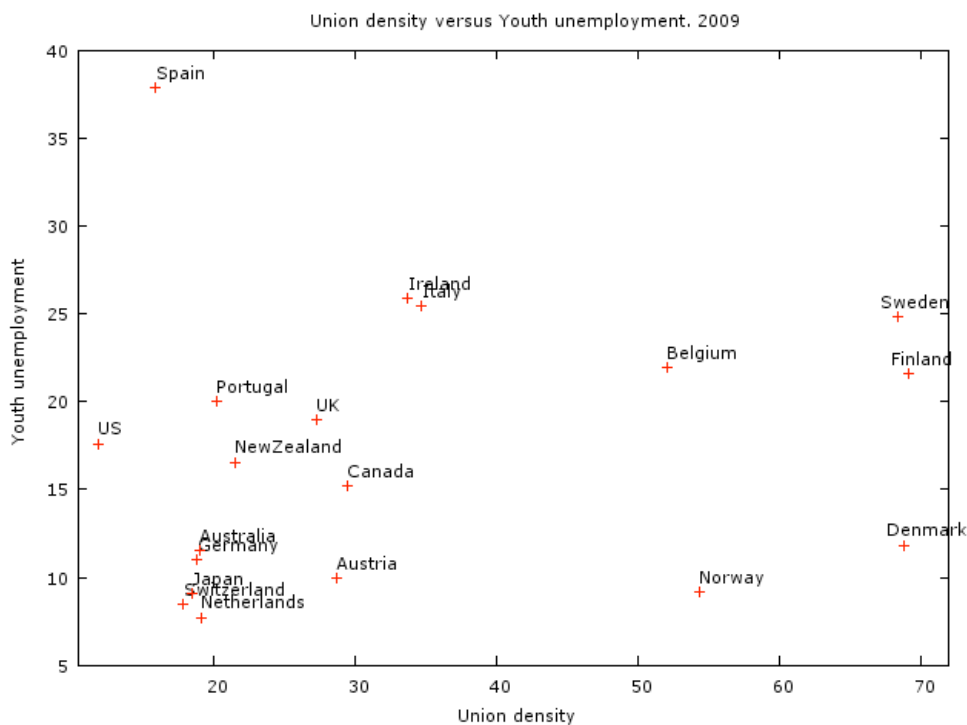


Source: Elaboration on OECD and J.Visser, ICTWSS database (Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts, 1960-2010)

As Figure 11 shows, trade union density varies greatly across countries. Membership is still high (though declining) in the Scandinavian countries, reaching almost 70% in Finland, Denmark and Sweden. It is around 50% in Norway and Belgium, while it falls to 30% of workers or less in Italy, Ireland, Canada and Austria and the United Kingdom. Trade union density is lower than 20% in the Netherlands, Australia, Germany, Switzerland, Spain and the United States and the minimum level is represented by

France, with only 7% of workers and employees that are members of trade unions. Figure 12 shows no precise relationship between trade union density on the one side and youth unemployment on the other side.

Figure 12 – Trade union density and youth unemployment. 2009



Source: Elaboration on OECD data

This trade union density indicator is in fact not very representative of the actual power of trade unions. Indeed, if declining membership could be interpreted as a signal of the declining power of trade unions, their collective bargaining capacity is instead better represented by the bargaining or union coverage (also called adjusted union coverage). This indicator considers the employees covered by wage bargaining agreements as a proportion of all wage and salary earners in employment with the right to bargain, expressed as a percentage (the indicator is adjusted for the possibility that some sectors or occupations are excluded from the right to bargain).

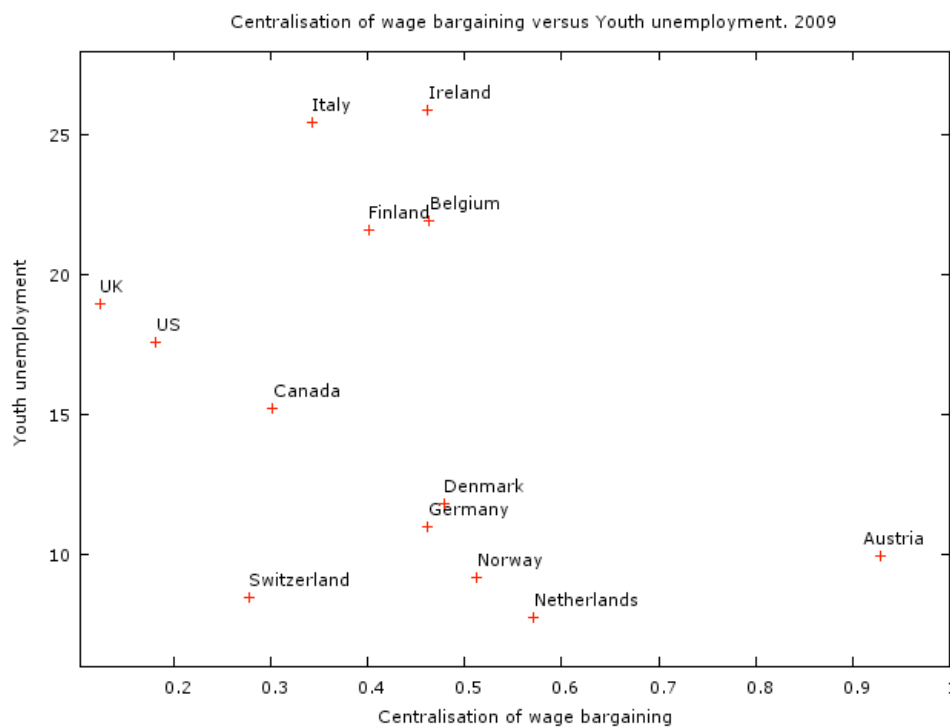
In France for example, the difference between trade union membership and bargaining coverage is striking. In fact, if only 7% of French employees are members of a trade union, almost 99% of them are covered by wage bargaining agreements. When looking at the adjusted union coverage indicator, it is possible to notice a greater (bargaining)

power of trade unions in Austria, Belgium, Sweden, France, Finland, Spain, the Netherlands, Italy and Denmark, where collective bargaining coverage reaches 80% of employees.

Besides coverage, the general structure and functioning of the industrial relations system conveys different degrees of power to trade unions and social partners in general. For example, Germany is characterized by a low union membership and an average level of bargaining coverage, but German trade unions are famously known for their power, visible for example in right of workers to participate in the management of the companies they work for, as provided by the codetermination mechanism (*Mitbestimmung*).

Complementary to trade unions is therefore the structure of collective bargaining, with both decentralised wage bargaining or highly corporatist systems (characterised by a high degree of centralisation and coordination), which are regarded as more “employment-friendly”, while medium level of centralisation/co-ordination that are considered to be more inefficient.

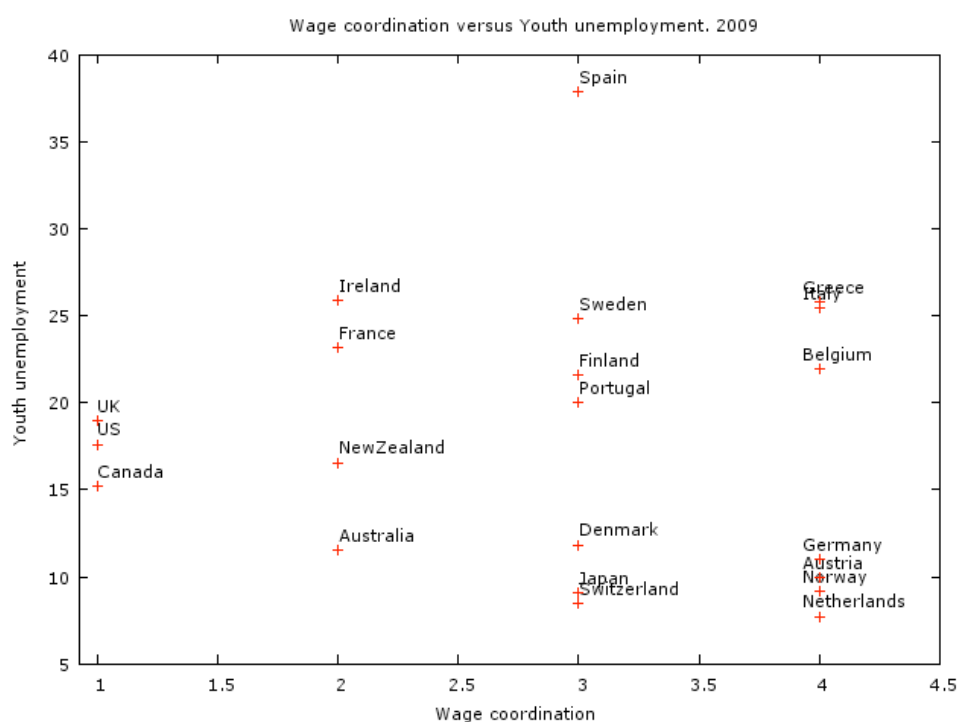
Figure 13 – Centralisation of wage bargaining and youth unemployment. 2009



Source: Elaboration on OECD data

Central level of bargaining has been traditionally dominant in Belgium and Ireland, while sectoral level is most common in Austria, Germany, Spain, Finland, Greece, Italy, the Netherlands, Norway and Portugal. A company or establishment level of bargaining is instead traditionally important in the Anglo-Saxon countries (Australia, Canada, the United Kingdom and the United States), as well as in Denmark, France, Japan and Sweden. Besides bargaining levels, coordination of wage bargaining also differ across countries.

Figure 14 – Wage coordination and youth unemployment. 2009



Source: Elaboration on OECD data

As Figure 14 shows, a higher degree of wage coordination can be found in Austria, Belgium, Germany, Greece, Italy, the Netherlands and Norway, where it is a mixed of industry and economy-wide bargaining, with either central organisations that negotiate non-enforceable central agreements and/or key unions and employers associations who set pattern for the entire economy.

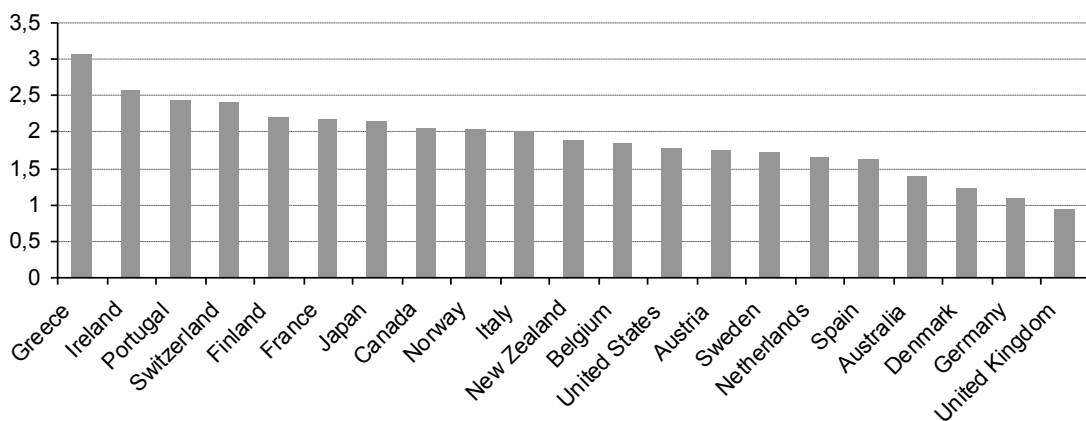
An intermediate level of coordination is instead visible in Denmark, Finland, Japan, Portugal, Spain, Sweden and Switzerland, where there is a predominance of industry

bargaining with irregular or non existing pattern setting, limited involvement of central organizations and limited freedom for company bargaining.

Finally, Anglo-Saxon countries and France are characterised by a low level of coordination, being mostly mixed industry- and firm level bargaining, with weak enforceability of industry agreements (as in Australia, France, Ireland and New Zealand) or even basically fragmented bargaining mostly happening at the company level (as in Canada and the United States).

As automatic extension of wage agreements may distort the balance between costs and productivity, similarly, the lack of competition in the product market may induce profit maximising firms to set prices above the marginal cost of production, thus reducing labour demand and hindering overall competitiveness. There is not a single indicator to look at when analysing the extent to which product market is regulated. For reasons of data availability across years, the empirical analysis of the determinants of youth unemployment will include an indicator that summarizes regulatory impediments to product market competition in seven non-manufacturing industries (gas, electricity, post, telecommunications, passenger air transport, railways and road freight), presented in Figure 15.

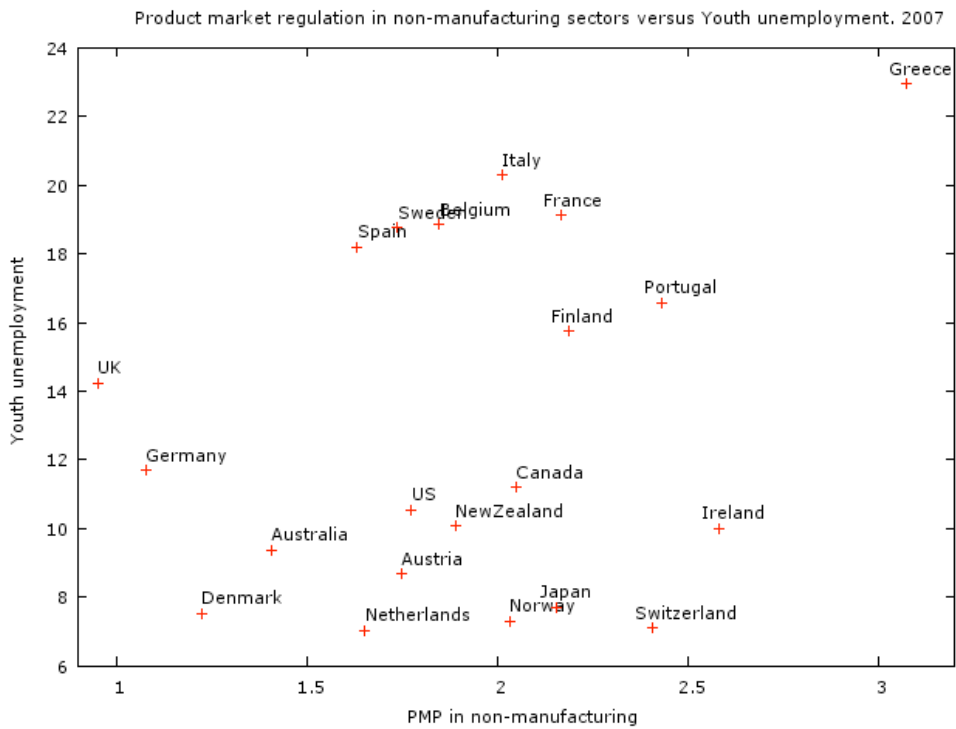
Figure 15 - Product market regulation in energy, transport and communications. 2007



Source: Elaboration on OECD data

The reason for looking at regulations in telecommunications, transport and energy sectors is that these are traditionally the most regulated industries, while manufacturing sectors are typically more open to international competition. Figure 15 shows the OECD summary index, covering information in four main areas: state control, barriers to entry, involvement in business operations and market structure. The scale of the indicator is 0 – 6 and goes from least to most restrictive of competition. Despite regulatory intensity decreased notably in the last decades, it is possible to identify some relatively restrictive countries (as Greece, Ireland, Portugal and Switzerland) and some relatively liberal ones (as the United Kingdom, Germany, Denmark and Australia).

Figure 16 – Product market regulation in non-manufacturing sectors and youth unemployment. 2007

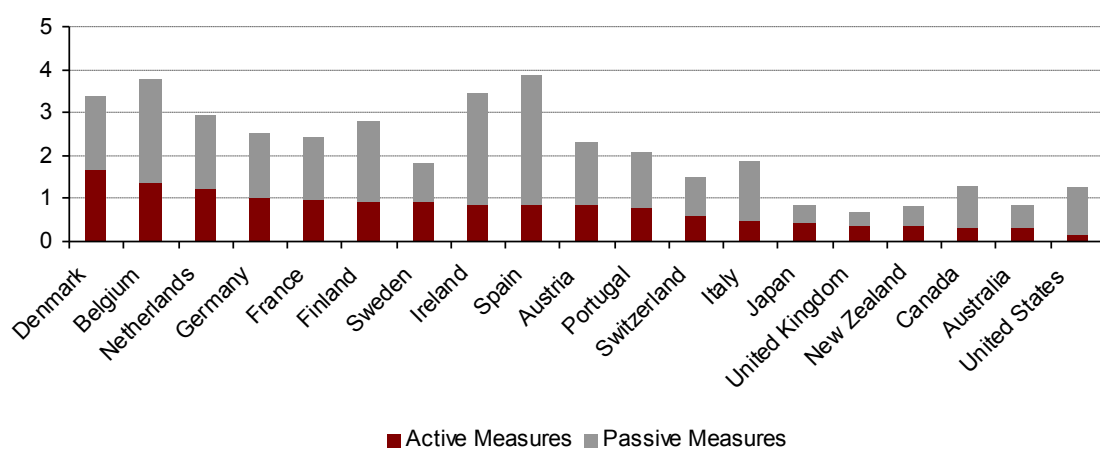


Source: Elaboration on OECD data

Besides labour market institutions, policies have to be considered as possible explanatory factors of unemployment. The economic and financial crisis resulted in a significant increase in the number of people who are unemployed and therefore eligible for assistance from labour market policy (LMP) interventions, mostly aimed at helping people who are out of work and wanting to move into employment.

Labour market policy expenditure can be decomposed into three main types of intervention: services, measures and supports. Labour market policy services cover the costs of all publicly funded services for jobseekers (guidance, counselling and other forms of job-search assistance), as well as any other expenditure of the public employment services (PES) not already covered in other categories. Labour market policy measures cover active interventions (also called active labour market policies, ALMP), aiming either to provide people with new skills or experience of work in order to improve their employability or to encourage employers to create new jobs and take on people who are unemployed or otherwise disadvantaged. Labour market policy supports are instead passive interventions, mostly providing financial assistance designed to compensate individuals for loss of wage or salary and to support them during active job-search (i.e. mostly unemployment benefits).

Figure 17 - Expenditure for active and passive labour market policies as percentage of GDP. 2009

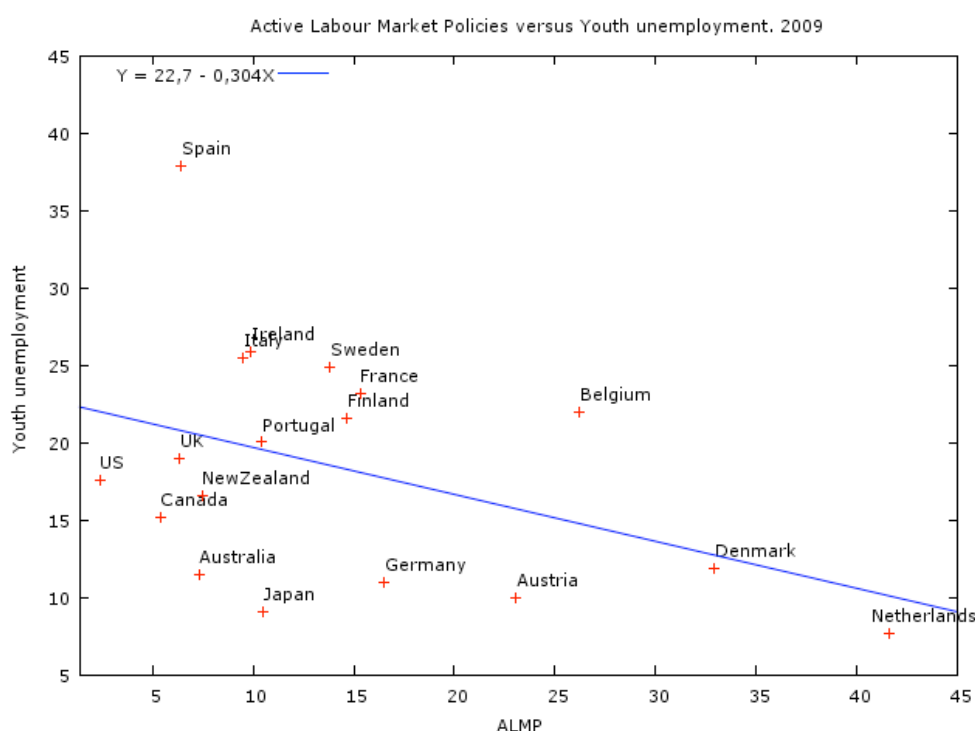


Source: Elaboration on OECD data

Countries differ in the extent to which they spend for labour market policies and in the composition of this expenditure. At the total level, summing up active and passive measures, Spain, Belgium, Ireland and Denmark have committed over 3% of their GDP in labour market policy expenditures in 2009 (before the economic crisis). The Netherlands, Finland, Germany, France, Austria and Portugal dedicated between 2% and 3% of their GDP for labour market policies. Italy, Sweden, Switzerland, Canada

and the United States between 1% and 2%, while Australia, Japan, New Zealand and the United Kingdom less than 1% of GDP. The composition of labour market policy expenditure greatly differs country by country, with the United Kingdom, Japan, Sweden and Denmark that reserve half of this expenditure to active measures, and Italy, Ireland, Spain and United States where active policies represent less than one fourth of the total expenditure. Top spenders on active labour market policies are Denmark (1,6% of GDP in 2009), Belgium (1,4%), the Netherlands (1,2%), Germany and France (1%).

Figure 18 – Active labour market policy and youth unemployment. 2009



Source: Elaboration on OECD data

As Figure 18 shows, the active labour market policy (ALMP) indicator is negatively related to youth unemployment across selected OECD countries. Indeed, the role of active labour market policies on aggregate and youth unemployment has been particularly stressed. The rationale for this consideration is that, on the one hand, ALMP can enhance qualifications of participants in training schemes and raise their productivity once at work and can reduce unemployment by raising the search effectiveness of job seekers, increasing job matching efficiency and reducing wage pressure, which in turn would reduce the duration of unemployment spells and raise

employment. On the other hand, the existence of generous active programmes may be taken as a signal of accommodation, which will raise wage pressure and contributing to longer duration of unemployment spells and higher overall unemployment rates.

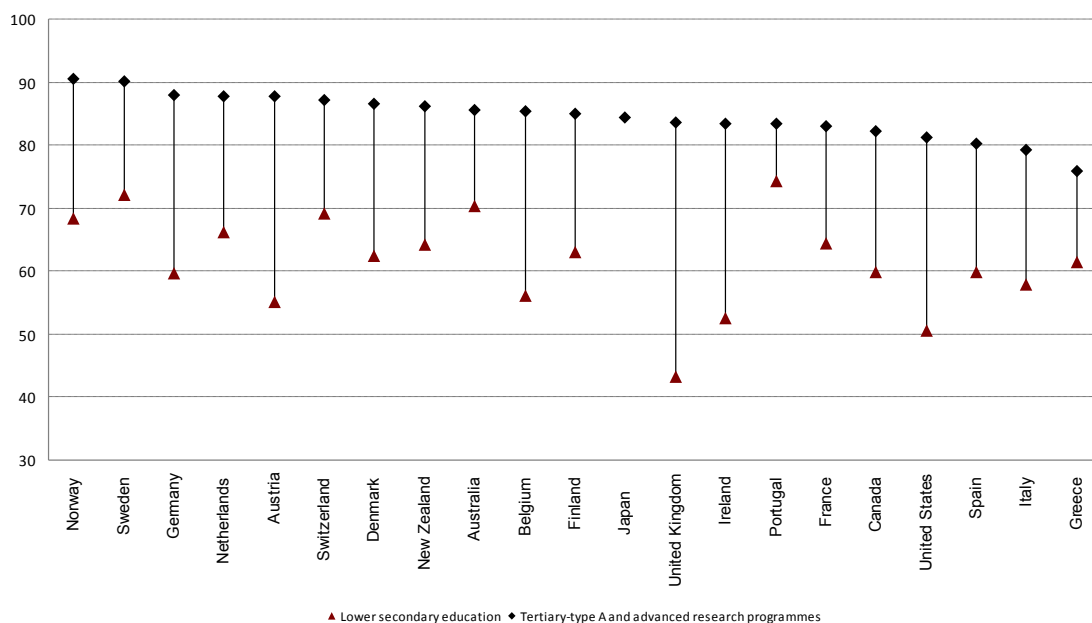
Changes in labour market policy expenditure have a tendency to follow changes in the underlying level of unemployment, a reason why the ALMP variable will be instrumented and treated separately in the empirical analysis of the determinants of youth unemployment.

3.2. Shape of educational and school-to-work transition institutions

As explained in the literature review, school-to-work transition smoothness and effectiveness differ across countries. School-to-work transition is a path characterised by long-standing institutional patterns influencing the supply of flexible or permanent jobs and their learning content. Wide consensus exists on the fact that youth unemployment and, more in general, young people difficulties in the labour market are shaped not only by labour market institutions, but also by individual characteristics, most importantly the lack and/or mismatch of the right skills for jobs, resulting in the youth productivity gap.

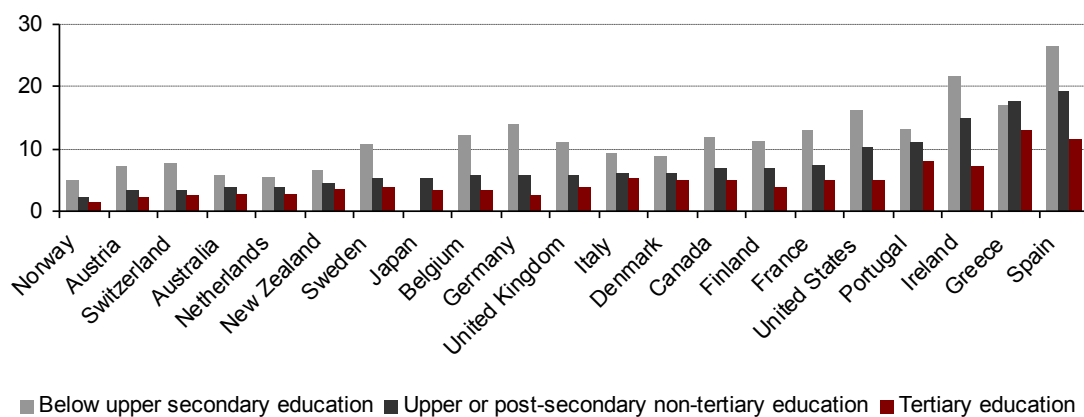
Educational attainment represents the basis for the development of human capital and, even though education per se is no longer guarantee for job, more educated people have lower difficulties in the labour market, reporting comparatively higher employment and lower unemployment rates (Figure 19 and 20).

Figure 19 - Employment rates among 25-64 year-olds with lower secondary education and with tertiary education. 2011



Source: OECD

Figure 20 - Unemployment rates among 25-64 year-olds, by educational attainment. 2011



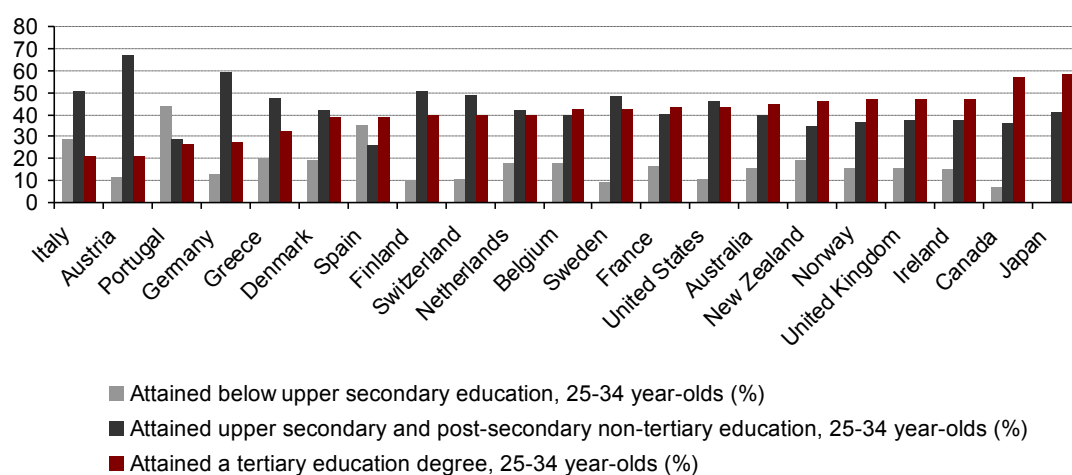
Source: Elaboration on OECD data

Education pays everywhere, but to different extent. Indeed the employment premiums connected to the attainment of a tertiary degree compared to a lower secondary education level vary across countries, from over 40 percentage points in the United Kingdom to around 10 percentage points in Portugal. Similarly, the probability to be unemployed decreases with education everywhere, but with different intensities. For example, the unemployment rate of adults with an educational attainment below the upper secondary

level is less than double of that of people holding a tertiary degree in Greece, Portugal, Denmark, Italy, New Zealand and the Netherlands, while this ratio increases from two to three times in Australia, Spain, Canada, France, Sweden, United Kingdom, Finland and Switzerland and over three times in Ireland, Austria, the United States, Norway, Belgium and Germany.

If education is the first important factor for employability, when looking at the educational attainment of young adults it becomes clear that countries are differently equipped for the labour market and against unemployment. Figure 21 provides an international comparison across selected OECD countries with regards to the educational attainment of people aged from 25 to 34 years old. It is clearly showed that only Japan and Canada register at least half of young adults holding a tertiary education degree, followed by Ireland, the United Kingdom, Norway, New Zealand, Australia, the United States, France, Sweden, Belgium, the Netherlands, Switzerland, Finland, Spain and Denmark, where tertiary graduated represent around 40% of the 25-34 year-olds population and Greece, Germany, Portugal, Austria and Italy, where the percentage is 30% and lower. In many countries young adults mostly hold upper secondary and post-secondary non-tertiary education levels, this being the case of almost 70% of people aged 25-34 year-old in Austria, almost 60% in Germany and nearly 50% in Italy, Greece, Finland, Switzerland and Sweden.

Figure 21 - Educational attainment of people aged 25 to 34 year-old. 2011



Source: Elaboration on OECD data

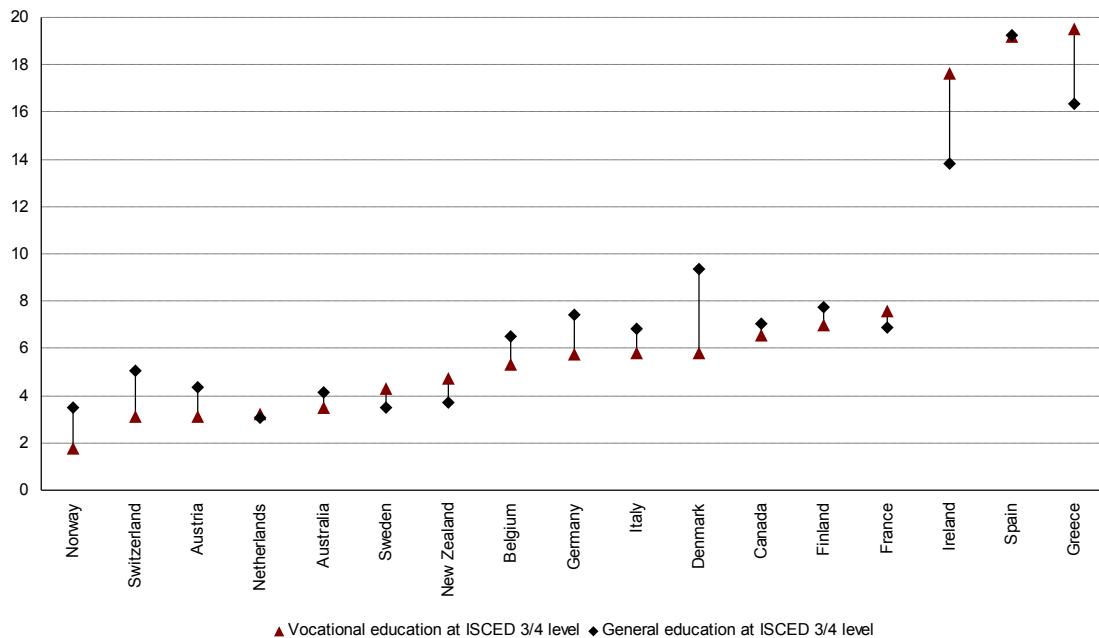
Comparing educational attainment data with the above presented data on youth unemployment, it becomes clear that not all types of education have the same

employability power and that, across similar educational attainment levels, the institutional characteristics of these educational pathways matter.

A first differentiation has to be done between education with vocational or general orientation. It is in fact widely recognized how vocational orientation can ensure better on-the-job learning and can ease the creation of the right skills for jobs, so enhancing youth employability.

The strong labour market orientation of vocational education is clear, starting from the definition reported in the UNESCO International Standard Classification of Education (ISCED-97), that defines vocational education and training (VET) as “education which is mainly designed to lead participants to acquire the practical skills, know-how and understanding necessary for employment in a particular occupation or trade or class of occupations or trades. Successful completion of such programmes leads to a labour-market relevant vocational qualification recognised by the competent authorities in the country in which it is obtained”.

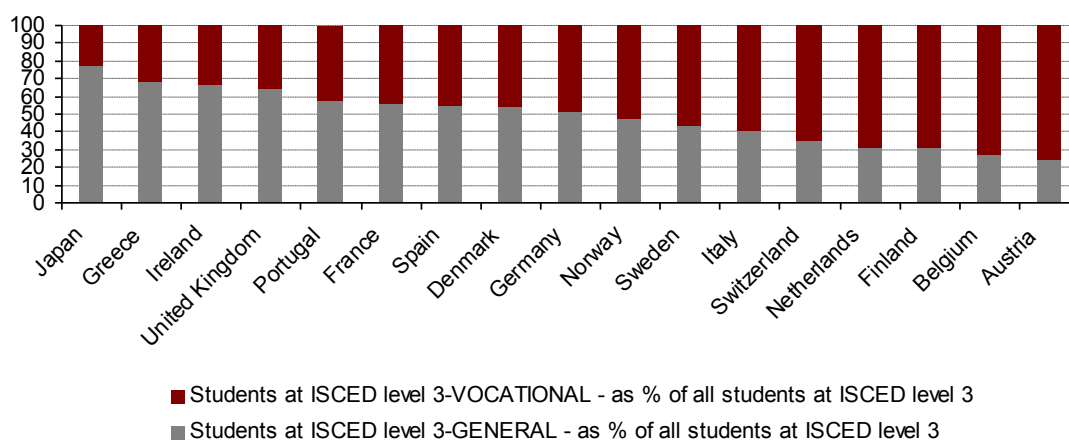
Figure 22 - Unemployment rates among 25-64 year-olds by type of education: general and vocational orientations at ISCED 3/4, 2011



Source: OECD

Data show that individuals with a vocationally oriented upper secondary education are, generally, more likely to be employed and less likely to be unemployed than those who have followed a general path (Figure 22). In Denmark unemployment rates among individuals with vocational upper secondary or post-secondary non-tertiary education are at least 3 percentage points lower than those of individuals with a general upper secondary or post-secondary non-tertiary degree, while the opposite pattern is observed in France, Greece, Ireland, New Zealand and Sweden.

Figure 23 - Share of students in upper secondary or postsecondary non-tertiary education by study orientation: general and vocational. 2011



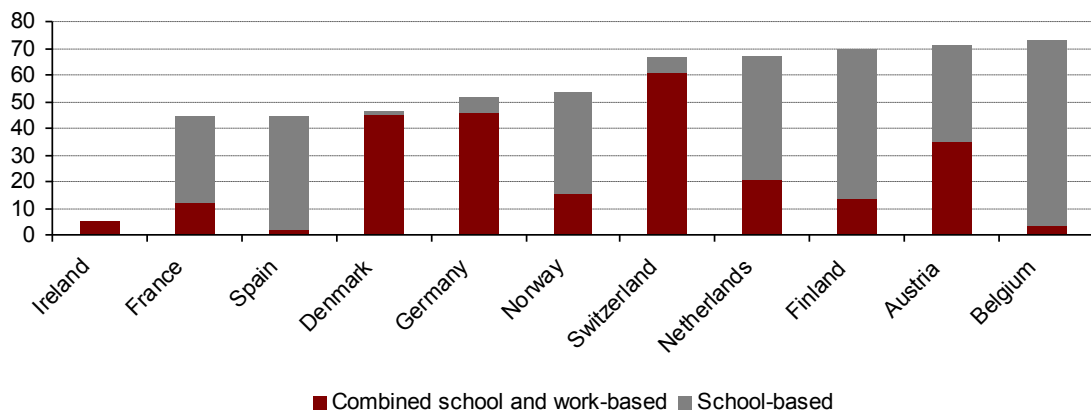
Source: Elaboration on OECD data

Among students in upper secondary or postsecondary non-tertiary education, the vocational orientation is more common in Austria, Belgium, Finland, the Netherlands, Switzerland, Italy, Sweden, Norway and Germany, where it is chosen by more than the half of the students at the ISCED level 3 (Figure 23).

VET systems vary widely among countries, thus limiting the cross-country comparability.

An important breakdown is however the extent to which VET is combined with actual work experience (as by means of apprenticeship, traineeships or work-study programmes) or it is only school-based.

Figure 24 - Share of students enrolled in vocational upper secondary education by type of programme. 2010



Source: Elaboration on OECD data

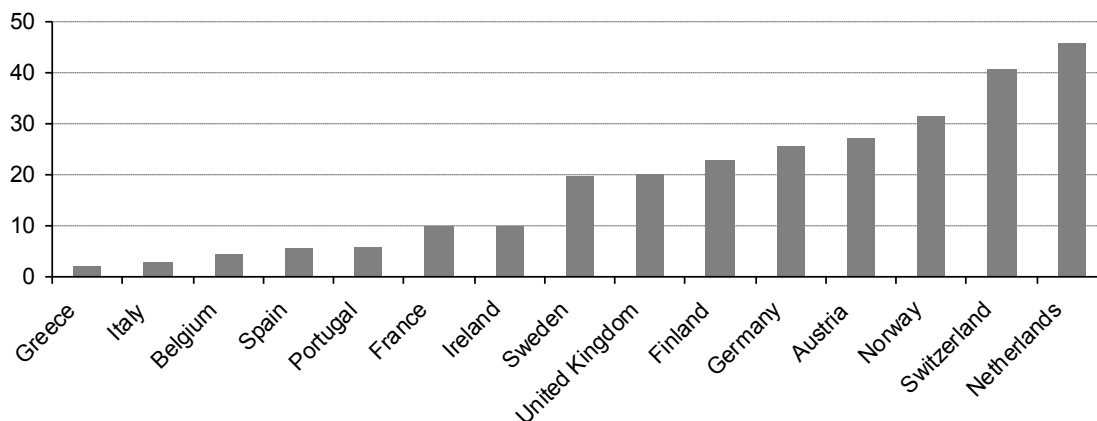
Figure 24 shows the share of students enrolled in vocational upper secondary education by type of programme: combined school and work or just school-based.

In countries for which data are available, combined school and work-based vocational education is typical of dual apprenticeship system countries (Denmark, Germany, Switzerland and Austria), while it represents a minor share in the other countries. For example, if in Italy VET is mostly attained in the classroom with no or irregular learning on-the-job, in German-speaking countries the dual apprenticeship system ensures systematic combination between school and work, with great employers' participation in the curricula design. Close collaboration between VET providers and employers greatly decreases the skills mismatch, while filling the inexperienced youth productivity gap and avoiding the need of long initial on-the-job training and late youth labour market entry. Indeed, wide consensus exists on the fact that, comparing school-based vocational training and dual apprenticeship models, a dual system tends to be associated with a smoother transition from school to work and with low youth unemployment.

Given data limitations concerning combined school-work educational programmes, an alternative way for understanding the extent to which young people experience the world of work while in study is to look at the participation of young people in education and training (formal and informal) by employment status, and particularly to look at the share of youth who study and work at the same time, no matter if this happens because the student is attaining a vocational programme combining school and work (as is the typical case in Germany with dual apprenticeship system), or simply because he/she is a

working students (as it is very common in the Netherlands). Such measure can compensate the lack of data on vocational programmes and provide a picture of the school-to-work transition model existing in a country: “study first, then work” or “studying while working”.

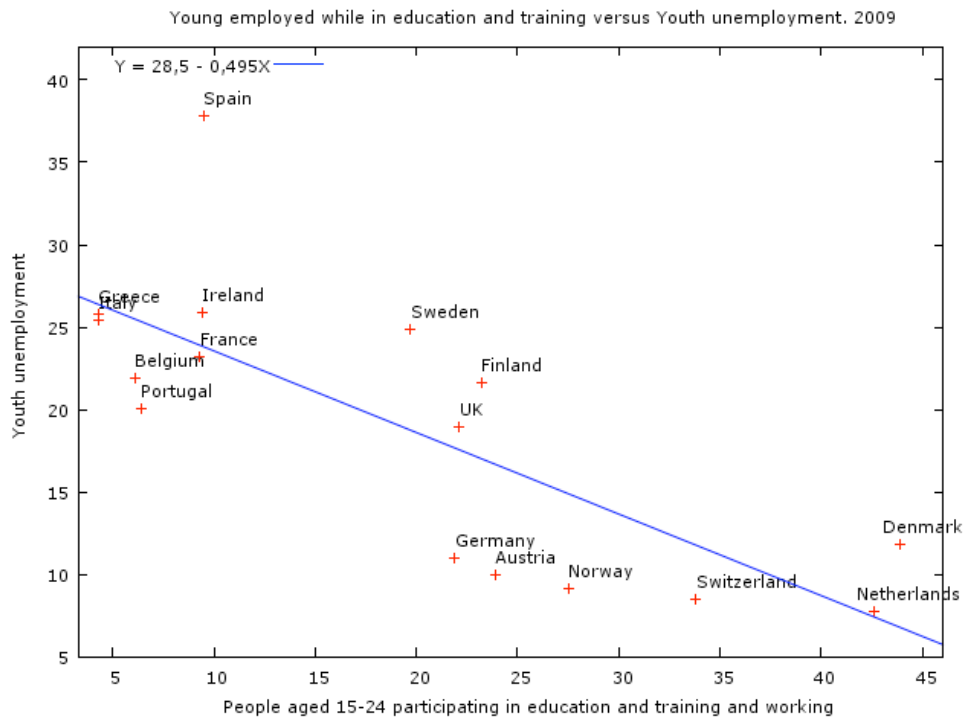
Figure 25 - Participation of young people in education and training (formal and informal) by employment status. 2012



Source: Elaboration on OECD data

Figure 25 shows the share of young people participating in education and training and also having a job. The measure includes formal and non-formal education and training; that means in general activities in the school/university systems but also courses, seminars workshops, etc. outside the formal education and regardless their topic.

Figure 26 – Youth in (formal and informal) education and working and youth unemployment. 2009



Source: Elaboration on OECD data

Scatterplot in Figure 26 clearly suggests that countries where working while studying and learning is more common, youth unemployment is lower. The role of work experience seems to go beyond the emphasis put by media and policy makers on apprenticeship. For example, even if the Netherlands is not a dual system apprenticeship country, youth considers work a fundamental part of their student-life and so commit themselves either in part-time or full-time jobs, easing school-to-work transition and lowering youth unemployment. In order to assess empirically the importance of experiencing work during studies, data of young people participating in education and training while working will be used in the empirical analysis as an explanatory variable for youth unemployment.

4. Traineeships: a comparative analysis across countries

The most common scheme for youth to enter the labour market is traineeship. The European Commission defines traineeships (internships or stages) as “work practice (either as part of a study curriculum or not) including an educational/training component which is limited in time. They allow to document practical work experience

as part of the individual CV and/or as requested in educational curricula or to gain work practice for the purpose of facilitating the transition from education and training to the labour market. They are predominantly short to middle-term (a few weeks up to 6 months, in certain cases one year)".

Even though traineeships represent a first hand experience for youth, their ambiguous position at the border between education and work, together with the existence, in most countries, of a loose and lacking regulation, have been thought to increase youth precariousness, thus putting doubt on the capacity of traineeship to be real stepping-stones into more stable employment, rather than dead-end experiences. The heterogeneity of regulatory frameworks across countries has been particularly addressed at the European level. The European policy maker has in fact undertaken a pathway toward the conception of a EU "Quality Framework for Traineeships" (COM(2012) 728 final, 5.12.2012) in order to enhance the employability power, decrease the risk of abuses and increase youth mobility. Quality traineeships represent in fact an essential part for the implementation of the initiative of the Commission on "Establishing a Youth Guarantee", adopted by the Council on April 2013 (2013/C 120/01, 22.4.2013) and calling all Member States to ensure that all young people up to the age of 25 years receive a good-quality offer of employment, continued education, an apprenticeship or a traineeship within four months of becoming unemployed or leaving formal education.

The "Quality framework" consultations process resulted in a proposal for a Council Recommendation on traineeships. The recommendation addresses all "open market" traineeships, identifying twenty pillars that have to be present in order to guarantee their quality: from the existence of a written agreement, to transparency of internships' announcement and offers, to learning objectives and the important role of tutor/mentor, to working conditions and maximum duration (set at six months), to the importance of certification procedures for certifying skills and competences learned during traineeship, to cross-border traineeships and a more efficient use of European Structural and Investment Funds.

Actually far from this ideal framework is reality. Indeed, starting from the regulatory framework, what emerges from the comparative analysis is first of all the lack of a formal definition of traineeship. A comparative study on traineeships regulation by the European Commission has in fact pointed out the fact that there is no precise definition

and solid legal framework for traineeships in many European countries. The consequence is the existence of a multitude of types, according to which the formal status of the trainee varies, together with rights and duties.

Despite the heterogeneity of traineeships' regulation across countries, it is possible to find some regularities or main features. A first distinction has to be made between traineeships that represent a mandatory part of formal education and traineeships that are not part of that. This main feature identifies two main types of traineeships: compulsory/educational traineeships and voluntary/ "open market" ones. According to this distinction, traineeships fall under the regulation of education and training or under the sphere of employment, respectively.

Compulsory traineeships can be academic/vocational or professional, respectively representing a part of the academic/vocational curricula or a mandatory step toward regulated professions, e.g. law, medicine, teaching, architecture, accounting, etc.

Besides compulsory traineeships, "open market traineeships" constitute very common work experiences for youth, as well as an arrangement that is very used by firms for screening and selecting candidates and/or providing initial training. This kind of traineeship is voluntary and generally conducted after the completion of studies and/or as part of a job search. Other types of traineeships are those aimed at easing the labour and social inclusion of disadvantaged subjects, thus representing tools of a country's active labour market policies (also known as "ALMP traineeships"). Finally, in the view of increasing students and youth mobility, transnational traineeships have been increasingly experienced by youth (as the Leonardo da Vinci programme promoted by the European Commission).

Despite these main types, regulatory framework differs across countries. While in France, Italy, Portugal, Spain and the Netherlands traineeships are directly regulated, in most of the other countries an explicit regulation of traineeships does not exist, but this does not mean that trainees are less protected. Indeed, a detailed regulation is not always a guarantee against abuses, an example of this being the Italian case. In Italy "open market" traineeships are subject to a heavy and detailed regulation at the regional level, however traineeships are often considered at high risk of misuse.

Probably aimed at removing all abuses connected to "open market" traineeships, French regulation allows only traineeships that are part of the formal education. Indeed in this

country, differently from all other countries, trainees always have a student status and all types of traineeships are subject to specific laws (including those in the open market) and must be included in educational programmes.

From a formal point of view, while in the majority of the countries traineeship implies a bilateral agreement to be signed by the trainee and the employer, the peculiarity of the Italian and French systems is the obligation to sign a tripartite agreement between the sending organisation (usually an education and training provider or, as the Italian case, also a public or private employment service), the firm and the trainee. The existence of a third party, besides the firm and the trainee, is supposed to warrant the quality of the traineeship and the respect of the learning objectives. However, it is demonstrated how the role of the sending organisation is often purely formalistic.

In Austria, Germany and Denmark, where school and work are traditionally highly combined and apprenticeship is widespread, a specific regulation of traineeships does not exist and these falls under the ruling of the national legislation on education and VET and/or employment.

Similarly, in the Anglo-Saxon countries there is no specific legal framework regulating traineeships. The main distinction exists between volunteering and work, in order to decide if employment law regulation applies, while in case of compulsory traineeships included in formal education they tend to be regulated by such institutions.

One of the most controversial issues concerning traineeships is remuneration.

Indeed, from the theory of education and investment in human capital, if traineeships would represent purely educational and training instruments, they would not entail any remuneration. Notwithstanding this aspect, the absence of remuneration has been increasingly addressed as one of the main piece of evidence of the abuse connected to traineeships. A survey of over 13 thousands young Europeans revealed the generalized lack of transparency and information, unclarity about remuneration, rights and obligations and health and safety.

The presence of remuneration mainly depends on the type of traineeship and is connected to the distinction between compulsory and voluntary traineeships. Pay is generally voluntary for mandatory academic and vocational traineeships, while it is often provided (but not always mandatory) for “open market” traineeship.

In France traineeships have to be remunerated if they exceed two months of duration within the same academic year (regardless of the number of hours worked), an amount depending on the level of qualification and on the age of the trainee. Besides remuneration trainees also have automatic access to social security coverage.

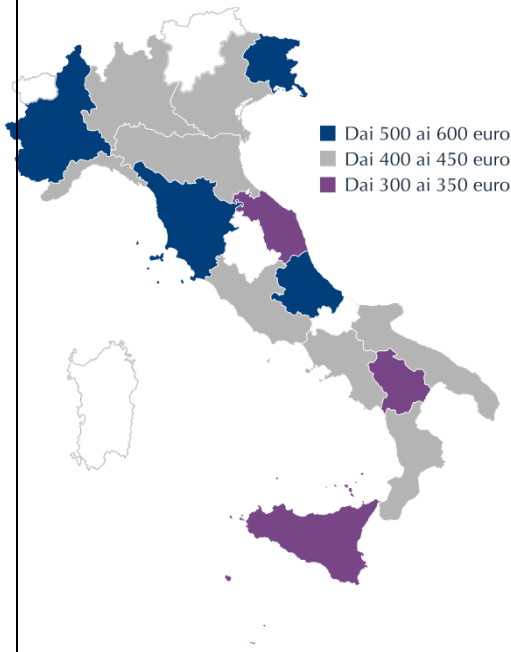
In most of the countries instead only “open market” traineeships can be entitled to “appropriate” remuneration, that usually coincides with a share of the statutory minimum wage applicable in the country (where existent, as in Belgium, France, Ireland, the Netherlands, Spain, Portugal the United Kingdom and the United States) or follows apprenticeships’ remuneration levels described in the collective agreements (as in Germany, Austria and Denmark). Italy partially differentiates in this aspect, since the recent reform of traineeships provides for non-mandatory trainees a mandatory minimum remuneration that is set by laws at the regional level (see Box 1).

In order to establish if a trainee is entitled of remuneration, Anglo-Saxon countries generally distinguish between volunteering and work. For example, in the United Kingdom when a trainee is defined as ‘worker’, he/she receive a remuneration set by national minimum wage rules and is entitled with similar rights to any other employee. Similarly, in the United States the Labour Standard Act distinguish between paid and unpaid internship according to the actual status of the intern, to be identified on the basis of a set of conditions: “1. The training, even though it includes actual operation of the facilities of the employer, is similar to what would be given in a vocational school or academic educational instruction; 2. The training is for the benefit of the trainees; 3. The trainees do not displace regular employees, but work under their close observation; 4. The employer that provides the training derives no immediate advantage from the activities of the trainees, and on occasion the employer’s operations may actually be impeded; 5. The trainees are not necessarily entitled to a job at the conclusion of the training period; and 6. The employer and the trainees understand that the trainees are not entitled to wages for the time spent in training”.

BOX 1 - Traineeships regulation in Italy after Fornero labour market reform
Internships in Italy have new rules since the Fornero labour market reform changed in 2012 the regulatory framework, establishing minimum standard for open market traineeships. Most of the 20 Italian regions and two autonomous provinces, which,

according to a federal system of competences' allocations, are the unique responsible for regulating education and training, have so legislated in order to adequate their previous norms to such minimum standards. Notwithstanding the fact that Fornero hoped goal was the creation of a homogeneous quality framework for internships in Italy, evidence reveals the multiplication of different regulations and increased heterogeneity.

Figure – Map of minimum pays for trainees



Fornero labour reform introduced an important innovation in the regulation of open market traineeships in Italy: the mandatory provision of a reimbursement to trainees, amounting 300 euro minimum. Given the federal system existing with regards to education and training issues, each region can decide for a higher pay. And in fact, as the reported in the analysis, the highest diversities across regions is to be noticed with regards to minimum reimbursement, with amounts ranging from minimum 300 euro to minimum 600 euro without a particular reason (nor cost of life neither performance reasons).

Source: ADAPT

EMPIRICAL ANALYSIS ON THE DETERMINANTS OF YOUTH UNEMPLOYMENT

SUMMARY: 1. Introduction - 2. Baseline model: the role of labour market institutions - 2.1 Sensitivity analysis - 3. Additional explanatory variables: the role of school-to-work transition - 4. Interactions among variables - 5. Analysis by welfare regimes: Social-Democratic, Christian-Democratic, Liberal and Mediterranean countries

1. Introduction

Economic and sociological literature has offered wide contributions, both theoretical and empirical, for the explanation of extensively higher unemployment rates among youth compared to adults and of the wide differences observed among countries with respect to the youth performance in the labour market.

Traditionally, youth unemployment has been related to several structural and cyclical determinants, from demographics, to the existence of labour market institutions such as unemployment benefits, minimum wages, employment protection legislation, taxes and other structural arguments, to cyclical factors, as well as the quality and effectiveness of the educational system and the ease of school-to-work transition.

After having analysed the stylized facts of youth unemployment, as well as of the main labour and educational institutions characteristics, in what follows I try to assess empirically the relative importance of such determinants for youth unemployment, starting from the role of labour market institutions and then adding relevant school-to-work transition variables.

The analysis of the labour market institutional determinants of youth unemployment (section 2) is based on annual data over the years 1980 to 2009 for 21 OECD countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States (depending on data availability, the number of countries can fall below 21 under some specifications).

After having estimated the role of labour market institutions for youth unemployment, a through sensitivity analysis is provided (section 2.1). In order to take into account the importance of school-to-work transition for youth, in section 3 the analysis adds an explanatory variable that proxies the extent to which youth experience work during

studied, namely the participation of young people in education and training and in work. Data availability for this school-to-work transition variable is limited to European countries and from the years 2000-2009, thus restricting the sample.

The fourth section analyses the main interactions among the labour market institutional variables and finally section five repeats the estimation by welfare type, i.e. distinguishing among Social-Democratic, Christian-Democratic, Liberal and Mediterranean countries.

2. Baseline Model: the Role of Labour Market Institutions

As stressed in the literature review, youth unemployment heterogeneity has been mainly explained as a reflection of labour market institutions' heterogeneity, together with cyclical and structural factors.

The effects of the former explanatory variables on youth and overall unemployment have been mostly estimated by the related economic literature using the following reduced-form model:

$$u_{i,t} = \alpha_i + \lambda_t + \beta Z_{i,t} + \sigma G_{i,t} + \varepsilon_{i,t} \quad (1)$$

where u is youth unemployment rate (15-24), the dependent variable (adult and elderly unemployment rates are added for comparative purpose), α , λ are country and time fixed effects, Z includes the following labour market institutions: unemployment benefit gross replacement rate, employment protection legislation (EPL, in various specifications), tax wedge, union density (substituted in certain specifications with the adjusted union coverage), degree of corporatism and product market regulation (PMR). The rationale for including these explanatory variables in the equation has been discussed in chapter 1 and detailed in the literature review. Finally, G is the output gap. In a second version of the baseline regression, also a measure of active labour market policies (ALMP) is included as explanatory variable.

The reason why this variable is estimated in a separate specification is that, as reported by the literature, policy variables tend to be pro-cyclical and therefore risks to be endogenous. To avoid endogeneity problems, ALMP is therefore instrumented following Bassanini and Duval (2006).

The above listed explanatory variables derive from the following sources and data construction:

- **Unemployment benefit gross replacement rate (UB)** is defined as the average across the first five years of unemployment for three family situations and two income levels (Source: OECD);

- **Employment protection legislation (EPL)** indicators synthesize the strictness of regulation of regular and temporary work, ranging from zero (least regulated) to 5 (highest regulated) (Source: OECD). They are compiled from 21 items covering three different aspects of the employment protection regulations: i) protection of regular employment related to individual dismissals, ii) protection of regular employment related to individual dismissal and collective bargaining and iii) strictness of temporary work regulation.

The strictness of employment protection legislation concerning regular contracts are related to individual dismissals. Version 1 of this indicator measures the strictness of regulation of individual dismissal of employees on regular/indefinite contracts through eight dimensions: notification procedures, delay involved before notice can start, length of the notice period at 9 months tenure, length of the notice period at 4 years tenure, length of the notice period at 20 years tenure, severance pay at 9 months tenure, severance pay at 4 years tenure, severance pay at 20 years tenure, definition of justified or unfair dismissal, length of trial period, compensation following unfair dismissal, possibility of reinstatement following unfair dismissal. A recently introduced new version of this indicator (available only from 2008 to 2013) also includes a ninth item: the maximum time to make a claim of unfair dismissal.

Besides protection of regular employment related to individual dismissal, an index including also collective dismissals will be considered (through the dimensions: definition of collective dismissal, additional notification requirements in case of collective dismissals, additional delays involved in case of collective dismissals, other special costs to employers in case of collective dismissals).

In order to take into account also the entry-side of the labour market, the strictness of protection for temporary work will be also used as explanatory variable (in substitution to EPL on regular employment). This index proxies the extent to which it is easy for employers to hire people, along dimensions related to fixed-term contracts (valid cases

for the use of fixed-term contracts, maximum number of successive fixed-term contracts, maximum cumulated duration of successive fixed-term contracts) and temporary work agencies (types of work for which temporary work agency employment is legal, restrictions on the number of renewals of TWA assignments and, only available for 2008-2013 period: maximum cumulated duration of TWA assignments, authorisation or reporting obligations; equal treatment of regular and agency workers at the user firm).

- **Tax wedge:** This indicator is a measure of the difference between labour costs to the employer and the corresponding net take-home pay of the employee and is calculated by expressing the sum of personal income tax, employee plus employer social security contributions together with any payroll tax, minus benefits as a percentage of labour costs. Employer social security contributions and – in some countries – payroll taxes are added to gross wage earnings of employees in order to determine a measure of total labour costs. The average tax wedge measures identify that part of total labour costs which is taken in tax and social security contributions net of cash benefits.

- **Trade union density** is defined as the percentage of employees who are members of a trade-union (Source: OECD). Besides this, **adjusted coverage**, i.e. employees covered by wage bargaining agreements as a proportion of all wage and salary earners in employment with the right to bargaining, expressed as percentage, adjusted for the possibility that some sectors or occupations are excluded from the right to bargain (Source: Data Base on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts, 1960-2010 (ICTWSS), Jelle Visser).

- **Degree of corporatism:** is the multiplication between **wage coordination** and **centralisation**. The coordination of wage bargaining is an index with a scale of five scores, ranging from 1 (lowest coordination) to 5 (highest coordination). In detail, score 5 represents an economy-wide bargaining, based on a) enforceable agreements between the central organisations of unions and employers affecting the entire economy or entire private sector, or on b) government imposition of a wage schedule, freeze, or ceiling. Score 4 represents a mixed industry and economy-wide bargaining: a) central organisations negotiate non-enforceable central agreements (guidelines) and/or b) key unions and employers associations set pattern for the entire economy. Score 3 indicates an industry bargaining with no or irregular pattern setting, limited involvement of central organizations, and limited freedoms for company bargaining. Score 2 describes a mixed or alternating industry- and firm level bargaining, with weak enforceability of industry agreements and

score 1 a fragmented bargaining, mostly at company level (Source: Data Base on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts, 1960-2010 (ICTWSS), Jelle Visser). Wage centralisation is instead a summary measure of centralisation of wage bargaining, taking into account both union authority and union concentration at multiple levels and ranging from 0 to 1 (Source: Data Base on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts, 1960-2010 (ICTWSS), Jelle Visser).

- **Product market regulation (PMR)**: summary indicator of regulatory impediments to product market competition in seven energy and service industries: gas, electricity, post, telecoms (mobile and fixed services), passenger air transport, railways (passenger and freight services) and road freight. (Source: OECD)

- **Output gap** is measured as the percentage difference between the levels of actual GDP and estimated potential GDP, both in real terms. (Source: OECD)

- In an alternative version of the baseline regression, as mentioned, **active labour market policies (ALMP)** will also be included, after having been instrumented in order to take into account endogeneity problems. The active labour market policy variable is calculated as the spending per unemployed as percentage of GDP per capita. Expenses for such policies include spending on public employment services and administration, labour market training, special programmes for youth when in transition from school to work, labour market programmes to provide or promote employment for unemployed and other persons (excluding young and disabled persons) and special programmes for the disabled. Considering how the indicator is constructed, it is likely to be pro-cyclical and so to decline when unemployment rises and to rise when unemployment declines, thus resulting endogenous. So, in order to avoid biased estimations, following Bassanini and Duval (2006) ALMP is instrumented with the lagged first difference of the residual of a regression of ALMPU on up to three lags of the output gap and more sensitivity analysis are conducted as by changing the number of lags of the preliminary regression or not differencing the variable. (Source: OECD)

Table 1 presents descriptive statistics and Table 2 simple pooled cross-country / time-series correlations between youth unemployment (the dependent variable) and each of the policies and institutions considered (the explanatory variables).

Table 1 - Descriptive statistics of the variables used in the baseline youth unemployment regressions. 1980 - 2009

Variable	Mean	Minimum	Maximum	Std. Dev.	N. of Observations
Youth unemployment	15,4705	3,20611	43,7694	8,12820	581
Unemployment benefit	28,885	0,30000	64,900	0,18342	630
Output gap	-0,366569	-8,93089	17,3170	2,37222	618
ALMP	17,3134	2,37403	111,063	14,7084	468
PMR	3,77561	0,940455	6,00000	1,36805	588
Employment protection legislation (regular)	2,13634	0,256667	5,00000	0,941110	520
Employment protection legislation (regular and collective dismissals)	2,13634	0,256667	5,00000	0,941110	520
Employment protection legislation (temporary work)	1,92993	0,250000	5,25000	1,42057	520
Tax wedge	28,7267	-0,329000	45,5486	9,74321	485
Union density	38,3346	7,57586	83,8902	20,3303	617
Adjusted coverage	67,3665	13,1000	99,0000	24,4045	630
Wage coordination	3,13492	1,00000	5,00000	1,27064	630
Centralisation	0,389246	0,0830662	0,977991	0,190975	565
Corporatism	1,36611	0,000000	4,88638	0,967265	570

Note: Corporatism is identified as the multiplication of the terms wage coordination and centralisation.

Table 2 - Correlations between youth unemployment and institutions and policies: simple correlations (Panel A) and purged from both country and time fixed effects (Panel B)

Panel A: Simple correlations					
	Output gap	ALMP	PMR	EPL (regular)	EPL (regular and collective dismissals)
Youth unemployment rate	-0,3762 ***	-0,3811 ***	0,2970 ***	0,3778 ***	0,2150 ***
	EPL (temporary)	Tax wedge	Union	Corporatism	UB
	0,4619 ***	0,4488 ***	-0,1008 **	-0,1988 ***	-0,0879 **
Panel B: Variables purged from both country and time fixed effects					
Youth	Output gap	ALMPU	PMR	EPL (regular)	EPL (regular

unemployment rate					and collective dismissals)
	-0,4090 ***	-0,5303 ***	0,0227	0,1041 **	0,1041 **
	EPL (temporary)	Tax wedge	Union	Corporatism	UB
	-0,1456 ***	0,3125 ***	0,1377 ***	-0,2375 ***	-0,0398

Note: Full correlation matrix in Appendix (1).

The panel shows significant positive correlations between youth unemployment and all the institutional and policy variables analysed, with the exception of unemployment benefit which shows almost no correlation. In particular, tax wedge, all employment protection legislation measures (EPL) and product market regulation (PMR) are positively correlated to youth unemployment, while better economic conditions (output gap), active labour market policies spending (ALMP) and the degree of corporatism of industrial relations (high coordination/centralisation) are found to be associated with lower youth unemployment rates.

Simple correlations have to be interpreted with caution, since they are often dependent on few observations and maybe biased due to the existence of omitted explanatory variables.

An approach suggested by the literature in order to mitigate the above mentioned problems is to show correlations purged from both country and time fixed-effects. Following Bassanini and Duval (2006) this is done by, first, by estimating separate regressions of the type $U_{it} = \alpha_i + \lambda_t + \varepsilon_{it}$, and $X_{it}^j = \alpha_i + \lambda_t + v_{it}$, and second, computing simple correlations between ε_{it} and v_{it} .

Using this approach, youth unemployment is found to be positively and significantly correlated with employment protection legislation for regular employment, tax wedge and union density and negatively correlated with the output gap, the expenditure on active labour market policies, employment protection legislation for temporary work and corporatism. However, no significant correlation is found between youth unemployment and product market regulation and average gross replacement rate of unemployment benefit.

To verify the above presented correlations, Equation (1) is used to assess the role of labour market institutions in determining cross-country variations in youth

unemployment (15-24). While the main focus of the analysis is on youth unemployment, two other dependent variables – adult and elderly unemployment - have been also considered with the aim of comparing the effect of labour market institutions across different age groups. Following the main empirical studies described in the corresponding section of the literature review, the above presented model is estimated using OLS fixed effects, but a sensitivity analysis using random effects is also presented. In fact, if it is true that institutional characteristics are embedded in countries' specificities - thus suggesting the use of fixed-effects - a random effect approach could be useful in order to allow for the analysis of time invariant institutional factors.

Table 3 - Baseline unemployment rate equation. 1980-2009

OLS Fixed effects							
Equation version number							
Estimated coefficients							
Explanatory variable	Youth Unemployment					Adult Unemployment	Old Unemployment
	1	1a= switching to EPL temp. work	1b= EPL regular * temporary work	1c= splitting corporatism in coordination and centralisation	1d= Adjust coverage as additional variable	2	3
Output Gap	-1,25 [10,05]***	-1,27 [10,15]***	-1,28 [10,14]***	-1,24 [10,02]***	-1,32 [10,54]***	-0,60 [10,43]***	-0,53 [8,71]***
Unemployment benefit gross replacement rate	0,005 [0,12]	-0,03 [0,80]	-0,00 [-0,04]	0,02 [0,58]	0,01 [0,40]	0,07 [3,97]***	0,03 [1,99]**
Employment Protection Legislation (regular work)	4,11 [3,55]***			4,28 [3,70]***	5,12 [4,28]***	1,22 [2,25]**	1,23 [2,16]**
Employment Protection Legislation (temporary work)		-1,14 [2,93]***					
EPL Regular employment x EPL temporary employment			-0,05 [0,35]				
Tax wedge	0,22 [4,40]***	0,19 [3,74]***	0,21 [4,12]***	0,22 [0,58]***	0,21 [4,34]***	0,15 [6,44]***	0,06 [2,54]**
Union density	0,02 [0,32]	-0,08 [1,12]	-0,07 [-1,00]	0,03 [0,41]	-0,12 [1,30]	0,11 [3,12]***	0,18 [4,76]***
Product market regulation	0,87 [1,98]**	1,75 [3,49]***	1,12 [2,21]***	0,93 [2,11]**	0,97 [2,24]**	0,23 [1,14]	-0,45 [2,11]**

Corporatism	-3,17 [4,28]***	-2,99 [3,99]***	-3,23 [4,25]***		-3,23 [4,41]***	-1,58 [4,55]***	-0,99 [2,73]***
Degree of coordination				-1,55 [4,14]***			
Degree of centralisation				-7,68 [1,42]			
Adjusted coverage					0,13 [2,85]***		
Country dummies	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Time dummies	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Observations	335	335	335	335	335	335	335
Number of countries	21	21	21	21	21	21	21
Adj. R2	0,868248	0,866464	0,862557	0,870076	0,871417	0,825130	0,795863

Each coefficient indicates the expected change (in percentage points) of youth, adult and elderly unemployment rate resulting from a one unit increase in the explanatory variable.

*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively.

All regressions contain a constant t-statistic in brackets in absolute terms.

Table 3 shows estimates of the expected change (in percentage points) of youth unemployment rate resulting from a one unit increase in the identified institutional variables; adult and elderly unemployment rates are reported for comparative purpose.

Tax wedge, product market regulation and employment protection legislation of regular employment against individual and collective dismissals (EPL regular work) are estimated to raise youth unemployment at conventional confidence levels in all specifications, while the degree of corporatism (high wage coordination and centralisation) and the strictness of temporary work regulation is found to significantly reduce youth unemployment in all models. The estimated coefficient of the output gap is also highly significant in all specifications, pointing to the importance of cyclical unemployment patterns and macroeconomic shocks for youth unemployment and confirming the fact that youth are disproportionately affected by economic cycle, as one can see from the coefficient size, which is more than double than that of adults and old people. Union density and unemployment benefit gross replacement rate are instead not statistically significant, the latter being significant only for adult and elderly unemployment.

More in detail, confirming the literature, tax wedge, i.e. the difference between the salary costs of a single average worker to their employer and the “take-home-pay” that the worker receives, is positively related to youth unemployment, with coefficient ranging from 0,19 to 0,21 and significant at the maximum level in all specifications.

Tax wedge is also found to increase adult (25-64) and elderly (55-64) unemployment rates, but the effects seem to decrease with age: respectively 0,15 and 0,06 (versus 0,20 on average for youth unemployment).

Similarly, product market regulation is a predictor of youth unemployment since it is always estimated with positive sign and at highly significant level, while it is not significant and even of opposite sign respectively for the adult and elderly dependent variables.

Lack of competition in the product market, accompanied by the existence of rents and rent-sharing behaviour may in fact hit disproportionately the most vulnerable job seekers and youth therein, by lowering labour demand and hindering new hiring.

Employment protection legislation's effects on youth unemployment have been demonstrated by the related literature to be quite ambiguous. Coherently, in this analysis results are mixed. In fact, if rigidity of regulation concerning dismissal is connected to higher youth unemployment rate, rigidity on the entry side (indicated by the employment protection legislation of temporary work) seems instead to be associated with lower youth unemployment. A positive sign of the strictness of employment protection for regular work (against individual and collective dismissal), stable in all specifications, does lend some support to the insider-outsider theory, predicting that excessive protection levels on the exit-side of the labour market relationship would hinder hiring and so increase youth unemployment and precariousness of employment. However, when the indicator is substituted with the one concerning the protection of temporary work (a measure of the ease of hiring on a temporary basis) the estimated sign is the opposite and youth unemployment seems to decrease the higher the rigidity levels on the entry-side, i.e. employment protection for temporary work. Considering both regular and temporary work protection legislation indexes (multiplication of the two) the estimated coefficient is no longer significant probably suggesting the existence of compensation mechanism between flexibility and rigidity on the two sides of the employment relationship.

With regards to wage setting institutions, results seem to be consistent with Calmfors' hump-shaped hypothesis, with higher centralization/coordination that is associated to lower unemployment rates for all age groups, but with higher magnitude for youth. Estimates for corporatism (multiplication of wage coordination and centralisation) show

quite stable results, suggesting a positive role of corporatism on youth unemployment and giving some support to the view that in centralised/co-ordinated bargaining systems unions and employers may be able to internalise the adverse employment consequences of excessive wage claims. In the specification number 1c the variable “corporatism” is splitted into its two components: wage coordination and centralisation in order to observe their relative role. Splitting corporatism into the two dimensions provides significant and negative sign only for the estimated coefficient of wage coordination. Notably, results for corporatism are bigger in coefficient for youth than for adults and elderly.

Remaining in the field of industrial relations, as typically showed by related studies, union density is not a significant explanatory variable of youth unemployment, but this indicator could be incomplete and might poorly capture the actual bargaining power of workers representatives, since in several countries collective agreements coverage largely exceeds the number of trade union members and due to the existence of extension mechanisms in collective bargaining. To this end an alternative measure – the adjusted union coverage - is also included in the regression.

Adjusted coverage is found to be positively and significantly related to youth unemployment (0,13 in coefficient, significant at 1% of confidence level), thus suggesting that trade unions may exert a power that goes beyond the direct membership and that is conveyed in the labour market through the collective bargaining. As stressed in the literature, the automatic extension of wage agreements may distort the balance between costs and productivity, something that is particularly crucial for youth who often lack of specific skills and experience, resulting in a productivity gap that may need to be taken into account in wage bargaining.

Besides labour market institutions, policies and in particular active labour market policies (ALMP) represent an important factor able to affect youth unemployment rate. However, as already mentioned, ALMP spending should be interpreted with caution due to the existence of endogeneity problems and therefore should be treated through an instrumental analysis.

In what follows different specifications of ALMP are included: i) simple ALMP variable in levels and ii) ALMP instrumented with the lagged first difference of the

residual of a regression of ALMP on up to three lags of the output gap (3 lags output gap).

Regressing the ALMP indicator on a certain number of lags of the output gap plausibly eliminates the effect of contemporaneous and lagged cyclical fluctuations.

Moreover, using lagged and differenced residuals is expected to remove the effect of once-off shifts in structural unemployment due to unobserved reforms.

Table 4 - Baseline regression plus the role of active labour market policy

Explanatory variable	Youth unemployment	
	1 = ALMP in levels	2 = ALMP Instrumental variable
Output Gap	-1,07 [8,99]***	-1,20 [9,63]***
Unemployment benefit gross replacement rate	0,08 [1,77]*	0,07 [1,64]
Employment Protection Legislation (regular work)	5,01 [4,74]***	4,01 [3,63]***
Tax wedge	0,17 [3,63]***	0,19 [3,70]***
Union density	0,10 [1,40]	0,05 [0,71]
Product market regulation	-0,32 [0,76]	0,71 [1,53]
Corporatism	-1,82 [2,42]**	-4,27 [5,01]***
ALMP	-0,14 [7,22]***	-0,16 [3,33]***
Country dummies	<i>yes</i>	<i>yes</i>
Time dummies	<i>yes</i>	<i>yes</i>
Observations	310	290
Number of countries	21	21
Adj. R2	0,870713	0,865521

Each coefficient indicates the expected change (in percentage points) in youth unemployment rate resulting from a one unit increase in the independent variable.

*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively.

All regressions contain a constant t-statistic in brackets in absolute terms.

Active labour market policy spending, both “in levels” (specification number 1) and as an instrumental variable (specification number 2), is estimated to significantly decrease youth unemployment, with coefficients between -1,7 (specification in level) and -1,2 (instrumental variable). Moreover, introducing the ALMP indicator in levels causes the unemployment benefit variable to become positive and significant (at the lowest conventional level, 10%).

All the results discussed in this section are robust to different choices of instruments (reported in the Appendix), such as reducing the number of lags of the output gap

included in the preliminary regression, increasing the order at which the first-differenced residual is lagged and/or not differencing the residuals. The results are also robust to the exclusion of high ALMP-spending countries (Denmark, Sweden, Norway and the Netherlands) from the sample.

2.1 Sensitivity analysis

In order to check the robustness of the above presented results, a thorough sensitivity analysis of the baseline equation has been carried out (Table 5).

Table 5 - Baseline regression by time periods: 1980s, 1990s and 2000s

Explanatory variable	Sub-sample: 1980s	Sub-sample: 1990s	Sub-sample: 2000s
Output Gap	-0,94 [4,17]***	-1,11 [9,63]***	-0,30 [0,16]
Unemployment benefit gross replacement rate	0,14 [0,88]	-0,00 [0,11]	0,04 [0,87]
Employment Protection Legislation (regular work)		1,90 [1,69]*	-2,15 [0,86]
Tax wedge	0,32 [1,52]	0,38 [4,43]***	0,09 [0,99]
Union density	0,04 [0,20]	0,15 [1,67]*	-0,14 [0,89]
Product market regulation	-0,31 [0,16]	-1,14 [1,60]	0,92 [1,14]
Corporatism	-0,71 [0,59]	-1,66 [2,08]**	-0,33 [0,24]
Country dummies	<i>yes</i>	<i>yes</i>	<i>yes</i>
Time dummies	<i>yes</i>	<i>yes</i>	<i>yes</i>
Observations	71	145	151
Number of countries	14	21	21
Adj. R2	0,927992	0,962079	

Each coefficient indicates the expected change (in percentage points) in youth unemployment rate resulting from a one unit increase in the independent variable.

*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively.

All regressions contain a constant t-statistic in brackets in absolute terms.

Note: EPL indicator is dropped in the specification 1 concerning the 1980s because data are not available.

A key finding is that the significant effects of the variables on youth unemployment vary across different time periods. Namely, effects seem to be concentrated in the decade of the nineties, while they are no longer significant in the other decades (Table 5).

Table 6 - Baseline regression by different model specification and estimation technique

Explanatory variable	Youth unemployment	
	1 = Dropping time effects	2= Random effects
Output Gap	-1,15 [11,35]***	-1,16 [11,78]***
Unemployment benefit gross replacement rate	0,00 [0,15]	-0,00 [0,06]
Employment Protection Legislation (regular work)	3,43 [2,92]***	2,52 [2,97]***
Tax wedge	0,23 [4,59]***	0,25 [5,28]***
Union density	-0,01 [0,19]	-0,03 [0,78]
Product market regulation	0,16 [0,71]	0,26 [1,31]
Corporatism	-2,68 [3,62]***	-2,72 [4,24]***
Country dummies	yes	
Time dummies	NO	
Observations	335	335
Number of countries	21	21
Adj. R2	0,858143	

Each coefficient indicates the expected change (in percentage points) in youth unemployment rate resulting from a one unit increase in the independent variable.

*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively.

All regressions contain a constant t-statistics in absolute terms in brackets.

As Table 6 shows, tax wedge, corporatism, output gap and employment protection legislation of regular employment are robust to different model specifications, as dropping time effects (specification number 1) and they are as well robust to different estimation techniques, i.e. using random effects (specification number 2).

3. Additional explanatory variables: the role of school to work transition

Especially when researching on the institutional determinants of youth unemployment, one cannot consider labour market institutions without taking into account educational and school-to-work transition characteristics. In fact, youth from 15 to 29 year old are mostly in transition between school and work, the former building skills for the latter and shaping probabilities of future career. Despite this, empirical studies on the institutional determinants of youth unemployment stressing (besides labour market institutions) also the role of school to work transition are scarce.

As explained in the previous chapter and in the literature review, higher educational levels for youth are generally connected to better labour market outcomes, even though education per se is no longer guarantee for job. One of the main problems affecting young people in transition is the excessive separation between school and work. Connected to this, different types of education are seen as being particularly beneficial for youth entering the labour market, especially those entailing good signalling power to employers with regards to the competencies and skills acquired by the candidate.

The popularity of vocational and pre-vocational training has been taken as a first factor to measure the extent to which school and work are related and speak one with each other. In fact, higher participation in vocational education may reflect a better perception of VET itself by students, parents and society as a whole, in turn possibly reflecting higher quality of such education. However, VET per se is not a guarantee of acquiring work-related skills, as in many countries vocational education is not part of a dual system of education combining school and work, but is only class-based, sometimes even lacking modern techniques and methods and so being not representative of real work situations. It has been demonstrated how vocational training combining school and work through apprenticeship and traineeship is far more efficient for youth school-to-work transition. But again, comparing countries on the basis of the use of apprenticeship may not be representative of the connection between education and work.

In fact, as seen in chapter 1, apprenticeship varies considerably among countries, especially with regards to its educational and training content. In some countries – notably German-speaking and other dual system countries – apprenticeship represents a valuable training instrument included in formal education, appreciated by both students and employers given the high signalling power connected to the certification of competences. In other countries, on the contrary, apprenticeship is not part of formal education system, being simply a fixed-term employment contract where training represents a marginal part. The training content of apprenticeship is reflected in apprentice's wage which, in non-dual system countries, is close to that of senior employees in the same position, while in dual-system countries it is one third of a trained worker's salary.

Moreover, comparative data on traineeships and apprenticeships do not exist. So, if comparing countries on the basis of apprenticeship can be misleading, in order to represent the extent to which educational system and school-to-work transition is connected to business and working sector I consider a variable indicating the “percentage of people aged from 15 to 29 who combines work with education and training” (Source: Eurostat).

This variable takes into consideration formal and non-formal education and training, that means general activities in the school/university systems but also courses, seminars workshops, etc. outside the formal education. Moreover, the Eurostat definition of “employee” includes persons doing an apprenticeship, traineeship or other training contract. Given the age considered, from 15 to 29 years old, it is therefore likely that many of these young employees participating in education and training are indeed apprentices and trainees engaged in a school/university program combining education and work, thus partially reflecting the degree of connection between education and business. In any case, whether education and training is provided because of a dual system of apprenticeship or because the person is a working-student, combination of school and work represents a potential driver for youth employability, reducing the productivity gap, increasing experience, specific knowledge, soft skills and networking. So, in order to account for the role of school-to-work transition in determining youth unemployment, the previous equation (1) is augmented as follows:

$$u_{i,t} = \alpha_i + \gamma_t + \beta Z_{i,t} + \alpha X_{i,t} + \chi APP_{i,t} + \varepsilon_{i,t} \quad (2)$$

where *APP* is the percentage of people aged from 15 to 29 who combines work with education and training, a proxy for the degree of connection between education and work. As in the previous analysis of labour market institutions, *Z* groups labour market institutions, *X* represents the economic cycle, while α and γ respectively indicate the geographical- and time-effects.

Data for the newly included variables are only available from 2000, so equation number (2) is estimated for the years 2000-2009. Moreover, data on students combining education and work are only limited to European countries thus restricting the sample of countries from 21 to 15 (data are not available for Australia, Canada, Japan, New

Zealand, Norway, United States). In order to allow for comparability with the baseline estimate, a balanced panel is also presented.

Table 7 - Baseline regression augmented with the school-to-work transition variable. 2000-2009

Explanatory variable	Youth unemployment	
	1	2= balanced panel
Output Gap	0,08 [0,25]	-0,08 [0,27]
Unemployment benefit gross replacement rate	0,18 [2,68]***	0,15 [2,24]**
Employment Protection Legislation (regular work)	-0,41 [0,13]	0,79 [0,25]
Tax wedge	0,42 [2,00]**	0,11 [0,75]
Union density	-0,16 [0,92]	-0,00 [0,00]
Product market regulation	2,95 [2,76]***	3,32 [3,14]***
Corporatism	-0,06 [0,04]	-1,00 [0,57]
Share youth combining education and work	-0,35 [3,36]***	-
Country dummies	<i>yes</i>	<i>yes</i>
Time dummies	<i>yes</i>	<i>yes</i>
Observations	105	111
Number of countries	15	15
Adj. R2	0,922203	0,910433

Each coefficient indicates the expected change (in percentage points) in youth unemployment rate resulting from a one unit increase in the independent variable.

*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively.

All regressions contain a constant t-statistics in absolute terms in brackets.

Including the school-to-work transition variable seems to explain more than previously estimated labour market institutions determinants, with the adjusted R-squared that increases from 0,91 to 0,92 (balanced panel without the school-to-work transition variable).

In particular, countries where young people combine education and work, both because of attending apprenticeship or traineeship or because working with part-time contracts (as proxied by the share of young employed between 15 and 29 years old participating in education and training) is found to be linked to lower youth unemployment rate, statistically significant at the highest level.

These results suggest the importance of the gradual integration of students in the labour market, through apprenticeship, traineeships or part-time contracts and point out

problems related to the excessive separation between education and work, as in Mediterranean countries.

4. Interactions among variables

The previously described explanatory variables interact one with each other inducing different labour market performance among countries. Moreover, institutional variables are often complementary, concurring to the determination of different institutional settings. A first interaction occurs between the structure of industrial relation and labour market regulations, indeed employment protection legislation is traditionally found to interact with wage setting mechanism, with higher protection generally associated to more compressed wage structure and lower wage inequality. A first interaction has therefore been created between employment protection of regular work and wage coordination and a second one with wage centralisation (specification 1a). A second set of interaction terms is between the trade union density and wage coordination/centralisation (specification 1b), adjusted union coverage (specification 1c) and the tax wedge (specification 1d).

Table 8 - Baseline regression estimated with interaction terms. 1980-2009

Explanatory variable	Youth unemployment				
	1	1a= interactions between EPL regular employment and wage coordination / centralisation	1b= interaction between unionism and wage coordination/ centralisation	1c= interaction between unionism and adjusted coverage	1d= interaction between unionism and tax wedge
Output Gap	-1,24 [10,02]***	-1,24 [10,03]***	-1,23 [10,06]***	-1,31 [10,90]***	-1,23 [9,97]***
Unemployment benefit gross replacement rate	0,02 [0,58]	0,02 [0,73]	0,02 [0,57]	0,04 [1,20]	0,03 [0,81]
Employment Protection Legislation (regular work)	4,28 [3,70]***	9,27 [4,03]***	4,76 [4,07]***	4,70 [4,08]***	4,16 [3,60]***
Tax wedge	0,22 [0,58]***	0,22 [4,40]***	0,20 [4,03]***	0,21 [4,51]***	0,07 [0,77]
Union density	0,03 [0,41]	0,07 [0,88]	0,16 [1,53]	-0,72 [4,64]***	-0,13 [1,05]
Adjusted coverage				-0,10 [-1,62]	
Product market	0,93	0,72	0,66	0,26	0,75

regulation	[2,11]**	[1,60]	[1,48]	[0,59]	[1,67]*
Degree of coordination	-1,55 [4,14]***	-0,63 [0,54]	-3,08 [3,47]***	-1,41 [3,86]***	-1,49 [3,96]***
Degree of centralisation	-7,68 [1,42]	10,36 [0,92]	14,72 [1,51]	-8,30 [-1,53]	-7,92 [1,47]
EPL x Coordination		-0,41 [0,84]			
EPL x Centralisation		-10,18 [1,98]**			
Union x Coordination			0,03 [1,88]*		
Union density x Centralisation			-0,61 [2,71]***		
Union density x Adjusted coverage				0,008 [4,82]***	
Union density x Tax wedge					0,004 [1,68]*
Country dummies	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Time dummies	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Observations	335	335	335	335	335
Number of countries	21	21	21	21	21
Adj. R2	0,868248	0,872062	0,872955	0,882184	0,870895

Each coefficient indicates the expected change (in percentage points) in youth unemployment rate resulting from a one unit increase in the independent variable.

*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively.

All regressions contain a constant t-statistics in absolute terms in brackets.

The result seems to confirm the idea that high centralisation contribute to contain unemployment pressure. Indeed, the interaction term between the strictness of employment protection for regular employment and the degree of centralisation of wage bargaining is negative and significant at 5% of confidence level (specification 1a) and similarly, the interaction term between the trade union density and the centralisation of wage bargaining is negative and significant at 1% (specification 1b).

As already notices, trade union density alone may poorly capture the actual trade union power and representativeness. Therefore, in the third specification (1c) unionism is interacted with the adjusted coverage variable (representing unions' bargaining coverage). This interaction is estimated to increase youth unemployment at the maximum level of confidence (1%), though the coefficient is very low in absolute term (specification 1c). Unionism is also found to strength the negative effect of tax wedge, as shown by the estimate of the interaction term between the two variables (specification 1d).

5. Analysis by welfare regimes: Social-Democratic, Christian-Democratic, Liberal and Mediterranean countries

The economic and institutional context shapes youth labour market performance determining wide divergences among countries, it is therefore important to account for countries heterogeneity when looking at youth unemployment. Economic and sociological literature identified some commonalities among countries, according to their welfare type and institutional setting, that can be taken into account in order to search for common roots of youth conditions in the labour markets.

Developed economies have been traditionally grouped by the Variety of Capitalism literature in three clusters: Social-democratic, Liberal and Christian-democratic (or conservative-corporatist), the latter being associated with the Catholic countries in Continental and Mediterranean Europe. Later, scholars identified Mediterranean countries as a single and independent group.

Other than considering welfare types *per se*, the literature has linked these systems to systematically different behaviours, performances and institutions in the labour markets. Indeed, labour market institutions vary with respect to the welfare regime in place, as well as countries have different welfare regimes according to their civic qualities, these affecting in turn labour market institutions. Specifically addressing youth unemployment, few studies have underlined the fact that historically based institutions and political tradition, cultural values, social capital provide a more satisfying interpretation than mainstream economics. Labour market models (and embedded institutions mix) have been evaluated in terms of their performance, revealing two peaks models which are connected to the best outcomes: liberal/Anglo-Saxon models on the one side and co-ordinated market economies (as Germany) on the other side.

In what follows, the baseline model for the analysis of labour market institutional determinants of youth unemployment (Equation 1) is re-estimated separately for the four welfare types: Christian-Democratic countries (Austria, Belgium, France, Germany, the Netherlands and Switzerland), Liberal countries (Australia, Canada, Ireland, New Zealand, the United Kingdom and the United States), Mediterranean (Greece, Italy, Portugal and Spain) and Social-Democratic countries (Denmark, Finland, Norway and Sweden).

Table 9 - Baseline regression by welfare state type. 1980-2009

Explanatory variable	Youth unemployment				
	1= Baseline model	2= Christian- Democratic	3= Liberal	4= Mediterranean	5= Social- Democratic
Output Gap	-1,24 [10,02]***	-0,07 [0,15]	-1,10 [8,69]***	-1,82 [3,90]***	-1,06 [4,13]***
Unemployment benefit gross replacement rate	0,02 [0,58]	0,11 [1,29]	0,02 [0,39]	0,11 [0,94]	0,14 [1,34]
Employment Protection Legislation (regular work)	4,28 [3,70]***	1,85 [0,62]	-7,46 [2,82]***	6,23 [3,53]***	-7,33 [1,64]
Tax wedge	0,22 [0,58]***	0,12 [1,27]	0,25 [5,14]***	0,77 [2,81]**	0,60 [2,11]**
Union density	0,03 [0,41]	-0,56 [3,24]***	0,01 [0,12]	-0,58 [2,00]*	-0,11 [0,39]
Product market regulation	0,93 [2,11]**	2,94 [2,63]**	0,67 [1,04]	7,94 [3,62]***	-1,35 [0,70]
Degree of coordination	-1,55 [4,14]***	1,24 [1,17]	-1,04 [-2,40]**	-1,06 [1,31]	-0,29 [0,46]
Degree of centralisation	-7,68 [1,42]	-13,92 [1,05]	6,81 [1,41]	-134,78 [5,27]***	-2,24 [0,08]
Country dummies	yes	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes	yes
Observations	335	97	93	50	76
Number of countries	21	6	6	4	4
Adj. R2	0,868248	0,890948	0,865425	0,951087	0,797554

Each coefficient indicates the expected change (in percentage points) in youth unemployment rate resulting from a one unit increase in the independent variable.

*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively.

All regressions contain a constant t-statistics in absolute terms in brackets.

Table 9 compares the estimate of the baseline equation based on the whole sample of 21 selected OECD countries from 1980 to 2009 (specification 1) with estimates by welfare type: Christian-Democratic countries (specification 2), Liberal countries (specification 3), Mediterranean countries (specification 4) and Social-Democratic countries (specification 5).

The analysis of the labour market determinants for the whole sample showed that stricter employment protection legislation of regular work, higher tax wedge and more pervasive regulations in the product market are significantly connected with higher youth unemployment rates, while positive economic cycle and higher level of coordination (and corporatism) are significantly linked to lower youth unemployment.

However, looking at each welfare type separately, a different role of the above mentioned variables appears.

Indeed, for Christian-Democratic countries, differently from the other groups, the output gap is not a variable that significantly explains youth unemployment, employment protection legislation and tax wedge are no longer significant while union density is estimated to reduce youth unemployment (at the maximum level of statistical confidence). Moreover, similarly to the estimation of the full sample, product market regulation is found to increase youth unemployment.

Liberal countries show instead similar results of the full sample analysis with regards to the output gap and the degree of coordination, which are found to significantly decrease youth unemployment (respectively at 1% and 5% of statistic significance), as well as concerning the tax wedge, which is linked to higher youth unemployment. The only difference for liberal countries is the estimated sign of the employment protection legislation variable, that is found to decrease youth unemployment and not to increase it, as in the full-sample analysis.

In the Mediterranean countries the output gap is estimated with negative sign and at the maximum significance level, with a coefficient that is bigger in absolute term than all other output gap coefficients, probably suggesting the particular importance of the economic cycle in these countries. Moreover, in Southern European countries the higher the degree of corporatism (wage coordination and wage centralisation) the lower the youth unemployment. On the contrary, the incomplete freedom of product market and the strictness of employment protection for regular employment do have a significant effect on youth unemployment, and namely they are found to increase it at the maximum significant level.

Finally, differently from the baseline regression, the analysis of Social-Democratic countries only shows significant estimates for the tax wedge and for the output gap, maintaining the expected signs and significant levels. In the Scandinavian countries the product market regulation and the degree of corporatism do not seem to play a role for youth unemployment, differently from the baseline model using the full sample.

**THE RELATIONSHIP BETWEEN YOUNG AND OLD IN THE LABOUR
MARKET: A COMPARATIVE ANALYSIS**

SUMMARY: 1. Introduction - 2. OECD Countries – 2.1. Youth/Old bilateral relationships – 2.2. Empirical evidence on the youth/old relationship across the OECD countries – 3. Empirical evidence on the youth/old relationship across European countries at the regional level – 4. Within-country estimates of the relationship between the employment of the old and the young at the European regional level – 4.1. The Italian case study

1. Introduction

Spurred by the persistency of the economic crisis and the soaring youth unemployment in most European and non-European industrialised countries, the ‘70s and ‘80s famous belief that young and older workers would be competitors in the labour market, with the latter crowding out the former in a race to take over a fixed-amount of jobs in the economy, has recently gained new momentum, despite firm empirical evidence contrasting with the “lump of labour” theory. This concept is predicated on the view that only a limited number of jobs are available in the economy and that the continued employment of one group of workers comes at the opportunity cost of the employment of other workers. Such prediction has been advocated with regards to some groups of workers, particularly men versus women, migrants versus non migrant and young versus older workers.

An example of the last one is, in fact, a recent proposal by the Italian government for the implementation of the so-called “Staffetta Generazionale”¹ (literarily “generational handoff” or “generational handover” contract), a job sharing mechanism that implies the gradual passing of the job from the older to the younger workers through the change of older workers full-time jobs into part-time positions and its contemporaneous and gradual take over by youth through an apprenticeship or permanent contract.

¹ A law proposal has been presented on 21 March 2013 by Senator Giorgio Santini and Rita Ghedini with the title: “Interventi per l’accesso flessibile e graduale alla pensione ai fini dell’invecchiamento attivo e della solidarietà intergenerazionale”. Following this, several regional applications have followed in Italy: Lombardia (Decree 1676, 28/02/2013) and Emilia Romagna (Delibera n.1094/2013).

More in detail, a worker nearing retirement agrees to work fewer hours for a lower wage until the end of his or her working life and, in exchange, the employer hires one young worker on an open-ended contract or on fixed-term arrangements.

The measure does not come without costs, as these are estimated to be about a billion euro for every 100,000 hirings, connected to the fact that the central government would have to integrate older workers social security provision, paying them the contributions missed in the changing from full- to part-time work and so ensuring a complete pension. A second (less probable) option of such proposal would be early retirement, but this would entail amendment of the second Fornero reform on pensions, which raised the retirement age. Moreover, explicit early retirement would contradict main national and European orientations towards the lengthening of working lives and the sustainability of social security systems.

In any case, even though the Italian proposed measure does not explicitly aim to incentive early retirement of older workers, it reduces the number of hours worked by them, so entailing the belief that providing youth with a job means take it off from an older worker.

The Italian law project has been already implemented in two of the most industrialised regions of the country, Lombardia and Emilia Romagna, with a cost of 6 million euro (3 million in each Region) for the integration of older workers social security provisions, to be funded by the Italian Ministry of Labour.

As can be seen from the title of the measure “Intervention for the flexible and gradual access into retirement with the scope of active ageing and inter-generational solidarity” (“Interventi per l’accesso flessibile e graduale alla pensione ai fini dell’invecchiamento attivo e della solidarietà intergenerazionale”), the law project pretends to be inspired by the European year for active ageing and solidarity between generations, but, in its contents, it actually clearly contradicts the European approach.

In fact, it claims that even though the lengthening of the working life is unavoidable for ensuring the medium and long-term sustainability of national social security system, the retention of older workers in the labour market would also represent a possible drawback for the economy’s growth capacity because of the scarce motivation and productivity of older workers. So, despite the title, it is evident how that approach is far from being the one sustained by the European Union, for which, instead, elderly

workers not only do not constitute a limit for the economy, but represent a great potential and a driver for social and economic development.

The recent Italian proposal of a bridge scheme between youth and elderly demonstrates that the idea that different groups of workers (in this case younger and older generations) would be competitors in the labour market is hard to overcome, notwithstanding firm empirical evidence contrasting it (see the literature review). So, over thirty years after the time in which early retirement as a youth unemployment solution was popular, new versions of it are now spreading.

An other example of youth / elderly bridge-scheme, by which the Italian law project has probably been inspired, comes from France. The French “contrat de génération” (approved by the French Government in April 2013²), is however strikingly different from the Italian one. In fact, the French scheme does not imply the substitution of older with younger workers, but rather the simultaneous presence of both groups for training and mentoring reasons. Indeed, the older worker is not supposed to lower his/her working hours, but he/she supports a younger worker until he has reached the pension age.

However, even though the French generation contract does not entail the direct substitution between older and younger workers, it is as well representative of a revival of an approach that sees youth and old as separated or rival in the labour market.

In this context, it is therefore worth showing updated evidence on the relationship between youth and old in the labour market at the comparative level to verify - also with regards to the recent economic crisis which has been thought to have sharpened the old-youth contrasts - if the crowding out hypothesis can still be rejected and if youth and old can still be seen as complementary and not substitutes in the labour market.

To this end, adding on related literature, this study will consider a broader geographical and temporal scope: 21 OECD countries from 1980 to 2012, European countries at regional geographical level (Nuts 2) from 1999 to 2012 and country-level analysis for the period 1999-2009.

Following main literature, bilateral relationships between youth and old in the labour market are presented. Moreover, simple descriptive and correlational evidence is then tested econometrically in a panel fixed-effect estimation framework in order to account

² Law 1 March 2013, n. 2013 – 185.

for the simultaneous impact of external factors (such as the whole condition of the economy).

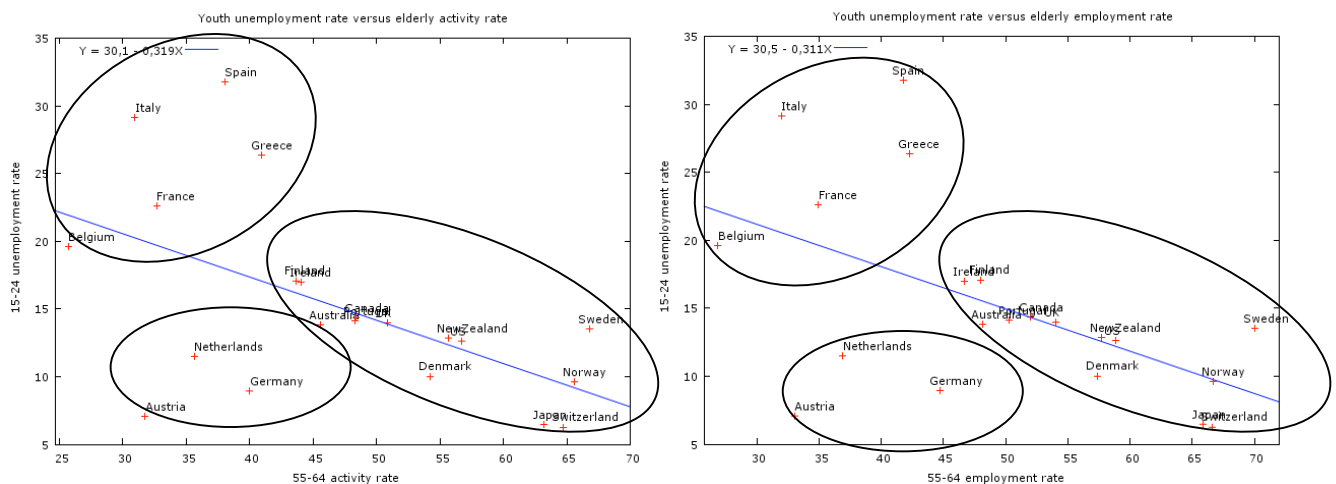
2. OECD Countries

2.1 Youth/Old bilateral relationships

In what follows, bilateral relationships for the OECD countries in the years 1980-2009 fail to show the existence of a crowding out effect from older to younger generations, with countries that registered higher elderly activity and employment rates, that also registered lower unemployment rates and higher employment rates for the young.

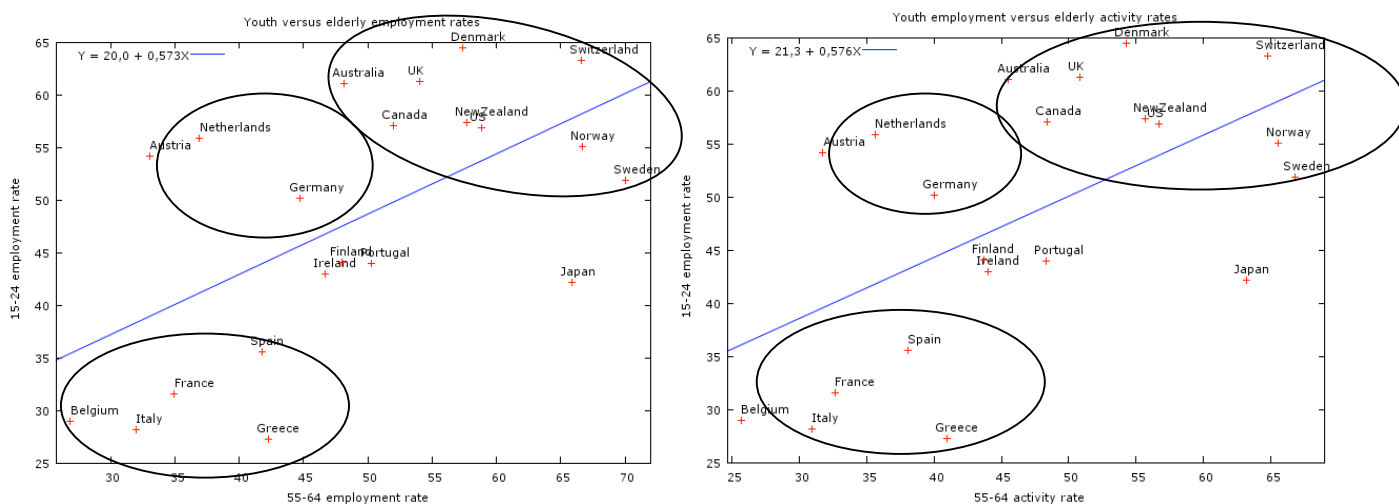
Depicted evidence, therefore, contradicts the crowding out hypothesis underlying job sharing, bridge schemes and early retirement policies (as the recent “staffetta generazionale” in Italy) while showing the existence of an opposite relationship.

Figure 27 – Youth unemployment vs elderly activity and employment rates (1980-2009 averages)



Source: Own elaboration on OECD data

Figure 28 – Youth employment vs elderly activity and employment rates (1980-2009 averages)



Source: Own elaboration on OECD data

As the graphs in Figure 27 and 28 show, it is possible to recognize three groups of countries representing three different states of art regarding the youth / old relationship in the labour market.

A first set of countries, the Mediterranean countries, plus Belgium and France, register a high rate of youth unemployment (over 20%), low youth employment (below 35%) and low elderly activity and employment rates (respectively lower than 40% and 45%).

A second set of continental countries, represented by Austria, Germany and the Netherlands, register low youth unemployment and high youth employment rates, as well as low elderly activity and employment rates.

A third group of countries, grouping both Anglo-Saxon and *flexicurity*-Scandinavian countries, register both good youth and elderly labour market performance, with low youth unemployment and high youth employment rates, as well as high activity and employment rates for older people.

Table 10 - Correlations between elderly activity and employment rates and youth unemployment and employment rates in different decades

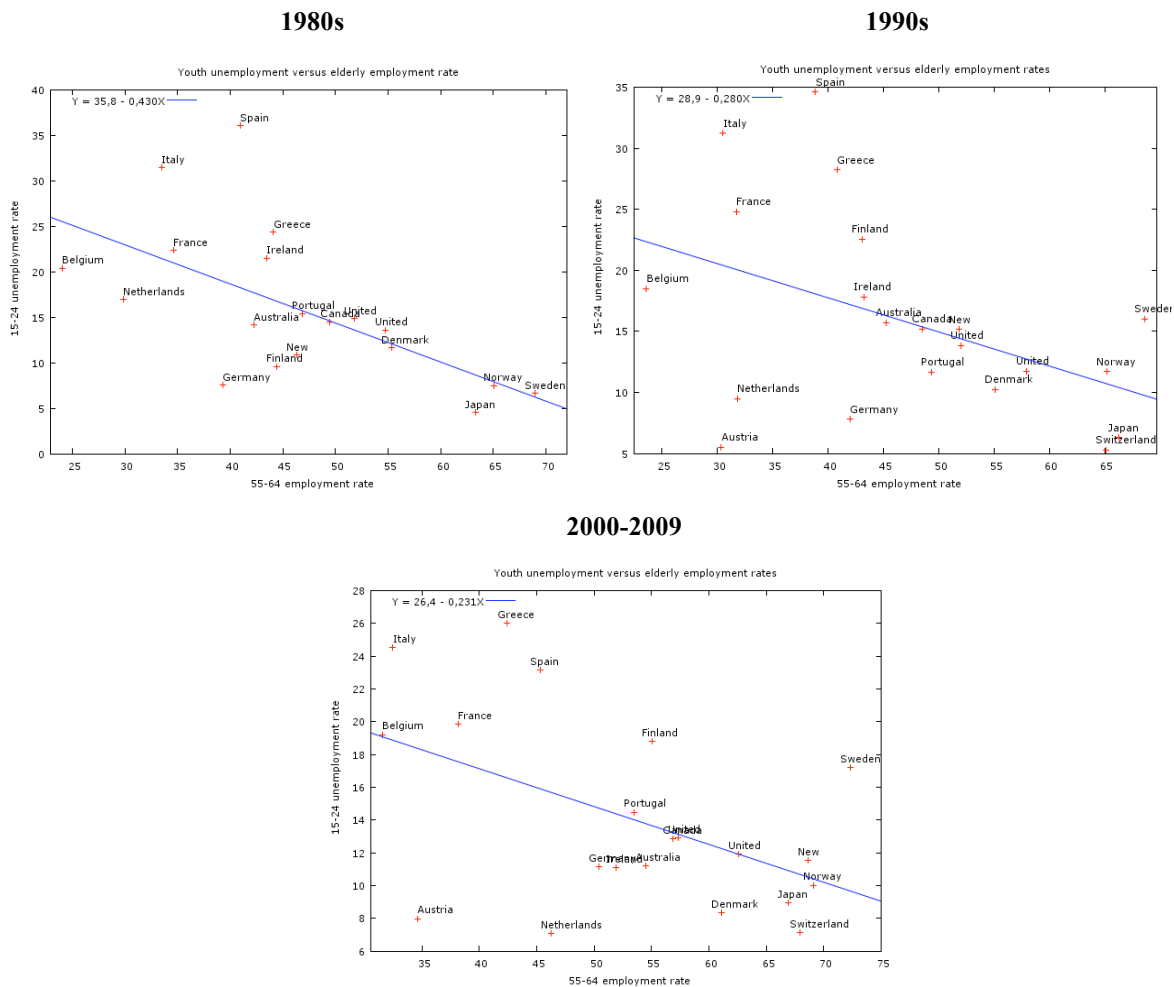
Elderly Activity rate	Elderly Employment rate	
1980-1990		
-0,5729	-0,5601	Youth Unemployment rate
0,5487	0,5696	Youth Employment rate
1990-2000		
-0,4884	-0,4591	Youth Unemployment rate

0,5156	0,5112	Youth Employment rate
2000-2009		
-0,4363	-0,4156	Youth Unemployment rate
0,5500	0,5330	Youth Employment rate
2009-2012		
-0,4447	-0,5352	Youth Unemployment rate
0,5880	0,6425	Youth Employment rate

Correlations between youth labour market outcomes and elderly activity and employment rates seem to confirm the complementary nature of the youth / old relationship, rather than the existence of substitution (Table 10).

Going beyond averages and considering sub-periods (1980s, 1990s, 2000-2009 and the crisis period in 2009-2012) it is possible to show that employment and unemployment for both age groups go always hand in hand.

Figure 29 – Youth / old labour market relationship: ‘80s, ‘90s, 2000-2009



Source: Own elaboration on OECD data

Youth unemployment is in fact negatively related to elderly employment rates across all the considered sub-periods and, paradoxically, such relationship is strongest in the eighties, the period of most popularity of the “lump sum of labour” theory conducting to early retirement measures in Europe.

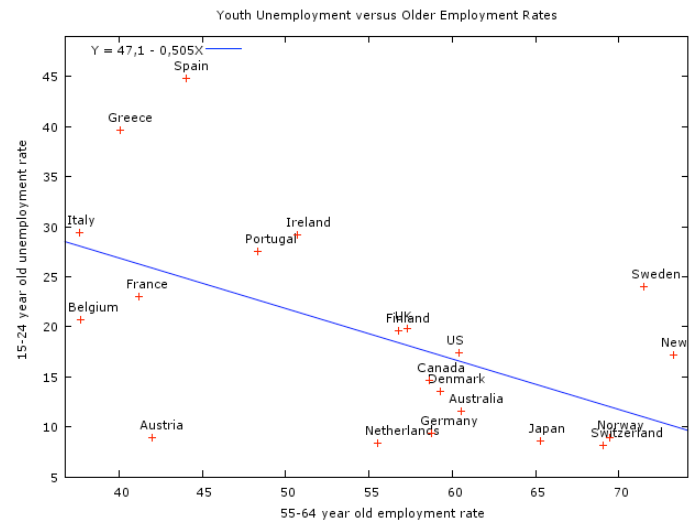
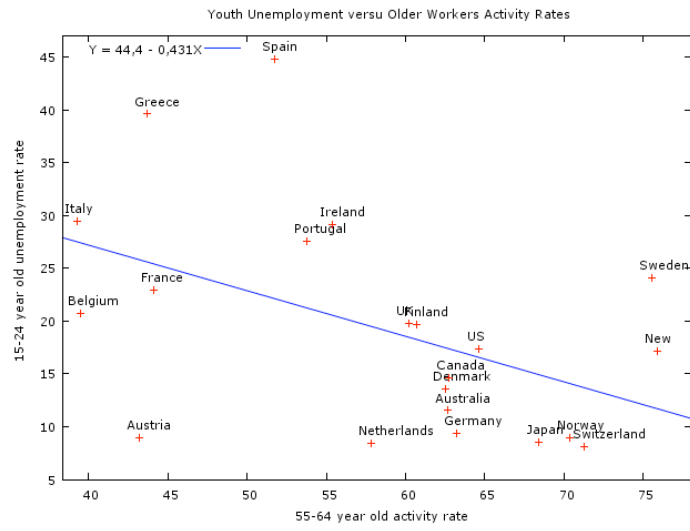
If one looks at the same relationships in different decades it becomes evident how correlations with respect to youth unemployment rate have been higher in the decade 1980-1990, while decreasing in subsequent decades (Figure 29).

Notwithstanding the fact that it is now clear that economies adapt to circumstances and that there is no a fixed-amount of jobs – the “lump of labour” has been defined the most famous fallacy of economics - the recent Italian proposal of work-sharing among generations may have its rational in the fact that countries that are experiencing zero-growth, as Italy, are also experiencing very slow job creation, so that a redistribution of existing jobs could benefit youth in the short-term, increasing their employment possibilities and reducing the scar of long-term unemployment.

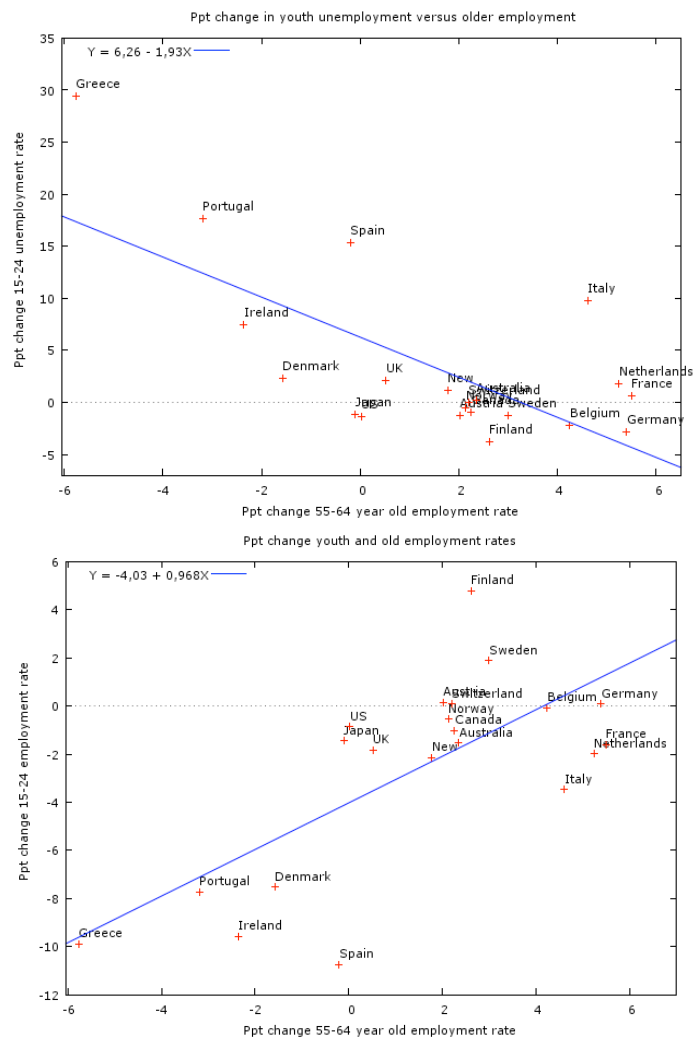
In order to see if this is the case, i.e. if young and older face more competition for jobs in times of crisis, one can observe above presented bilateral relationships focusing on the 2009-2012 period, both in levels and percentage point changes (Figure 30).

Figure 30 – Youth / old labour market relationship during the crisis

Levels, average 2009-2012



Ppt changes, 2009-2012



Source: Own elaboration on OECD

Bilateral relationships during the crisis do not support the crowding out hypothesis between youth and elderly. Indeed, Figure 30 shows that, also during the crisis, the relationship between youth unemployment and older participation rate is confirmed to be negative.

Both comparing levels (employment and unemployment rates of the two age groups) and also in terms of percentage points changes between 2009-2012, one can clearly observe the existence of a positive relationship between young and old employment outcomes also during the crisis.

Bilateral relationship between youth unemployment rate and old employment rate in terms of percentage points changes (2009-2012) is negative, suggesting that better

elderly employment outcomes during the crisis are connected to lower increases of youth unemployment rate.

If older workers were crowding out youth during the crisis one would have observed a positive relationship, with an increase of older workers employment implying an increase in youth unemployment. The same holds for the relationship between percentage point change of youth and old employment rates, with a positive relationship indicating that countries which experienced the best performance in terms of older employment were also the least hit in terms of youth employment loss, even though, in terms of magnitude of the effects, it is evident that youth carried the main burden of the crisis.

Between 2009 and 2012, youth employment rate decreased by over 10 percentage points in Greece, Ireland and Spain, while the impact on elderly employment rate was more limited (respectively -6, -2 percentage points and constant for Spain).

In many countries, youth and old employment rates have registered opposite trends, the former registering losses while the latter even increasing during the crisis (this happened in Australia, Belgium, Canada, France, Italy, the Netherlands, New Zealand, Norway, UK and US), probably connected to the higher presence of short-term contracts for youth and the higher stability and increase in retirement age on the elderly side.

In any case, though differences in magnitude do exist, the relationship that sees youth and old sharing a similar destiny in the labour market holds in the crisis, with youth unemployment rate that soared in those countries where also elderly unemployment rate did, and vice versa youth unemployment rate falling in countries where also elderly unemployment fell.

Once again, the strong correlation of employment outcomes between younger and older people does not support policies aiming at reducing older workers working times, or even anticipating their exit from the labour market in times of crisis.

Depicted evidence suggested intuitively the fact that the whole efficiency, dynamicity and well-functioning of the labour market (i.e. the capacity of the economic system of creating jobs) is of greater importance for youth labour market situation than this apparent “competition” between old and young and, therefore, early retirement and

work-sharing schemes between young and old people, as those proposed by the Italian Government, would be of little or negative effect.

2.2. Empirical evidence on the youth/old relationship across the OECD countries

As previously argued, common trends between youth and old employment and unemployment series are likely to be connected to the role of external factors shaping both of them. Simple bilateral relationship, though intuitive, needs therefore to be tested econometrically to provide a more robust evidence excluding the existence of a crowding-out effect.

Following Gruber, Milligan, Wise (2010) the relationship between youth and older workforce across OECD countries is assessed through different specifications.

Youth (15-24) and prime age (25-54) unemployment and employment rates are related to older (55-64) labour force participation and employment rates in order to test for the existence of substitution or complementarities and, in other words, to see if releasing elderly jobs in favour of the youth would be beneficial for youth labour market outcomes.

In order to account for differences among countries, the youth/old relationship is investigated in a fixed- country and year-effects framework, thus estimating:

$$Y_{youth,it} = \beta_0 + \beta_1(E_{old})_{it} + \beta_2 X_{it} + c_i + y_t + u_{it}$$

where:

i= country, t= years, Y= youth (and prime-age) unemployment and employment rate;

X=controls for cyclical and structural factors; c=country fixed effects, y=year effects.

Following Gruber, Milligan and Wise (2010), besides estimation in *(i) levels*, where employment and unemployment rates are regressed on contemporaneous levels of the explanatory variables, different specifications are also estimated in order to provide as sensitivity analysis: *ii) 3-year lag*: employment and unemployment rates of young (and prime-age) persons in a given year are regressed on the employment of older persons three years earlier³; *iii) 5-year differences*: the difference between youth unemployment

³ The other covariates are measured in the same year as the youth and prime-age employment and unemployment rates.

in a given year to youth unemployment 5 years earlier is related to the comparable 5-year differences in employment of older persons and 5-year difference in the other explanatory variables; *iv) 5-year log differences*: the same as the third specification, but in the logarithm.

As anticipated, in order to account for external factors that, affecting labour market in general and youth (and prime age) and older outcomes in particular could bias the estimates, controls for cyclical and structural characteristics of the economies are needed. This will be done by including controls for GDP per capita, GDP growth, proportion of manufacturing sector in value added of the economy and the share of people aged 15-24 in total population. Estimates are shown with and without controlling for these covariates.

Panel fixed-effect estimates of the effect of elderly activity/employment rates on younger generations unemployment and employment rates (young aged 20 to 24 and adults aged 25 to 54) are presented for 21 OECD countries - Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States - in two temporal periods: 1980-2009 and 2009-2012 (Table 11).

Table 11 - Panel fixed-effect estimates of the effect of elderly labour force participation on youth and prime-age unemployment and employment rates. 1980-2009

Specification	<i>Youth 20 to 24</i>		<i>Prime age 25 to 54</i>	
	<i>Unemployment Rate</i>	<i>Employment Rate</i>	<i>Unemployment Rate</i>	<i>Employment Rate</i>
Explanatory variable: Elderly activity rate				
No controls				
<i>Levels</i>	-0,34***	0,52***	-0,30***	0,34***
<i>3-year lag on elderly activity rate</i>	-0,12**	0,31***	-0,19***	0,19***
<i>5-year difference</i>	0,06	-0,07	-0,10***	0,15***
<i>5-year log difference</i>	-0,78***	-0,08	-0,78***	0,09***
With controls				
<i>Levels</i>	-0,32***	0,50***	-0,28***	0,35***
<i>3-year lag on elderly activity rate</i>	-0,04	0,23***	-0,16***	0,14***
<i>5-year difference</i>	0,04	-0,04	-0,11***	0,16***
<i>5-year log difference</i>	-0,78***	-0,09	-0,78***	0,09***

Explanatory variable: Elderly employment rate				
	No controls			
<i>Levels</i>	-0,19***	0,06*	-0,16***	0,43***
<i>3-year lag on elderly employment</i>	-0,17***	0,10**	-0,16***	0,39***
<i>5-year difference</i>	0,25***	-0,25***	-0,05**	0,10***
<i>5-year log difference</i>	0,98***	-0,20***	-0,48***	0,06***
	With controls			
<i>Levels</i>	-0,12**	0,34***	-0,17***	0,24***
<i>3-year lag on elderly employment</i>	0,02	0,16**	-0,08**	0,06
<i>5-year difference</i>	0,21***	-0,16**	-0,06***	0,13***
<i>5-year log difference</i>	1,27***	-0,26***	-0,61***	0,08***

Each coefficient indicates the expected change (in percentage points) in youth unemployment rate resulting from a one unit increase in the independent variable.

*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively.

All regressions contain a constant t-statistics in absolute terms in brackets.

Note: Specifications with controls include GDP per head divided by 1000, GDP growth and share of manufacturing in total economies' value added.

The key explanatory variables are the activity and employment rates of persons 55 to 64. Specifications with controls also include covariates for GDP per capita, the growth in GDP, the proportion of the economy in manufacturing and the share of youth population.

In addition, country-specific effects are included in order to control for country-specific attributes that, in addition to the covariates, affect the employment and the unemployment of youth. Similarly, estimates also include year effects that capture attributes that are common to all countries in a given year.

Table 11 shows the estimated effect of the activity and employment of persons 55 to 64 on the unemployment and the employment of youth 20 to 24, and on the unemployment and employment of prime-age persons 25 to 54.

The first key result is that in all significant estimates, both with and without controls, the elderly activity and employment rate is associated with *lower* youth unemployment and *higher* youth employment rates, that is to say, an increase in the employment of older persons is estimated to decrease the unemployment rate of youth (and prime age persons) and to increase the employment rate of youth (and prime-age persons). The only estimate that does not follow this pattern is the estimated effect of elderly employment on youth unemployment in the “5-year difference” and “5-year log difference” specifications with and without controls, the estimated effect being not

statistically different from zero. Similarly Gruber, Milligan and Wise (2010) found in their analysis one exception in the lagged specification (in their case was the 3-year difference). In any case, such opposite result concerning the 5-year differences estimates (with and without logarithm) disappears when the dependent variable is prime-age.

More in detail, the empirical analysis suggests that, controlling for cyclical and structural factors, a one percentage point increase in the activity rate of older persons corresponds to a decrease between -0,32 and -0,78 percentage points in the youth unemployment rate, while without controls the corresponding decrease is between -0,12 and -0,78 percentage points.

Looking at youth employment rate as dependent variable, estimates with controls indicate that a one percentage point increase in the activity rate of older persons increases the employment rate of youth between 0,50 and 0,23 percentage points (+0,52 and +0,31 in the specification without controls).

The same holds with regards to prime-age persons, with the signs that are all coherent with those of the youth specifications, though slightly lower in coefficients.

In conclusion, the panel fixed-effect analysis provides no support for the existence of competition and substitution between young and old in the labour markets, while the contrary is true, that is to say that increasing activity rates of the older is connected with more job opportunities also for the younger, presumably through lower tax rates connected to lower retirement costs. The positive relationship is of course not consistent with the boxed economy proposition underlying the lump of labour fallacy.

Adding to Gruber, Milligan and Wise (2010), who were not considering specifically the crisis period, Table 12 shows estimates for the years 2009-2012. In fact, since work sharing and early retirement policies are most common during crisis periods, the youth/old relationship is re-estimated for the years from 2009 to 2012, both considering variables in levels and percentage point changes, in order to see if youth are crowded out by old in the crisis.

Table 12 - Panel fixed-effect estimates of the effect of elderly labour force participation on youth and prime-age unemployment and employment rates (in levels). 2009-2012

	<i>Youth 20 to 24</i>	<i>Prime age 25 to 54</i>
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Specification	<i>Unemployment Rate</i>	<i>Employment Rate</i>	<i>Unemployment Rate</i>	<i>Employment Rate</i>
	No controls			
Elderly activity rate (levels)	-1,29***	0,66**	-0,55***	0,46***
	Controls			
Elderly activity rate (levels)	-0,91***	0,54**	-0,28*	0,25**
	No controls			
Elderly employment rate (levels)	-1,82***	1,07***	-0,44***	0,35***
	Controls			
Elderly employment rate (levels)	-1,32***	0,88***	-0,49***	0,41***

Each coefficient indicates the expected change (in percentage points) in youth unemployment rate resulting from a one unit increase in the independent variable.

*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively.

All regressions contain a constant t-statistics in absolute terms in brackets.

Note: Specifications with controls include GDP per head divided by 1000, GDP growth. Specification without controls include time effects.

Table 13 - Panel fixed-effects estimates of the labour force participation of persons 55 to 64 on younger unemployment and employment rates (percentage point changes). 2009-2012

Specification	<i>Youth 20 to 24</i>		<i>Prime age 25 to 54</i>	
	<i>Unemployment Rate</i>	<i>Employment Rate</i>	<i>Unemployment Rate</i>	<i>Employment Rate</i>
	Explanatory variable: Elderly activity rate			
	No controls			
Levels	0,91 ***	-0,78***	-0,45	0,20**
	Controls			
Levels	12,58	0,20	-0,05	0,13
	Explanatory variable: Change elderly employment rate			
	No controls			
Levels	-1,06***	0,92***	-0,00	0,002***
	Controls			
Levels	-0,68**	0,54**	-0,00	0,001**

Note: Specifications with controls include GDP per head divided by 1000, GDP growth and share of manufacturing in total economies' value added.

The presented set of estimates (Table 12 and Table 13) confirms the existence of a complementary relationship between younger and older labour market outcomes also for the crisis period (2009-2012), failing to support evidence for the crowding out hypothesis.

All specifications in levels (Table 12), with and without controls, show a positive and significant relationship between youth and elderly labour market outcomes, with elderly activity and employment that are associated with *lower* youth unemployment

and *higher* youth employment rates. Also during the economic crisis, an increase in the employment of older persons is estimated to decrease the unemployment rate of youth (and prime age persons) and to increase the employment rate of youth (and prime-age persons).

Also in terms of percentage point changes (Table 13), the regression analysis confirms that better developments for the elderly are connected with better outcomes also for youth.

This test adds to the existing literature shedding light on the relationship between youth and old during the crisis. Showed evidence contrasts recent policy proposals gathering the idea that in order to lower the youth unemployment, jobs have to be released from older to younger generations. On the contrary, the analysis provides support of the fact that elderly labour force participation and employment is needed for the sustainability of public finances and the social security system.

3. Empirical evidence on the youth/old relationship across European countries at the regional level

The above presented analysis shed light on cross-country relationship at the national level between younger and older generations, confirming the fallacy of the “lump sum of labour” theory and the fact that younger and older generations seem to share a common trend in the labour market, which make them complementary rather than substitute.

However, what appears to be true at the cross-country state level, might be contradicted using regional data.

Therefore, the youth/old analysis is repeated now at regional level (Nuts-2, source: Eurostat) for some European countries: Austria, Belgium, Denmark, Finland, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland, Portugal, UK.

The specification at country regional level is meant to show if the observed youth/old relationship is confirmed also using a different sample which include regional data and thus to provide further confirmation of previous findings. This sample of analysis includes 318 European regions (see the list in Appendix) from 1999 to 2012. In order to take into account the economic crisis, the analysis is done for two sub-periods - 1999-

2009 and 2009-2012 - separately. Moreover, differently from previous cross-country estimates, the dependent variable here refers from youth from 15 to 24 years old, due to different data availability.

Table 14 - Panel estimates of the effect of the labour force participation of persons aged 55 to 64 on the unemployment rate and employment rate of younger persons (15-24 year old) at the European regional level (Nuts-2). 1999-2009

<i>Specification</i>	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	0,091 [5,65]***	0,03 [2,61]***
Country dummies	<i>yes</i>	<i>yes</i>
Time dummies	<i>no</i>	<i>no</i>
Observations	3210	3235
Number of regions	316	318
Adj. R2	0,825843	0,951418
Controls		
Elderly activity rate	-0,00 [0,08]	0,16 [8,53]***
Country dummies	<i>yes</i>	<i>yes</i>
Time dummies	<i>yes</i>	<i>yes</i>
Observations	2640	2641
Number of regions	282	282
Adj. R2	0,856222	0,960055
No controls		
Elderly employment rate	0,03 [2,26]**	0,06 [5,52]***
Country dummies	<i>yes</i>	<i>yes</i>
Time dummies	<i>no</i>	<i>no</i>
Observations	3210	3235
Number of regions	316	318
Adj. R2	0,824229	0,951810
Controls		
Elderly employment rate	-0,07 [3,10]***	0,21 [11,04]***
Country dummies	<i>yes</i>	<i>yes</i>
Time dummies	<i>yes</i>	<i>yes</i>
Observations	2640	2641
Number of regions	282	282
Adj. R2	0,856811	0,960849

Each coefficient indicates the expected change (in percentage points) in youth, adult, elderly unemployment rate resulting from a one unit increase in the independent variable.

*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively.

All regressions contain a constant t-statistic in brackets in absolute terms.

In the 1999-2009 period at the overall regional European level (including 318 regions) the relationship between youth and old is less clear cut compared to the cross-country (state level) evidence showed in the previous analysis (Table 14).

In fact, when considering regional data, it is possible to find little evidence of a possible crowding out effect, according to which young and old people would be substitute and “competitors” in the labour market.

Indeed, youth unemployment rate is estimated to be positively related to elderly activity and employment rates (and not negatively, as previously observed), thus suggesting that the higher the activity and employment levels of people aged 55-64, the higher the level of youth unemployment. However, in the specification with controls one can reject the crowding-out hypothesis, with elderly employment rate having the negative expected sign.

Higher youth employment rates go hand in hand with higher activity and employment rates of the elderly, as previously observed for the sample of 21 OECD countries, thus rejecting again the crowding out hypothesis. The results are mainly confirmed at maximum level of significance in all specifications.

Results at the European regional level strongly contradict the crowding out hypothesis, thus confirming previous result of the positive impact of elderly activity and employment rates for youth labour market outcomes. In particular, a one percentage point increase in the elderly employment rate corresponds to a change of -0,07 percentage points in the youth unemployment rate and a change between 0,06 and 0,21 percentage points increase in the youth employment rate. Finally, a one percentage point increase in elderly activity rate is connected to a change between 0,03 and 0,16 percentage points in youth employment rate.

The idea that young and old are challenging for a fixed amount of jobs in the economy maybe more realistic in a period of jobless growth and recession, in which existing jobs may be shared among different age groups. To this end, estimates referring to the economic crisis period (2009-2012) are also reported (Table 15) in order to check if crowding out evidence at the European regional level may be found during the crisis.

Table 15 - Panel estimates of the effect of the labour force participation of persons aged 55 to 64 on the unemployment rate and employment rate of younger persons (15-24 year old). 2009-2012 period

<i>Specification</i>	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	0,12 [1,88]*	-0,19 [5,51]***

Country dummies	<i>yes</i>	<i>yes</i>
Time dummies	<i>no</i>	<i>no</i>
Observations	1263	1272
Number of regions	316	318
Adj. R2	0,871581	0,969809
Controls		
Elderly activity rate	-0,05 [0,61]	0,15 [1,97]**
Country dummies	<i>yes</i>	<i>yes</i>
Time dummies	<i>yes</i>	<i>yes</i>
Observations	592	592
Number of regions	297	297
Adj. R2	0,958544	0,983529
No controls		
Elderly employment rate	-0,341678 [5,31]***	0,02 [0,59]
Country dummies	<i>yes</i>	<i>yes</i>
Time dummies	<i>no</i>	<i>no</i>
Observations	1263	1272
Number of regions	316	318
Adj. R2	0,874841	0,968855
Controls		
Elderly employment rate	-0,17 [2,01]**	0,25 [3,55]***
Country dummies	<i>yes</i>	<i>yes</i>
Time dummies	<i>yes</i>	<i>yes</i>
Observations	592	592
Number of regions	297	297
Adj. R2	0,959066	0,984005

Each coefficient indicates the expected change (in percentage points) in youth, adult, elderly unemployment rate resulting from a one unit increase in the independent variable.

*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively.

All regressions contain a constant t-statistic in brackets in absolute terms.

Overall, as shown in Table 15, no evidence of crowding out effect from older to younger generation can be found at the European regional level during the crisis.

The employment rate of older people is always associated with positive youth labour market outcomes (lower unemployment and higher employment rates), thus rejecting the fact that youth and old would be substitutes in the labour market, with the latter crowding out the former as in the “lump sum of labour” framework.

4. Within-country estimates of the relationship between the employment of the old and the young at the European regional level

Observed evidence has shown the complement nature of the youth / old relationship in the labour market at the OECD and European regional level, excluding the existence of substitution or crowding out effect from older to younger generations. The analysis

referred to cross-country comparisons, but such aggregation could mask different relationships existing within country.

In what follows, the “youth-in-old-out” hypothesis is tested within each European country analysed (Austria, Belgium, Denmark, Finland, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland, Portugal, UK) using regional data (Nuts-2) over the 1999 – 2009 period. For each country, first, correlations and scatterplot are provided in order to intuitively show the youth / old relationship; descriptive evidence is then assessed through panel fixed-effect estimations of the effect of elderly activity and employment on youth unemployment and employment following previous model. As previously mentioned, the characteristics of the economy and other structural factors are likely to drive both youth and old outcomes; therefore, in order to take into account the role of external factors, besides country and time fixed-effects, controls for GDP per capita, the industry share in total value added and the youth share in total population are also included.

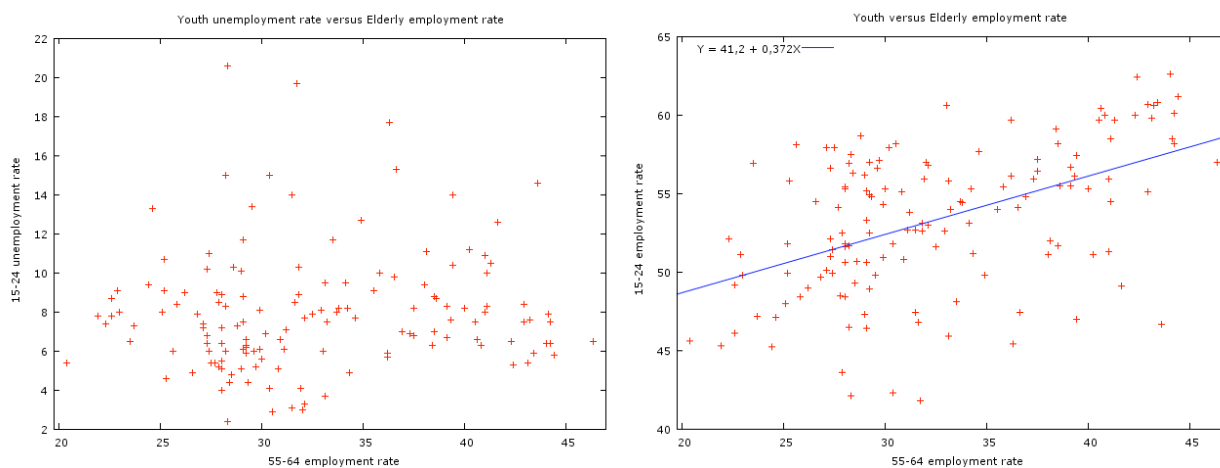
In **Austria** one cannot find support for the crowding out hypothesis at the regional (Nuts 2) level from 1999 to 2009.

Table 16 - Correlations between youth and old labour market outcomes in Austria

55-64 activity rate	55-64 employment rate	
0,5836	0,6310	15-24 activity rate
0,4404	0,4962	15-24 employment rate
0,1318	0,0871	15-24 unemployment rate

In fact, even though correlations in Table 16 show that elderly activity is slightly positively correlated with youth unemployment (0,13), larger correlations can be found between elderly and youth activity and employment rates, suggesting that a greater presence of old people in the labour market is correlated with better outcomes for youth across Austrian regions.

Figure 31 – Youth / old labour market relationship in Austria



Depicted graphical evidence also shows the positive relationship between the employment rates of people aged 55-64 and 15-24, while no relationship is showed between the elderly employment and youth unemployment rate.

Table 17 - Panel fixed-effect estimates of the youth/old relationship

Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	0,08**	0,31***
Controls		
Elderly activity rate	-0,02	0,06
No controls		
Elderly employment rate	0,09***	0,30***
Controls		
Elderly employment rate	0,00	0,04

In the econometric test, even though higher elderly activity and employment rates are linked to higher youth unemployment rate in the specifications without controls, in those including controls the effect is no longer statistically significant, thus rejecting the crowding out hypothesis. Older participation and employment seems instead to be connected to higher youth employment rates, even though the evidence turns not significant when controlling for covariates, as expected by the economic literature.

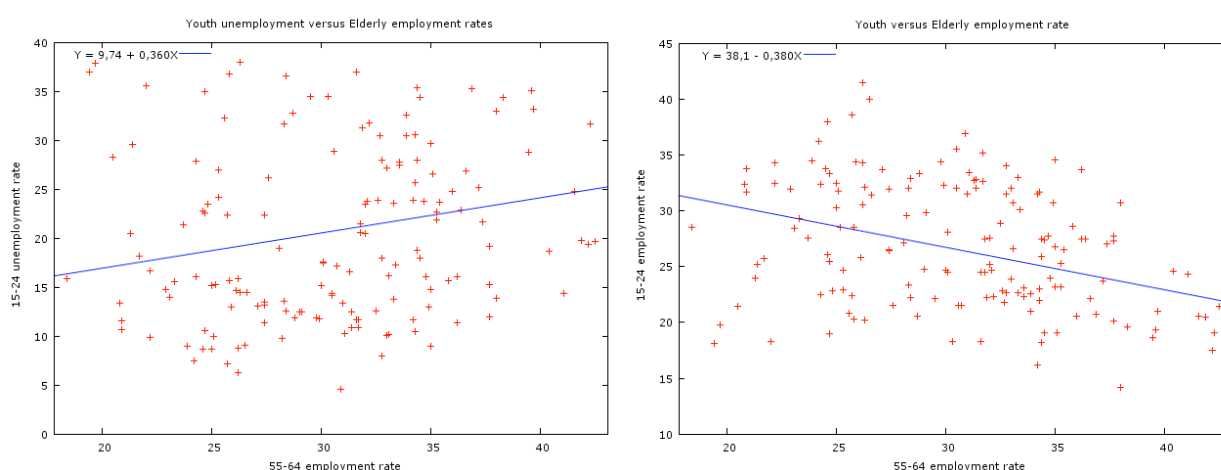
In **Belgium**, correlational evidence shows instead some support to the crowding out hypothesis, since elderly participation in the labour market, both in terms of higher activity and employment rates, is found to be negatively correlated to youth activity and employment indicators. Similarly, elderly activity and employment rates are positively

correlated to youth unemployment rates, thus suggesting that regions where the elderly are active the most in the labour market are characterised by higher levels of youth unemployment.

Table 18 - Correlations between youth and old labour market outcomes in Belgium

55-64 activity rate	55-64 employment rate	
-0,4255	-0,4138	15-24 activity rate
-0,4093	-0,3749	15-24 employment rate
0,2775	0,2251	15-24 unemployment rate

Figure 32 – Youth / old labour market relationship in Belgium



Such relationships are also visible in the scatterplot in Figure 32, with youth unemployment rate positively related to elderly employment rate and youth employment rate negatively correlated with old employment rate.

Table 19 - Panel fixed-effect estimates of the youth/old relationship

Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	0,22***	-0,10***
Controls		
Elderly activity rate	0,11	-0,08
No controls		
Elderly employment rate	0,21***	-0,11***
Controls		
Elderly employment rate	0,10	-0,08

In Belgium it is possible to find a little more evidence of a possible crowding-out effect from older to younger generations. In fact correlations suggest that higher elderly activity and employment rate are connected to higher youth unemployment and lower youth employment. Correlations are also supported by two scatterplot which depict such apparent substitution effect between the two generation.

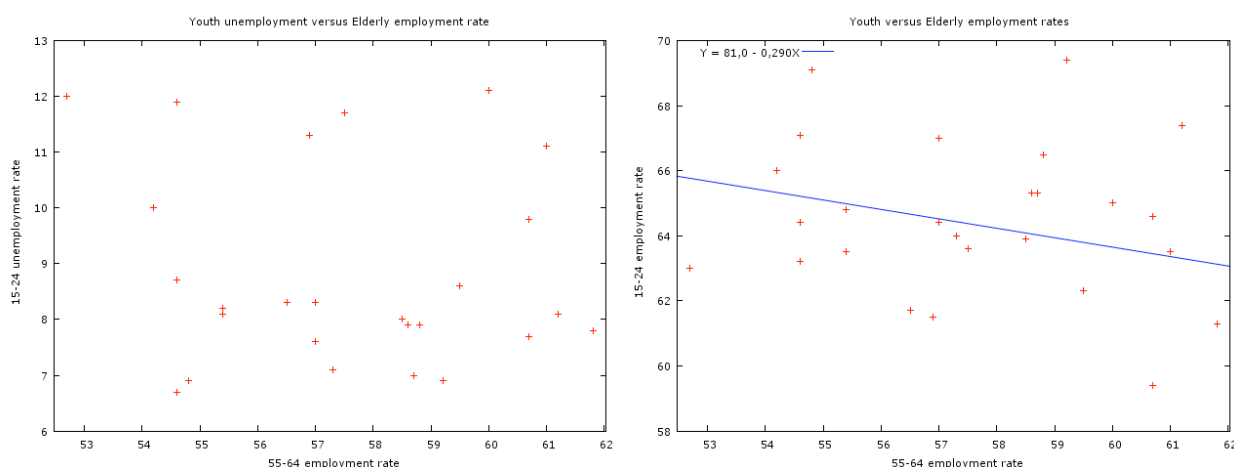
As also shown by the econometric analysis, in specifications without controls one can find evidence of substitution effect between youth and elderly in the labour market. However, when controlling for time-effects, GDP per capita, share of industry in total value added and share of youth in total population, estimates are no longer significant, thus failing to confirm the crowding out hypothesis and finally providing support on the complementarily nature of the youth/old labour market outcomes.

Evidence for **Denmark** has to be interpreted with caution because of missing data for all regions from 1999 to 2006 (only data from 2007 to 2009 are available).

Table 20 - Correlations between youth and old labour market outcomes in Denmark

55-64 activity rate	55-64 employment rate	15-24 activity rate
-0,4605	-0,3828	15-24 employment rate
-0,4109	-0,3031	15-24 unemployment rate
-0,0191	-0,1022	

Figure 33 – Youth / old labour market relationship in Denmark



Available observations indicate no correlation between older employment and youth unemployment and a negative relationship between elderly and youth employment.

Table 21 - Panel fixed-effect estimates of the youth/old relationship

Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	0,05	-0,60***
Controls		
Elderly activity rate	0,78***	0,17
No controls		
Elderly employment rate	-0,02	-0,59***
Controls		
Elderly employment rate	0,78*	3,15***

Note: Missing data

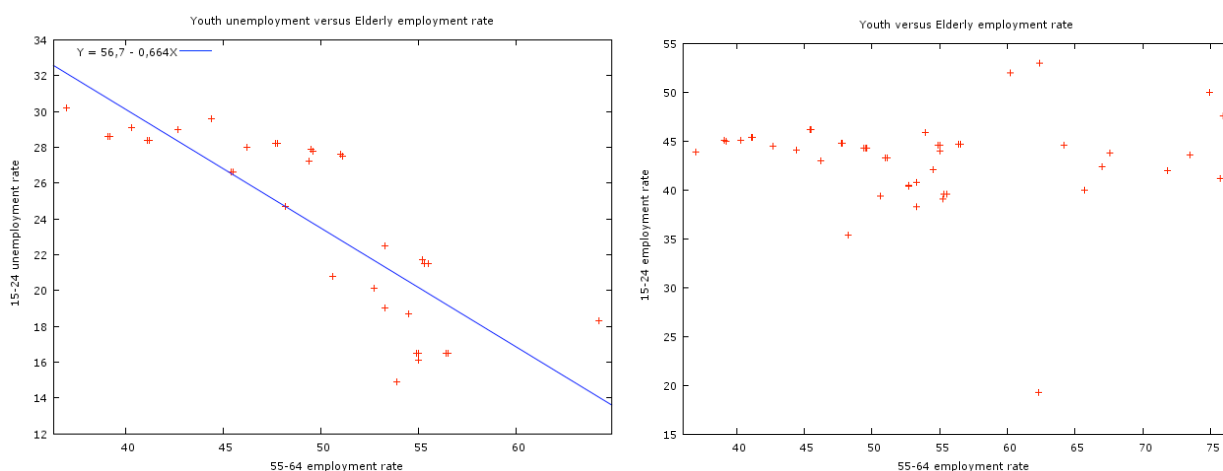
OLS estimate (not reported here) are not significant when youth unemployment is the dependent variable and supportive of the crowding out hypothesis when the dependent variable is youth employment. Fixed effects estimate instead result confused by missing data of the covariates and thus should be interpreted carefully, all in all finding little support for the crowding out hypothesis.

In **Finland**, at the regional level for the 1999-2009 period, youth and old labour market outcomes seems to go hand in hand, with no support for the crowding out hypothesis.

Table 22 - Correlations between youth and old labour market outcomes in Finland

55-64 activity rate	55-64 employment rate	
-0,3970	-0,3462	15-24 activity rate
-0,0533	-0,0030	15-24 employment rate
-0,8078	-0,8248	15-24 unemployment rate

Figure 34 – Youth / old labour market relationship in Finland



As it is possible to see from the depicted graphs, Finnish regions where elderly employment rate is higher are also those where youth unemployment rate is lower. It is not possible to find instead a similar relationship between older activity and employment rates and youth employment rates, in fact there seems to be no correlations among the variables.

Table 23 - Panel fixed-effect estimates of the youth/old relationship

Dependent variable	Youth Unemployment Rate	Youth Employment Rate
No controls		
Elderly activity rate	-0,75 ***	-0,12
Controls		
Elderly activity rate	-0,24	0,14
No controls		
Elderly employment rate	-0,73***	-0,01
Controls		
Elderly employment rate	-0,43	0,24

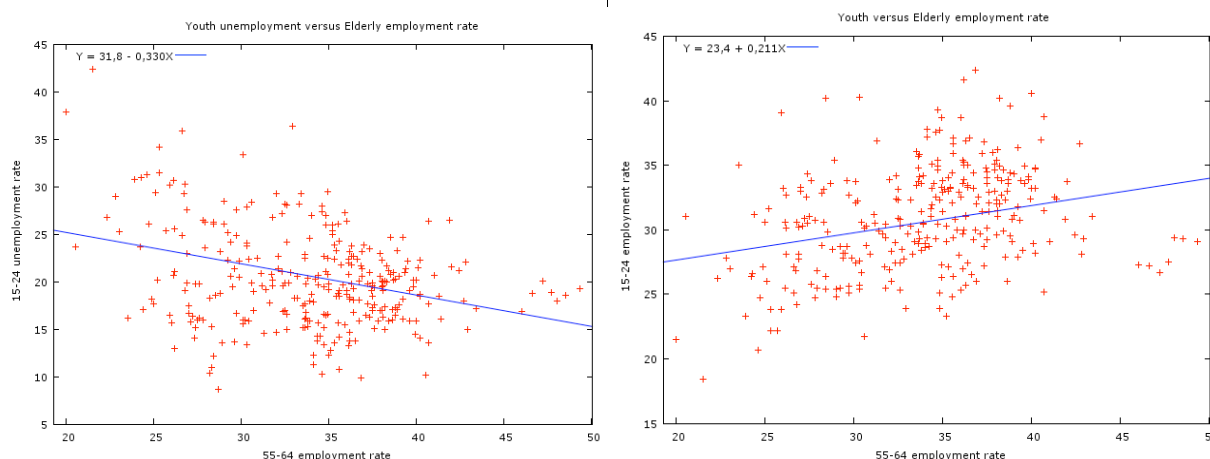
Results from the econometric analysis (also in the OLS specifications, though not reported in the table) do confirm the fact that youth and old in Finland are not rival in the labour market.

Also in **France** there is no sign of the “youth-in-old-out” hypothesis.

Table 24 - Correlations between youth and old labour market outcomes in France

55-64 activity rate	55-64 employment rate	
-0,1046	-0,0025	15-24 activity rate
-0,0169	0,1042	15-24 employment rate
-0,0200	-0,1381	15-24 unemployment rate

Figure 35 – Youth / old labour market relationship in France



Elderly employment is in fact reversely correlated to youth unemployment and positively correlated to youth employment, as shown by correlations in Table 24 and scatterplot in Figure 35.

Table 25 - Panel fixed-effect estimates of the youth/old relationship

Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	-0,14 ***	0,30***
Controls		
Elderly activity rate	0,03	0,05
No controls		
Elderly employment rate	-0,19***	0,31***
Controls		
Elderly employment rate	-0,07	0,07

Also the econometric analysis (Table 25) strongly reject the existence of a crowding out effect between youth and old in the labour market.

In **Germany** it is also possible to exclude the existence of “youth-in-old-out” effect between youth and old, as presented by correlations, graphs and econometric estimates.

Table 26 - Correlations between youth and old labour market outcomes in Germany

55-64 activity rate	55-64 employment rate	
0,3159	0,2548	15-24 activity rate
0,1832	0,2505	15-24 employment rate
0,1765	-0,0891	15-24 unemployment rate

Figure 36 – Youth / old labour market relationship in Germany

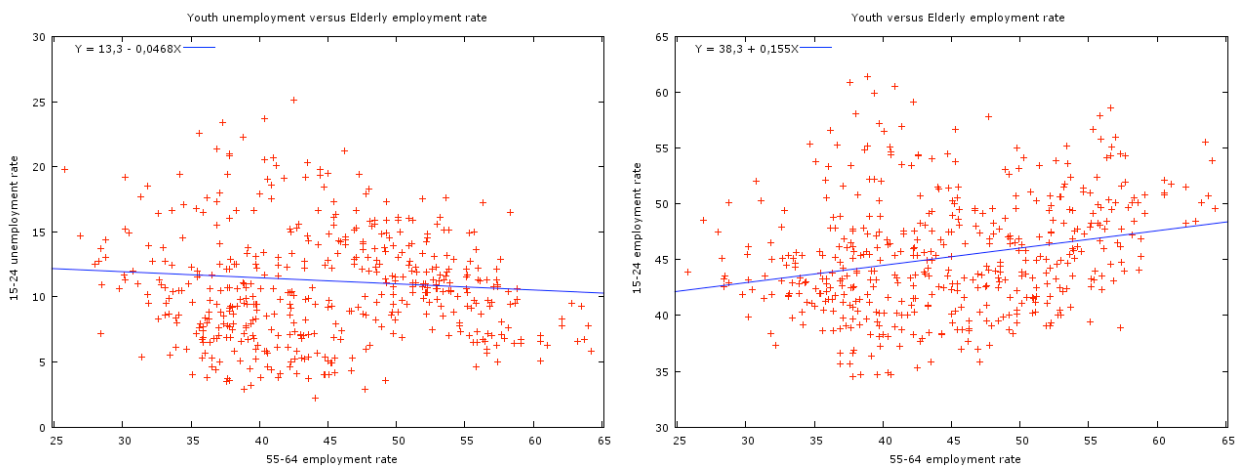


Table 27 - Panel fixed-effect estimates of the youth/old relationship

Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	0,16***	0,02*
Controls		
Elderly activity rate	-0,01	0,10**
No controls		
Elderly employment rate	0,13***	0,04***
Controls		
Elderly employment rate	-0,01	0,11**

Even when elderly activity and employment rates are found to be connected with higher youth unemployment (as in Table 27, in the specifications without controls), when taking into account economic and demographic diversities among regions, such evidence disappears and the estimated sign turns negative though not significant. It is instead always (with and without controls) positive and significant the relationship between youth and old employment rates, again rejecting the crowding out hypothesis. Also in **Greece** one cannot find support for the existence of substitution between youth and elderly. Indeed correlations (Table 28), scatterplot (Figure 37) and the econometric analysis (Table 29) all support the positive relationship between youth and old labour market outcomes.

Table 28 - Correlations between youth and old labour market outcomes in Greece

55-64 activity rate	55-64 employment rate	
0,1838	0,1809	15-24 activity rate
0,2798	0,2747	15-24 employment rate
-0,2536	-0,2520	15-24 unemployment rate

Figure 37 – Youth / old labour market relationship in Greece

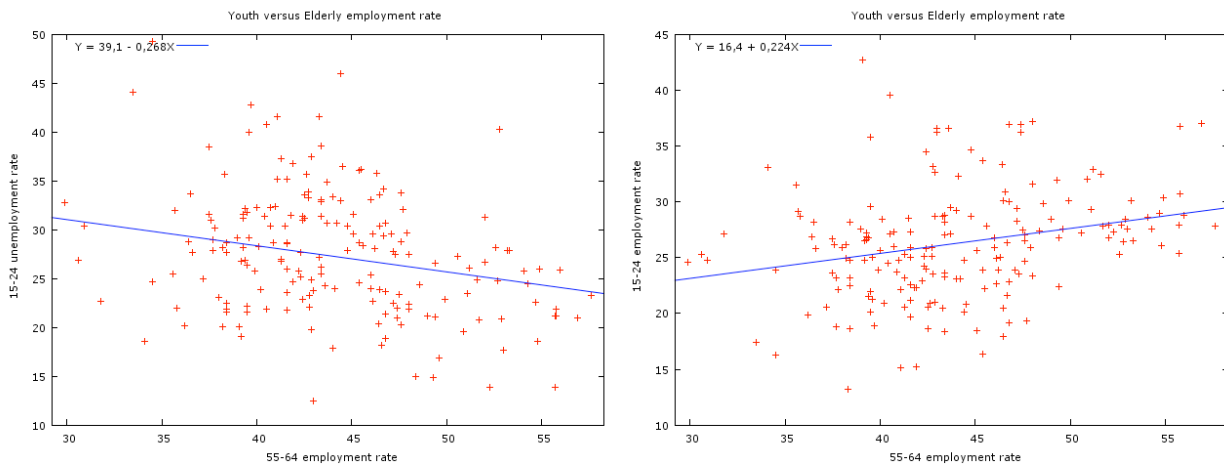


Table 29 - Panel fixed-effect estimates of the youth/old relationship

Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	-0,46***	-0,21**
Controls		
Elderly activity rate	-0,21	0,12
No controls		
Elderly employment rate	-0,45***	-0,17**
Controls		
Elderly employment rate	-0,21	0,15*

In **Ireland** at the regional level and for the years 1999-2009 it is as well not possible to find robust evidence of a crowding out effect from old to young people. In fact, even though correlations reveal that higher elderly participation in the labour market and employment outcomes are correlated with higher youth unemployment rates, the econometric analysis rejects the crowding out hypothesis.

Table 30 - Correlations between youth and old labour market outcomes in Ireland

55-64 activity rate	55-64 employment rate	
0,4252	0,5180	15-24 activity rate
0,0247	0,1818	15-24 employment rate
0,4199	0,2429	15-24 unemployment rate

Figure 38 – Youth / old labour market relationship in Ireland

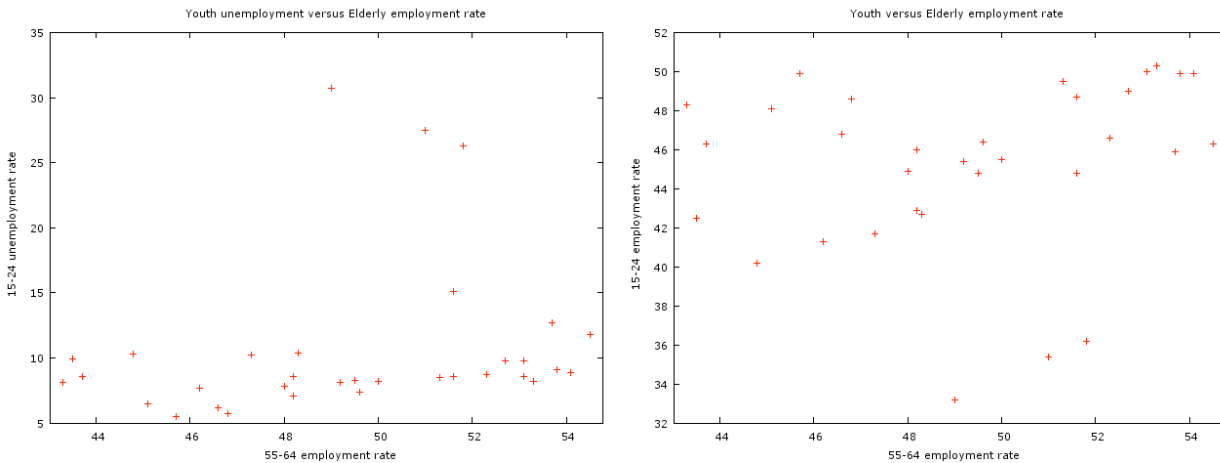


Table 31 - Panel fixed-effect estimates of the youth/old relationship

Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	0,75***	-0,01
Controls		
Elderly activity rate	-0,46*	-0,18
No controls		
Elderly employment rate	0,46*	0,18

Controls		
Elderly employment rate	-0,54**	0,00

Indeed, in the specifications without controls, higher elderly activity and employment rates are found to be related to higher youth unemployment. However, when controlling for the cyclical and structural characteristics of the economies, the expected negative sign emerges. No relationship, and no evidence of the “lump sum of labour” on the youth employment side.

Correlations and scatterplot for **the Netherlands** suggest no relationship between elderly participation in the labour market and youth unemployment, while showing evidence of a slightly positive relationship between 55-64 and 15-24 year old activity and employment rates, thus rejecting the crowding out hypothesis.

Table 32 - Correlations between youth and old labour market outcomes in the Netherlands

55-64 activity rate	55-64 employment rate	
0,2047	0,2257	15-24 activity rate
0,1520	0,1841	15-24 employment rate
0,0009	-0,0382	15-24 unemployment rate

Figure 39 – Youth / old labour market relationship in the Netherlands

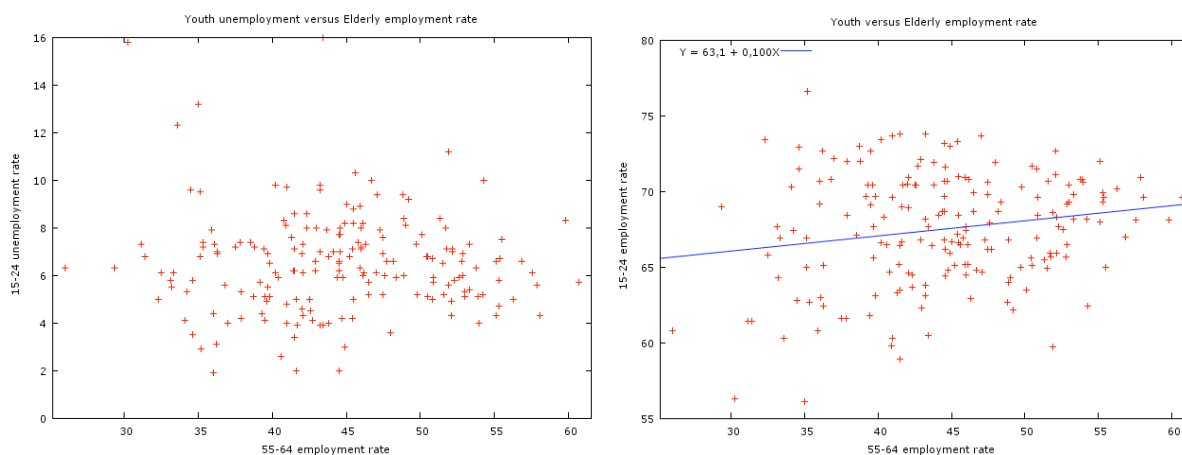


Table 33 - Panel fixed-effect estimates of the youth/old relationship

Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
Explanatory variable: Elderly activity rate		
No controls		
Levels	0,01	0,07**
Controls		
Levels	-0,00	-0,05
Explanatory variable: Elderly employment rate		

No controls		
Levels	0,00	0,09**
Controls		
Levels	-0,03	-0,00

Econometric estimates confirm the existence of no relationship between young and old labour market outcomes in the Netherlands, and so the fact that the two cannot be considered as substitute in the labour market.

Data for **Norway** also confirm the existence of complementarities, instead of substitution, between youth and old in the labour market, with negative correlation between elderly activity and employment rates and youth unemployment rate and no correlation with youth employment rate.

Table 34 - Correlations between youth and old labour market outcomes in Norway

55-64 activity rate	55-64 employment rate	
-0,1603	-0,1513	15-24 activity rate
0,0245	0,0357	15-24 employment rate
-0,3750	-0,3790	15-24 unemployment rate

Figure 40 – Youth / old labour market relationship in Norway

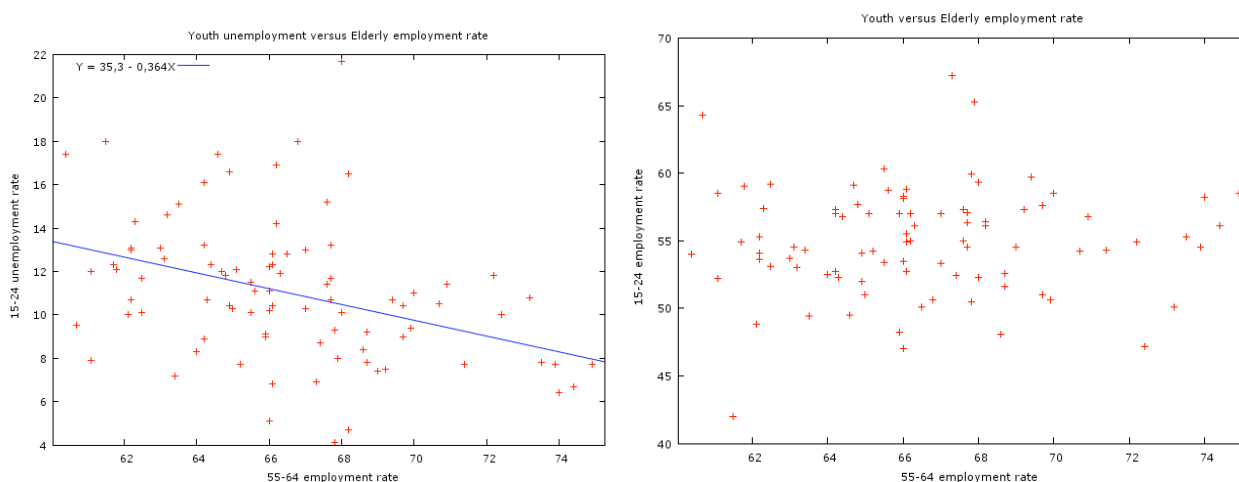


Table 35 - Panel fixed-effect estimates of the youth/old relationship

Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
Explanatory variable: Elderly activity rate		
No controls		
Levels	-0,34***	-0,33**
Controls		
Levels	-0,18	1,08
Explanatory variable: Elderly employment rate		
No controls		
Levels	-0,35***	-0,31**

Controls		
Levels	-0,25	0,94

Indeed graphs and econometric estimates fail to support the “Lump sum of labour” hypothesis for Norway, with higher older participation and employment rates that are linked with lower youth unemployment rates, the result being significant only in the specifications without controls, coherently with the literature. On the youth employment side, econometric estimates find a negative coefficient of elderly activity and employment rates, thus supporting a possible crowding out effect, but this disappears in the specifications with controls for covariates.

For **Portugal**, data show the existence of a possible crowding out effect from old to youth in the labour market. In fact, correlations describe a negative relationship between old and youth labour market outcomes, that is to say, where older activity and employment rates are higher, youth unemployment is also higher and youth employment is lower.

Table 36 - Correlations between youth and old labour market outcomes in Portugal

55-64 activity rate	55-64 employment rate	
-0,2863	-0,2630	15-24 activity rate
-0,3549	-0,2664	15-24 employment rate
0,2631	0,1197	15-24 unemployment rate

Figure 41 – Youth / old labour market relationship in Portugal

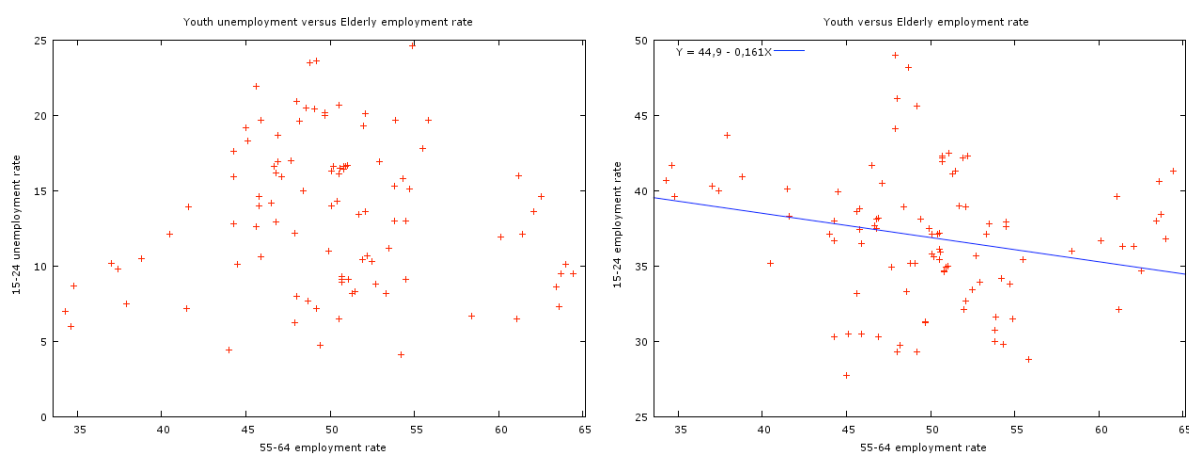


Table 37 - Panel fixed-effect estimates of the youth/old relationship

Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
	No controls	

Elderly activity rate	0,77***	-0,46***
Controls		
Elderly activity rate	0,17**	-0,04
No controls		
Elderly employment rate	0,49***	-0,18
Controls		
Elderly employment rate	0,16**	-0,03

Econometric estimates confirm a possible crowding out effect from older to younger generations. In fact higher elderly activity rate are associated to higher youth unemployment rate, the result being significant at 5% also in the specification including controls. Moreover, higher elderly participation in the labour market is also related to lower youth employment, though only in the specification without controls.

Descriptive statistics for **Spain** reject the fact that youth and old would be competitors in the labour market. This is pretty clear when looking at the correlations and at the scatterplot, showing that regions with higher older activity and employment rates are associated with lower youth unemployment and higher youth employment rates.

Table 38 - Correlations between youth and old labour market outcomes in Spain

55-64 activity rate	55-64 employment rate	
0,5202	0,4477	15-24 activity rate
0,4818	0,5352	15-24 employment rate
-0,1948	-0,3736	15-24 unemployment rate

Figure 42 – Youth / old labour market relationship in Spain

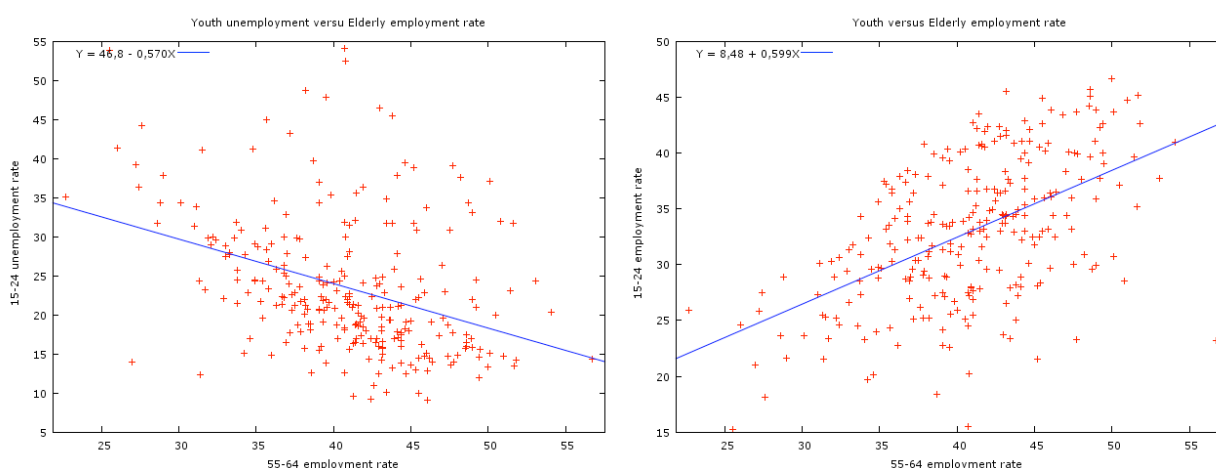


Table 39 - Panel fixed-effect estimates of the youth/old relationship

Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	0,12	-0,05

Controls		
Elderly activity rate	0,33**	-0,22***
No controls		
Elderly employment rate	-0,14	0,03
Controls		
Elderly employment rate	-0,01	-0,16**

From fixed-effect econometric estimates this is however less clear, because some support for the crowding out hypothesis can be found in the specifications including controls. Elderly activity rate is in fact positively and significantly related to youth unemployment rate and negatively and significantly related to youth employment rate (in the specification including controls). Similarly, elderly employment is found to be negatively and significantly related to youth employment (in the specification including controls).

Sweden represents an ambiguous case since elderly presence in the labour market is both connected to higher unemployment and higher employment of youth.

Table 40 - Correlations between youth and old labour market outcomes in Sweden

55-64 activity rate	55-64 employment rate	
0,6057	0,6711	15-24 activity rate
0,3345	0,4280	15-24 employment rate
0,2751	0,2230	15-24 unemployment rate

Figure 43 – Youth / old labour market relationship in Sweden

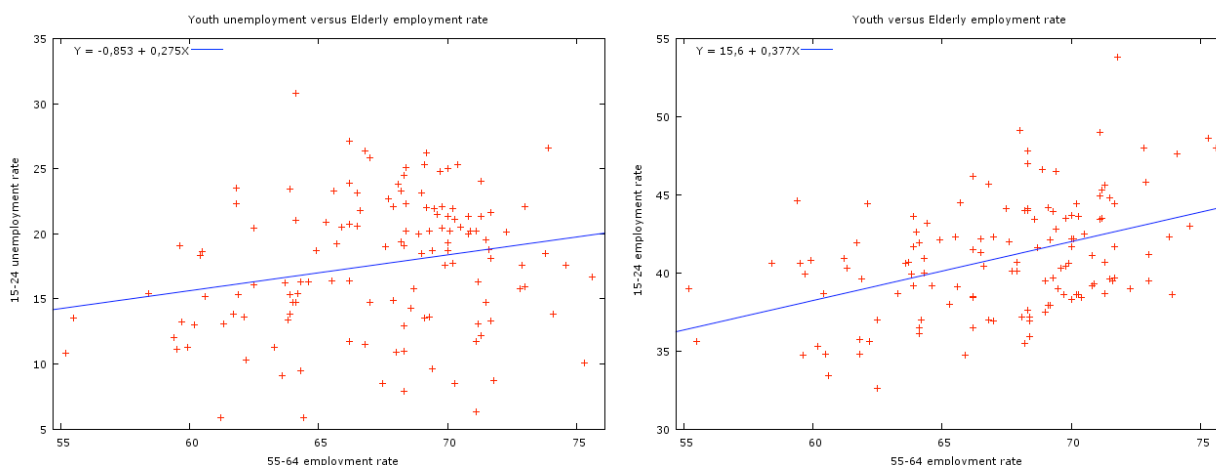


Table 41 - Panel fixed-effect estimates of the youth/old relationship

Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	-0,01	0,47***
Controls		

Elderly activity rate	0,14*	0,41***
No controls		
Elderly employment rate	-0,06	0,58***
Controls		
Elderly employment rate	0,16*	0,40***

Indeed, as it is possible to see from both correlations and scatterplot, Swedish regions that register higher elderly employment also register higher unemployment, thus providing evidence for the “lump sum of labour” hypothesis. However, elderly employment is also found to be connected to higher youth employment, thus rejecting that hypothesis. Panel fixed-effects estimates confirm such dualism reporting, on the one side, support the fact that elderly labour market participation and employment are connected with higher youth employment rates, but also with higher youth unemployment rates.

In **Switzerland** instead data do not provide evidence for the crowding out hypothesis.

Table 42 - Correlations between youth and old labour market outcomes in Switzerland

55-64 activity rate	55-64 employment rate	15-24 activity rate
0,8163	0,8358	15-24 employment rate
0,7936	0,8219	15-24 unemployment rate
-0,5522	-0,5952	

Figure 44 – Youth / old labour market relationship in Switzerland

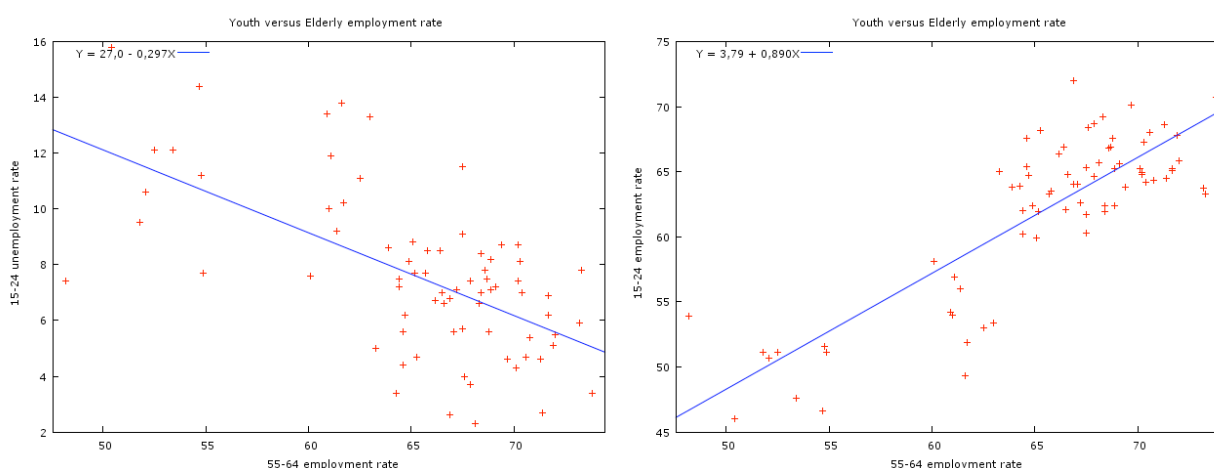


Table 43 - Panel fixed-effect estimates of the youth/old relationship

Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	0,01	-0,20
Controls		

Elderly activity rate	-0,05	-0,19
No controls		
Elderly employment rate	0,02	-0,12
Controls		
Elderly employment rate	-0,06	-0,09

Note: Controls for Switzerland do not include GDP per capita due to lack of data at the regional level

Fixed-effect estimates are not significant, showing no relationship between youth and elderly labour market outcomes and thus rejecting the “lump of labour” fallacy.

Finally, also for the **United Kingdom** the analysis fails to support the crowding out hypothesis between youth and old people.

Table 44 - Correlations between youth and old labour market outcomes in Switzerland

55-64 activity rate	55-64 employment rate	
0,3968	0,4187	15-24 activity rate
0,3912	0,4250	15-24 employment rate
-0,2151	-0,2579	15-24 unemployment rate

Figure 45 – Youth / old labour market relationship in the United Kingdom

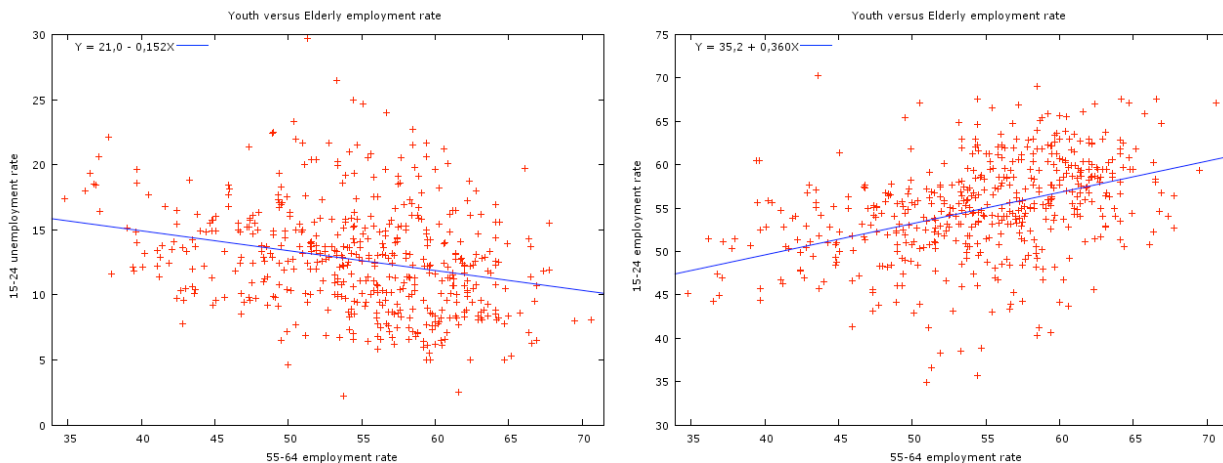


Table 45 - Panel fixed-effect estimates of the youth/old relationship

Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	-0,08**	0,09*
Controls		
Elderly activity rate	-0,07	0,06
No controls		
Elderly employment rate	-0,10**	0,08
Controls		
Elderly employment rate	-0,09**	0,05

Depicted evidence and fixed-effect estimates reject the “lump sum of labour” hypothesis by showing instead that elderly activity and employment rates (the latter also in the specification with controls) are inversely related to youth unemployment.

4.1. The Italian case study

As already mentioned, the Italian government - alarmed by the persistent high youth unemployment in the country - recently proposed a revisited version of the eighties and nineties early retirement policies called *Staffetta generazionale*, with a view that, in order to lower youth unemployment, jobs have to be released from older workers, specifically by reducing their working hours, from full- to part-time. Following this policy proposal, two of the most industrialised Italian regions (Lombardia and Emilia Romagna) have already adopted this idea with an estimated cost of 3 million euro each. It is therefore particularly interesting to show if the “lump of labour” prediction can be found in this country.

Eurostat data at Nuts-2 level are missing for several Italian regions from 1999 to 2003, thus reducing the time period to the years 2004-2009; a provincial level analysis based on ISTAT Labour Force Survey data is also provided in order to provide a more complete picture.

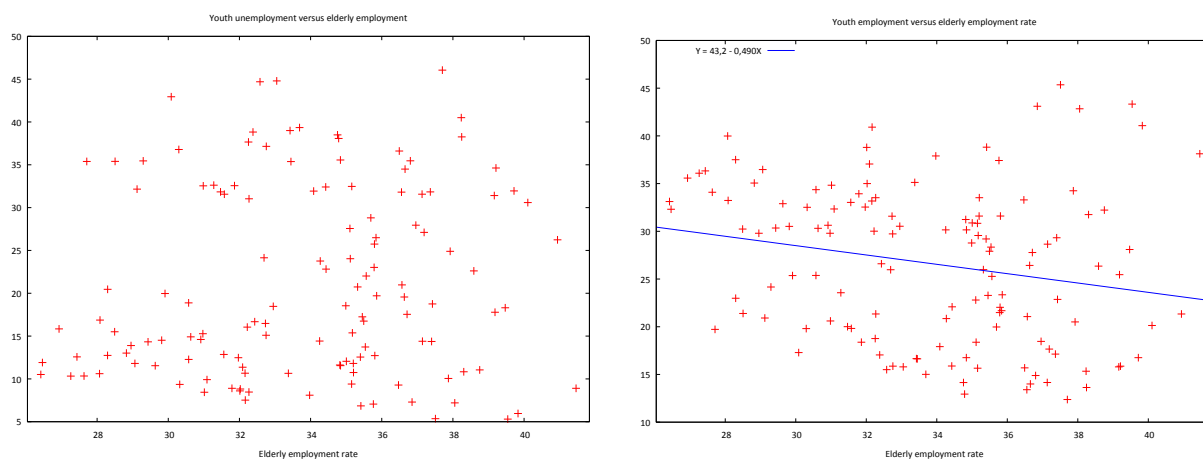
Table 46 shows the correlation matrix at the regional and provincial level between young and elderly labour market outcomes. Correlations provide some evidence of substitution or crowding out effect, with higher elderly activity and employment connected to lower youth activity and employment and to higher youth unemployment, both at the regional and provincial level.

Table 46 - Correlations between youth and old labour market outcomes in Italy

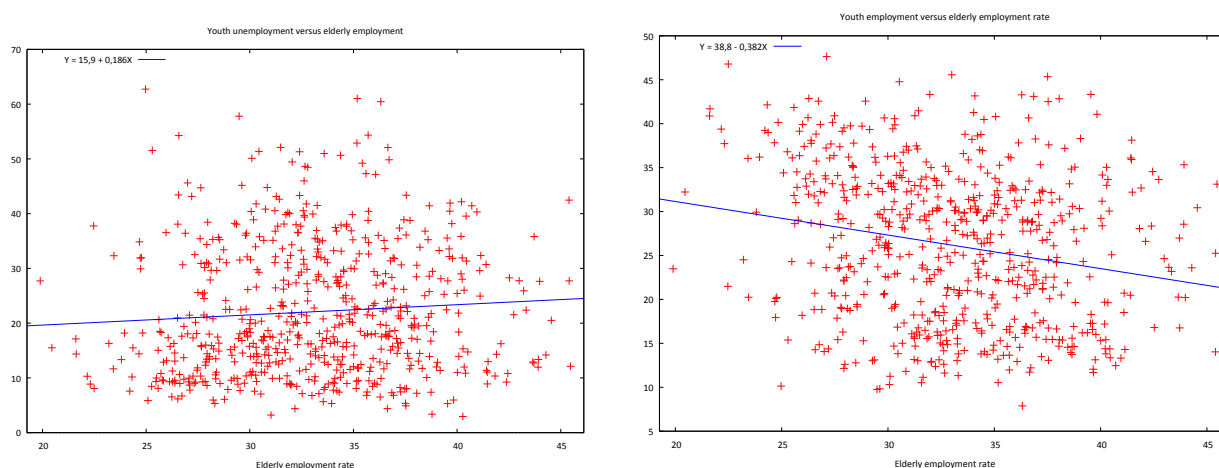
Regional level		
Elderly activity rate	Elderly employment rate	
-0,3753	-0,3002	15-24 Activity rate
-0,3069	-0,2123	15-24 Employment rate
0,2144	0,1035	15-24 Unemployment rate
Provincial level		
Elderly activity rate	Elderly employment rate	
-0,2972	-0,2625	15-24 Activity rate

-0,2675	-0,2109	15-24 Employment rate
0,1509	0,0749	15-24 Unemployment rate

Figure 46 – Youth / old labour market relationship in Italy
Regional level (2004-2009)



Provincial level (2004-2009)



The existence of a possible “lump sum of labour” effect in Italy between young and older worker is also clearly visible from the scatterplot at the regional and provincial levels. More in details, at the regional level youth unemployment rate seems to be not correlated to elderly employment rate, but youth employment is negatively correlated with elderly employment, suggesting that the regions where old people register higher employment are also those where young people register lower employment. At the provincial level, the crowding out prediction is confirmed, with higher elderly employment associated to higher youth unemployment and to lower youth employment.

Table 47 - Panel fixed-effect estimates of the youth/old relationship (provincial 2004-2012)

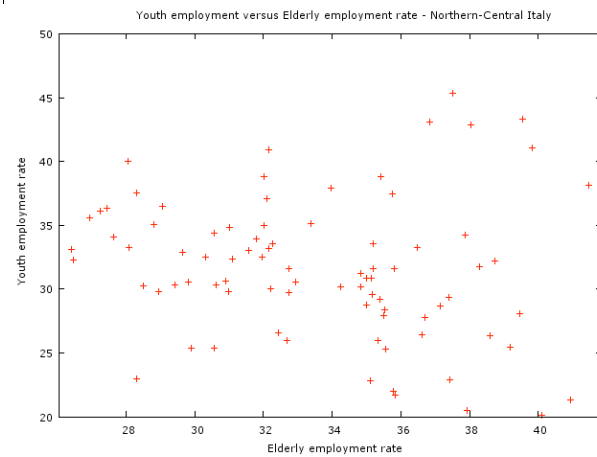
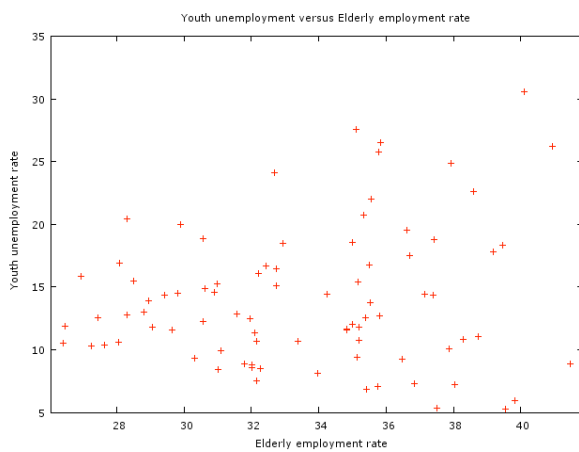
Regional level		
Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	0,57***	-0,20**
Controls		
Elderly activity rate	0,55 ***	-0,19*
No controls		
Elderly employment rate	0,50***	-0,19*
Controls		
Elderly employment rate	0,46**	-0,17
Provincial level		
Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	0,20***	-0,08*
Elderly employment rate	0,18**	-0,08*

Note: At the regional level in the specification including controls, the control for the share of industry in total value added is dropped because of missing data.

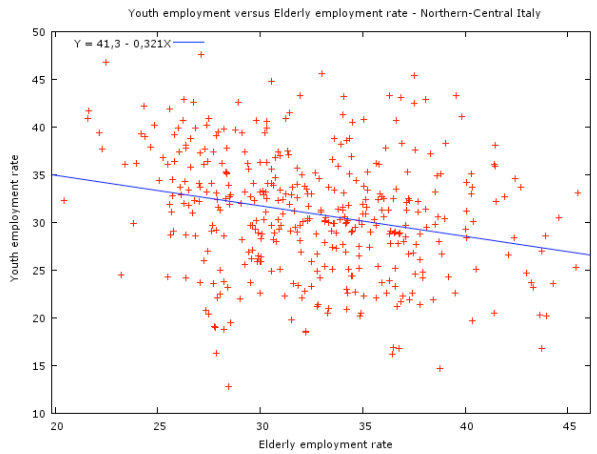
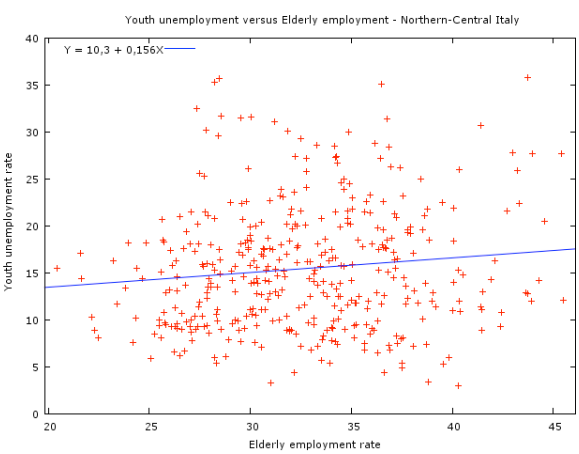
The econometric analysis at the regional level supports correlational and graphical indication of a possible crowding out effect from old to young generations. In fact, evidence for youth unemployment rate is supportive of the “lump of labour” hypothesis in all specifications, with and without controls, with coefficient estimated with a positive (instead of negative) sign and statistically significant at the 5% and 1% of significance. Evidence for youth employment is also quite supportive of the “lump sum of labour” hypothesis, with all negative (instead of positive) signs that are significant but one. Results are coherent with the estimates at the provincial level, even though only specifications without controls are available because of not availability of data at that level of detail.

Despite correlational and empirical analysis at the regional and provincial levels seem to suggest the existence of substitution between young and old people, such evidence may mask diverging relationships across Italian macro-regions, given the high economic disparity between the North and the South of Italy.

**Figure 47 – Youth / old labour market relationship in Northern-Central Italy
Regional level (2004-2009)**

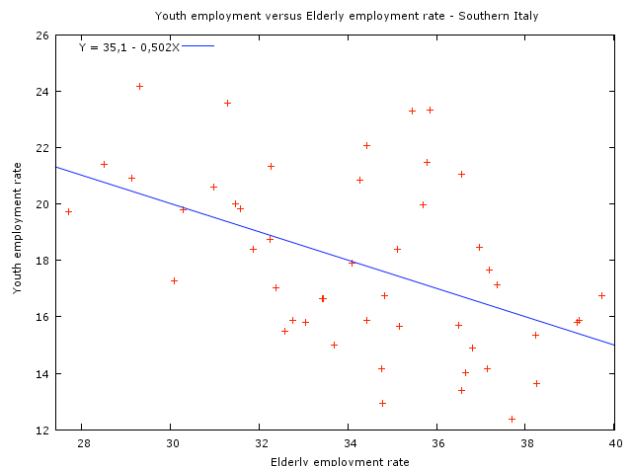
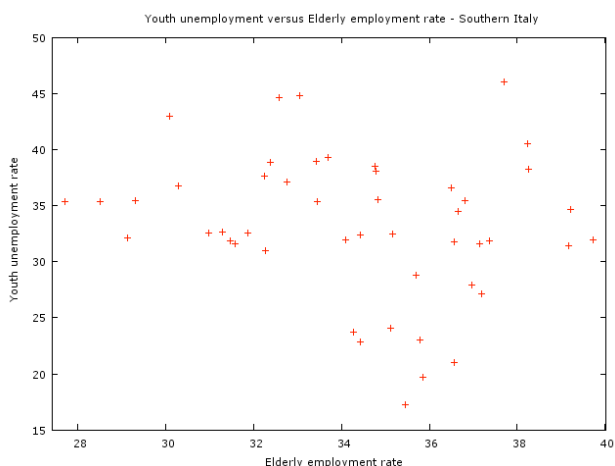


Provincial level (2004-2009)

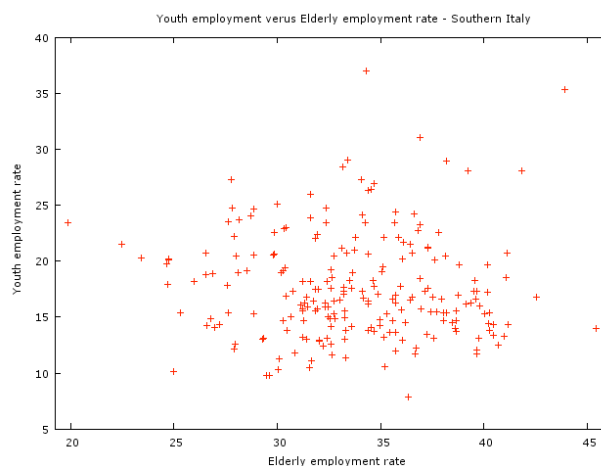
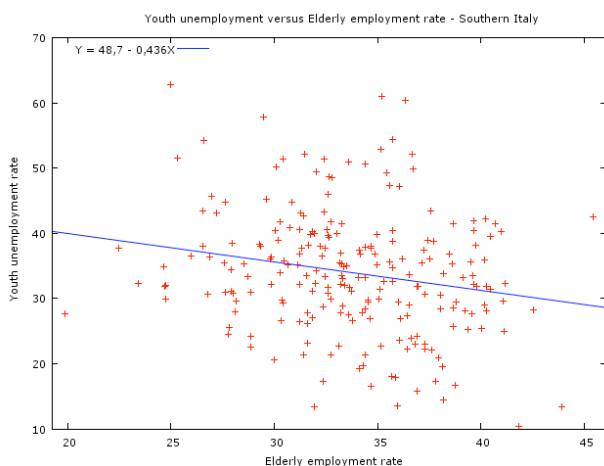


When one considers only Northern and Central Italy, it is possible to find evidence of the “lump sum of labour” prediction at the provincial level, while no relationship emerges at the regional level. Intuitively, graphs show that across Northern and Central provinces, higher employment of the old is associated to higher unemployment and lower employment of the young.

**Figure 48 – Youth / old labour market relationship in Southern Italy
Regional level (2004-2009)**



Provincial level (2004-2009)



Considering only Southern Italy instead evidence is mixed. In fact, on the one side, substitution seems to be present between youth and elderly employment at the regional level, while at the provincial level one can find evidence rejecting the “Lump sum of labour” hypothesis, with Southern provinces experiencing higher elderly employment that also register lower youth unemployment rates.

Table 48 - Panel fixed-effect estimates of the youth/old relationship

Northern-Central Italy		
Regional level		
Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	-0,03	0,24
Elderly employment rate	-0,13	0,26
Controls		
Elderly activity rate	-0,24	0,32*
Elderly employment rate	-0,26	0,34*
Provincial level		

No controls		
Elderly employment rate	0,13	-0,09
Elderly activity rate	0,13	-0,07
Southern Italy		
Regional level		
Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	0,41	-0,22
Elderly employment rate	0,31	-0,23
Controls		
Elderly activity rate	0,49	-0,18
Elderly employment rate	0,53	-0,20
Provincial level		
Dependent variable	<i>Youth Unemployment Rate</i>	<i>Youth Employment Rate</i>
No controls		
Elderly activity rate	-0,03	0,07
Elderly employment rate	-0,11	0,09

The econometric analysis that divides the sample in two parts – Northern/Central and Southern Italy – provide confirmation of the fact that the observed substitution that at the aggregate level was supportive for the “lump sum of labour” hypothesis was actually due to the aggregation of data.

In fact, when the analysis is run separately for Northern/Central regions and provinces on the one side and Southern ones on the other side, estimates are no longer significant, thus failing to support the crowding out version. Indeed, the only two significant results show, for Northern/Central regions a positive relationship between elderly and youth employment and activity rates in the specifications including controls for GDP per capita and youth share in total population.

So, even if at the aggregate Italian level, differently from other countries econometric estimates, it was possible to find some evidence for the “Lump sum of labour” hypothesis, this result disappears when disentangling between Italian macro-regions, being in line with the analysis made by Brugiavini and Peracchi (2008) who found no substitution between generations.

LITERATURE REVIEW

SUMMARY: I. Explaining Cross-National Variation in Youth Unemployment – 1. International stylized facts – 2. Determinants of youth unemployment – 2.1 Shape of labour market institutions: regulation, policies and industrial relations – 2.2 Shape of educational and school-to-work transition institutions - II. Empirical Analysis on the Determinants of Youth Unemployment – 1. The Role of Interactions among Explanatory Variables – 2. Social Capital and Different Welfare Regimes: Social-Democratic, Christian-Democratic, Liberal and Mediterranean Countries - III. The Relationship between Young and Old in the Labour Market: A Comparative Analysis

I. Explaining Cross-National Variation in Youth Unemployment

1. International stylized facts

Youth in the global labour markets, between long- and short-term trends, have been described by ILO, *Global Employment Trends for Youth 2013: A generation at risk*, International Labour Office, Geneva, March 2013, while for an overall assessment of the youth labour market outcomes for the industrialised economies in the wake of the crisis see OECD, *OECD Employment Outlook 2013*, OECD Publishing, July 2013 and S. SCARPETTA, A. SONNET, T. MANFREDI, *Rising Youth Unemployment During The Crisis: How to Prevent Negative Long-term Consequences on a Generation?*, OECD Social, Employment and Migration Working Papers, No. 106, OECD Publishing, 2010, the latter reviewing youth labour market developments in the OECD countries, the identification of key structural issues and policy suggestions to avoid the possible scarring effects of the crisis on youth see. The relationship between financial crises and youth unemployment is then investigated for a large panel of countries around the world (over 70 countries) in M. CHOUDRY, E. MARELLI, M. SIGNORELLI, *Youth Unemployment Rate and Impact of Financial Crises*, International Journal Of Manpower, 33(1):76-95, 2012. The effects of the 'Great Recession' on young people's labour market experiences in the European Union have been depicted in S. VERICK, *The Impact of the Global Financial Crisis on Labour Markets in OECD Countries: Why Youth and Other Vulnerable Groups Have Been Hit Hard. From the Great Recession to Labour Market Recovery: Issues, Evidence and Policy Options*. New York: St. Martin's Press, Palgrave Macmillan, 2011 and N. O'HIGGINS, *This Time It's Different? Youth*

Labour Markets during 'The Great Recession', Comparative Economic Studies, 54(2), 395-412, June 2012. More evidence on the disproportionately high effect of the economic crisis on youth, with reference to USA and UK, can be furthermore found in D. N. F. BELL, D. G. BLANCHFLOWER, *Youth Unemployment: Déjà Vu?*, IZA Discussion Paper No. 4705, January 2010 and D. N. F. BELL, D. G. BLANCHFLOWER, *Young People and the Great Recession*, IZA Discussion Paper No. 5674, April 2011. Crisis impacts differently different types of workers. According to Y. CHO, D. NEWHOUSE, *How Did the Great Recession Affect Different Types of Workers? Evidence from 17 Middle-Income Countries*, World Development, 41(1):31-50, January 2013 youth suffered extraordinary increases in unemployment and declines in wage employment compared to other age groups and even compared to traditionally disadvantaged groups such as less educated and female workers. While above mentioned publications focused mainly on youth employment and unemployment in the crisis, youth inactivity has been specifically addressed, at the European level, by Eurofound, *NEETs. Young people not in employment, education or training: Characteristics, costs and policy responses in Europe*, European Foundation for the Improvement of Living and Working Conditions, 2012.

Descriptive piece of evidence on education and training for young people are collected in OECD, *Education at a Glance 2013: OECD Indicators*, OECD Publishing, June 2013 and challenges and trends are addressed in OECD, *Trends Shaping Education 2013*, OECD Publishing, January 2013.

Students performance at school have been addressed by OECD, *PISA 2009 Results: What Students Know and Can Do Student Performance in Reading, Mathematics and Science (Volume I)*, PISA, OECD Publishing, 2010, while adults' skills have been recorded for the first time through the PIAAC survey by the OECD and described in OECD, *OECD Skills Outlook 2013: First Results from the Survey of Adult Skills*, OECD Publishing, 2013.

Key facts and data concerning vocational education and training are included in OECD, *Learning for Jobs: OECD Reviews of Vocational Education and Training*, OECD Publishing, 2010; CEDEFOP, *Labour market outcomes of vocational education in Europe. Evidence from the European Union labour force survey*, Cedefop Research papers n. 5532, June 2013; CEDEFOP, *On the way to 2020: data for vocational*

education and training policies, Cedefop Research papers n. 5533, May 2013 and OECD, *Off To A Good Start? Jobs For Youth*, Paris and Washington, D.C., 2010.

Specifically on traineeships regulation across Europe see EUROPEAN COMMISSION, *Study on a comprehensive overview on traineeship arrangements in Member States*, 2012. EUROPEAN PARLIAMENT, Promoting Youth Access to the Labour Market, Strengthening Trainee, Internship and Apprenticeship Status, Rapporteur Mme Emilie Turunen MEP, EP 2009/2221(INI), 14.6.2010, while for a comprehensive survey on traineeships characteristics see EUROPEAN COMMISSION, *The Experience of Traineeships in the EU*, Flash Eurobarometer n. 378, November 2013.

On the role of trainee-related organisations for traineeships regulation see EUROPEAN PARLIAMENT COMMITTEE ON PETITIONS, *Notice to Members, Petition 1452/2008 by Ms Anne-Charlotte Bailly (German), on behalf of Generation P, on Fair Internship and Proper Access of the Young People to the European Labour Market*, EUROPEAN YOUTH FORUM/YFJ, *Opinion Paper on Internships, adopted by the Council of Members/Extraordinary General Assembly*, Brussels, 8-9 May 2009 and the European Quality Charter on Internships and Apprenticeships.

2. Determinants of youth unemployment

Economic literature has offered wide contributions, both theoretical and empirical, to the explanations of extensively higher unemployment rates among youth compared to adults and of wide differences among countries with respect to youth performance in the labour market.

Youth unemployment has been related to several determinants, belonging to demographics and other structural arguments, cyclical factors, the existence of labour market institutions such as unemployment benefits, minimum wages, employment protection legislation, taxes, as well as the quality and effectiveness of the educational system and the ease of school-to-work transition. In this review an extensive analysis of the literature on the determinants of youth unemployment is provided in order to have a clear understanding of the origin and reasons of this phenomenon and shed light on the what we know on youth unemployment.

2.1 Shape of labour market institutions: regulation, policies and industrial relations

Some determinants of youth conditions in the labour market can be considered as structural, being not directly connected to cyclical factors, but being instead inborn to the condition of youth or to the aggregate economy (macro-structural factors).

Demographics has been considered as a central structural determinant of youth unemployment. Even though this is not the case today, since most developed countries are facing a dramatic ageing of the population and a reduction of youth relative cohort-size (see ILO, *Global Employment Trends for Youth 2012*, Geneva, 2012), the baby boomers era economic literature included demographics as one of the causes of youth unemployment. The fact that the more young people are in the labour markets and the more jobs will be needed to accommodate them has been explained in the seminal work by S. KORENMAN, D. NEUMARK, *Cohort crowding and youth labour markets: a cross national analysis*, NBER Working Paper Series, No. 6031, May 1997. A similar result was reached for Spain by N. AHN, M. IZQUIERDO, J. F. JIMENO, *Youth cohort size and unemployment in Spain: An exploration of national, regional and micro data*, FEDEA, mimeo, 2000. Other studies have confirmed the crowding effect on unemployment for the US (see P. FLAIM, *The Effect of Demographic Change on the Nation's Unemployment Rate*, Monthly Labor Review, 13–23, 1979, P. FLAIM, *Population Changes, the Baby Boom and the Unemployment Rate*, Monthly Labor Review, 3–10, 1990). For Germany see K. ZIMMERMAN, *Ageing and the labor market: Age structure, cohort size and unemployment*, Journal of Population Economics 4: 177-200, 1991. Also for the UK authors have confirmed substantial adverse effect of cohort size on the relative employment outcomes and wages for youth (see S. NICKELL, *Cohort size effects on the wages of young men in Britain: 1961-1989*, British Journal of Industrial Relations 31 (3): 459-69, 1993 and R. E. WRIGHT, *Cohort size and earnings in Great Britain*, Journal of Population Economics 4:295-305, 1991). Other than static dimensions of demography, demographic shocks have also been considered at the root of the gap in the unemployment rate between the US and some European countries (see G. BERTOLA, F. D. BLAU, L. M. KAHN, *Labor Market Institutions and Demographic Employment Patterns*, NBER Working Papers 9043, 2002). Not only demographics affects unemployment, but also relative wages (R. B.

FREEMAN, D. A. WISE, *The Youth Labor Market Problem: Its Nature, Causes, and Consequences*, NBER Books, National Bureau of Economic Research, 1982) and average education attainment (see D. C. STAPLETON, D. J. YOUNG, *Educational Attainment and Cohort Size*, *Journal of Labor Economics*, 6(3):330-361, 1988), as literature have shown. Less numerous, though existent, are opposite results showing that higher share of the youth population actually decreases, and not increases, unemployment (R. SHIMER, *The Impact of Young Workers on Aggregate Labor Markets*, *The Quarterly Journal of Economics* 116, 969-1007, 2001).

Other structural reasons for youth unemployment and joblessness' seem deeply-rooted in youth age specificities itself. According to early studies, key structural factors could be the high mobility and short job tenure (low-seniority) of the young (see L. LEIGHTON, J. MINCER, *Labor Turnover and Youth Unemployment*, in Richard B. Freeman and David A. Wise, eds., *The Youth Labor Market Problem: Its Nature, Causes, and Consequences*, University of Chicago Press, 1982 and K. B. CLARK, L. H. SUMMERS, *Labour force participation: timing and persistence*, *Review of Economic Studies*, 49(5), pp.825-844, 1982), also linked to the fact that young people are generally hired with temporary contracts, becoming more sensitive to the economic cycle (see next section). Also cultural reasons do matter for youth condition in the labour market according to the literature. The long permanence of youth by family's household is connected to lower job mobility which is, in turn, connected to higher equilibrium unemployment (see R. LAYARD, S. NICKELL, R. JACKMAN, *Unemployment. Macroeconomic Performance and the Labor Market*. Oxford University, Oxford, 1991 and S. BECKER, S. BENTOLILA, A. FERNANDES, A. ICHINO, *Youth Emancipation and Perceived Job Insecurity*, IZA DP No. 1836, November 2005).

Despite structural causes, one of the most important determinants of youth unemployment, as well as of the overall level of unemployment, is the economic cycle. Widely used indicators of the level of aggregate economic activity are the unemployment rate for adult males, the growth rate of personal income, measures of GDP per capita or output gap (see R. B. FREEMAN, D. A. WISE, *The Youth Labor Market Problem: Its Nature Causes and Consequences*, in Richard B. Freeman and David A. Wise, eds, *The Youth Labor Market Problem: Its Nature, Causes, and Consequences*, University of Chicago Press, 1982; A. BASSANINI, R. DUVAL, *Employment Patterns in OECD Countries. Reassessing the role of policies and institutions*, OECD Social, Employment and Migration Working Papers, No. 35, OECD

Publishing, 2006; S. SCARPETTA, *Assessing the role of labour market policies and institutional settings on unemployment: a cross-country study*, OECD Economic Studies No . 2, November 1996).

For the literature on the effects of the recent financial and economic crisis on youth unemployment see D. N. F. BELL, D. BLANCHFLOWER, *Young People and the Great Recession*, Discussion Paper No. 5674, April 2011; S. SCARPETTA, A. SONNET, T. MANFREDI, T., *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, 2010; S. VERICK, *Who is hit hardest during a financial crisis? The vulnerability of young men and women to unemployment in an economic downturn*, IZA discussion papers N. 4359, 2009.

Despite of the general effect of aggregate demand and business cycle on overall unemployment, however, quantitatively, youth unemployment rate appears to be disproportionately affected and one of the most highly sensitive variables in the labour market (see D. G. BLANCHFLOWER, R. B. FREEMAN, *The Declining Economic Status of Young Workers in OECD Countries*, In David G. Blanchflower and Richard B. Freeman (eds): *Youth Unemployment and Joblessness in Advanced Countries*. Chicago and London: University of Chicago Press: 19–55, 2000; O. BLANCHARD, J. WOLFERS, *The role of shock and institutions in the rise of European unemployment: The aggregate evidence*, *The Economic Journal*, 110, March 2000; Jimeno, Juan F. and Diego Rodríguez-Palenzuela, *Youth Unemployment in the OECD: Demographic Shifts, Labour Market Institutions and Macroeconomic Shocks*, EZB-Working Papers 2002-155, 2002 and ILO, *Global Employment Trends for Youth 2013*, January 2013).

As stated by E. S. PHELPS, *Structural Slumps*, Cambridge, MA: Harvard University Press, 1994, differences in labour market performance across the OECD can be better explained “structurally”, looking at the institutional frameworks of the countries. Debate on the role of labour market institutions took off with the observation of divergent labour market outcomes across Europe and US, analysed in the seminal contribution by S. NICKELL, *Unemployment and labour market rigidities: Europe versus North America*, *Journal of Economic Perspectives*, 11, 3, 55-74, 1997, which have been further deepened allowing for interactions between institutions and policies in J. ELMESKOV, J. MARTIN, S. SCARPETTA, *Key Lessons for Labour Market*

Reforms: Evidence from OECD Countries' Experiences, Swedish Economic Policy Review, Vol. 5, Issue 2, Autumn 1998. Together with famous OECD, *The OECD Jobs Study. Facts, Analysis, Strategies*, OECD Publishing, 1994, these pieces of evidence provided a strong and lasting basis for the spread of several (mainly empirical) works all supporting the mainstream view that institutions interfere with labour market mechanism creating unemployment and, thus, that deregulation would be the solution. Economic literature has identified a number of policy and institutional (potential) determinants of unemployment. One main source of institutions interacting with the labour market is the regulation of labour, which includes employment laws, industrial relations and social security. For a review of labour regulations in 85 countries see J. C. BOTERO, S. DJANKOV, R. LA PORTA, F. LOPEZ DE SILANES, A. SHLEIFER, *The Regulation of Labour*, Quarterly Journal of Economics, Vol. 119, No. 4, November 2004, while for the consequences of labour regulations see E. LAZEAR, *Job Security Provisions and Employment*, Quarterly Journal of Economics, 699–726, 1990.

Unemployment insurance or unemployment benefit generosity has been addressed as one of the main determinant of aggregate unemployment, with more generous benefits connected to some increase in unemployment duration, even though only small attempts have considered youth unemployment (see S. SCARPETTA, *Assessing the role of labour market policies and institutional settings on unemployment: a cross-country study*, OECD Economic Studies No. 2, November 1996; S. NICKELL, R. LAYARD, *Labor Market Institutions and Economic Performance*, in O. Ashenfelter and D. Card (eds.) *Handbook of Labor Economics*. Vol. 3C, North-Holland, Amsterdam, 1999; L. NUNZIATA, *Unemployment, Labour Market Institutions and Shocks*, Nuffield College Working Papers in Economics 2002-W16, 2002).

Taxes on labour have been also indicated by a number of empirical studies as one of the most robust institutional determinant of unemployment, with high taxation that tends to be associated to higher unemployment rates (see M. BELOT, J. VAN OURS, *Does the Recent Success of Some OECD Countries in Lowering their Unemployment Rates Lie in the Clever Design of their Labour Market Reform?*, Oxford Economic Papers, Vol. 56, No. 4, 2004; S. NICKELL, *Unemployment and Labor Market Rigidities: Europe versus North America*, The Journal of Economic Perspectives, Vol. 11, No. 3, 1997), the effect being even stronger in presence of strong trade unions and low or medium degree of

centralisation/co-ordination of wage bargaining (see F. DAVERI, G. TABELLINI, *Unemployment, Growth and Taxation in Industrial Countries*, Economic Policy, No. 30, 2000). Data on labour taxes are regularly compiled by OECD in its Taxing Wages publications series and databases, the most handy of which is the tax wedge indicator (see the last available OECD, *Taxing Wages 2013*, OECD Publishing). Not only labour taxes, but also the whole fiscal system is likely to exert indirect effects on labour market. For example, level and the progressivity of state income taxes (as mortgage interest deductions) are found to be positively correlated with intergenerational mobility and this, in turn, is likely to affect unemployment (see R. CHATTY, N. HENDREN, P. KLINE, E. SAEZ, *The Economic Impacts of Tax Expenditures: Evidence from Spatial Variation across the US*, SOI White Paper, The Equality of Opportunity Project, 2013. Evidence on the effectiveness of ALMP is, on the contrary, less clear cut. Some studies identified a favourable effect of ALMP spending (e.g. SCARPETTA, 1996; NICKELL, 1997, 1998; J. BOONE, J. VAN OURS, *Effective Active Labor Market Policies*, IZA Discussion Paper, No. 1335, November 2004), but it is crucial to find “what works for whom” (see J. P. MARTIN, D. GRUBB, *What Works and for Whom: A Review of OECD Countries' Experiences with Active Labour Market Policies*. Swedish Economic Policy Review, Vol. 8, No. 2, Fall 2001). For a meta-analysis of ALMP evaluation (based on 199 program estimates drawn from 97 studies conducted between 1995 and 2007) see D. CARD, J. KLUVE AND A. WEBER, *Active labor market policy evaluations: A Meta-analysis*, IZA DP No. 4002, February 2009. Even more mixed are the results concerning the effect of employment protection legislation (EPL). For one of the first studies on labour market legislation one might remind E. P. LAZEAR, *Job security provisions and employment*, Quarterly Journal of Economics, 105, 699-726, 1990. Despite mainstream view (OECD, 1994; SCARPETTA, 1996; NICKELL, 1997) claimed for an important role of hiring and firing regulations on unemployment, various further studies showed that the link between restrictive EPL and unemployment is not robust enough (see BASSANINI AND DUVAL, 2006; D. R. HOWELL, D. BAKER, A. GLYN, J. SCHMITT, *Are Protective Labor Market Institutions Really at the Root of Unemployment? A Critical Perspective on the Statistical Evidence*, CEPR Reports and Issue Briefs 2006-14, 2004; M. BELOT, J. VAN OURS, *Unemployment and Labor Market Institutions: An*

Empirical Analysis, Journal of the Japanese and International Economy, Vol. 15, No. 4, 2001). Employment protection legislation literature underlined the indirect consequences of excessive or asymmetric job protection, such as the extensive use of atypical labour contract and the rise in the labour market dualism between outsider and insider (S. BENTOLILA, J. J. DOLADO, *Labour Flexibility and Wages: Lessons from Spain*, Economic Policy, Vol. 18, April 1994; T. BOERI, P. GARIBALDI, *Two Tier Reforms of Employment Protection: a Honeymoon Effect?*, Economic Journal, Royal Economic Society, vol. 117(521), pages 357-385, 2007). This process, according to G. BERTOLA, F. BLAU, L. KAHN, *Labor market institutions and demographic employment patterns*, Journal of Population Economics, vol. 20, Issue 4, October 2007 led to a disproportional effect on new entrants, – mainly youth - immigrants and women, raising the relative incidence of temporary employment. However, in Europe with the only exception of Spain (see B. COCKX, M. PICCHIO, *Are short-lived jobs stepping stones to long-lasting jobs?*, Oxford Bulletin of Economics and Statistics, 74 (5), 2012), temporary jobs have been demonstrated to be stepping stone into stable employment rather than dead end jobs (A.L. BOOTH, J.J. DOLADO and J. FRANK, *Symposium on temporary work*, Economic Journal, 112 (480), 2002; M. FRANCESCONI, and J. FRANK, *Temporary jobs: Stepping stones or dead ends?*, Economic Journal, 112 (480), 2002; T. HAGEN, *Do fixed-term contracts increase the long-term employment opportunities of the unemployed?*, Technical Report, 2003; C. GÖBEL, E. VERHOFSTADT, *Is temporary employment a stepping stone for unemployed school leavers?*, Technical Report, 2008; A. ICHINO, F. MEALLI, T. NANNICINI, *From temporary help jobs to permanent employment: What can we learn from matching estimators and their sensitivity?*, Journal of Applied Econometrics, 23 (3), 2008; M. PICCHIO, *Temporary contracts and transitions to stable jobs in Italy*, Labour, 22 (s1), 2008)

Besides the role of labour regulation, very few studies have empirically tested the role of business regulations, finding it potentially more important for employment outcomes (see R. FONSECA, P. LOPEZ-GARCIA, C. PISSARIDES, *Entrepreneurship, start-up costs and employment*, European Economic Review 45, 692-705, 2001; C. PISSARIDES, *Company Start-Up Costs and Employment*, CEP Discussion Papers n. dp0520, LSE, March 2002). The empirical investigation of firm regulation for labour

market outcomes needs further development, being at the moment mostly theoretical (see among others O. BLANCHARD, F. GIAVAZZI, *Macroeconomic effects of regulation and deregulation in goods and labor markets*, Quarterly Journal of Economics, 118(3), 879–907, 2003) or focused on the overall effect of product market regulation on employment and not on firm (and start-up) regulations (G. NICOLETTI, A. BASSANINI, E. ERNST, S. JEAN, P. SANTIAGO, P. SWAIM, *Product and labour markets interactions in OECD countries*, OECD Economics Department Working Papers, No. 312, OECD Publishing, 2001; G. NICOLETTI, S. SCARPETTA, *Product Market Reforms and Employment in OECD Countries*, OECD Economics Department Working Papers, No. 472, OECD Publishing, 2005). For details of construction of the non-manufacturing index of product market regulation see P. CONWAY, G. NICOLETTI, *Product market regulation in the non-manufacturing sectors of OECD countries: measurement and highlights*, OECD Economics Department Working Papers No. 530, December 2006.

Literature on wage-setting institutions has pointed out moreover how a strong presence of trade unions and uniform wage policies tend to compress wages particularly at the bottom of the wage distribution or tend to price certain individuals out of the labour market (for a review of wage-setting institutions effects see W. KOENIGER, M. LEONARDI, L. NUNZIATA, *Labour Market Institutions and Wage Inequality*, IZA DP No. 1291, September 2004; see R. FREEMAN, *Labour Market Institutions around the World*, NBER Working Paper, N° 13242, 2007). The effect is considered to be bigger for those individuals characterised by a more elastic labour supply, as youth and women (see BERTOLA, BLAU, KAHN, 2007), with the consequence of reducing their relative employment, other things equal. But here results are mixed since numerous studies have denied a negative role of trade unions (via wage compression) on employment (see D. CARD, F. KRAMARZ, T. LAMIEUX, *Changes in the Relative Structure of Wages and Employment: A Comparison of the United States, Canada, and France*, The Canadian Journal of Economics / Revue canadienne d'Economie, Vol. 32, No. 4, August 1999). Commentators drawn attention also on indirect ways in which unions could influence the labour market, and precisely on the fact that High Performance Work Practices (HPWP) adoption seems to be hindered by the presence of unions (see M. A. HUSELID, B. L. RAU, *The Determinants of High Performance Work*

Systems; Cross Sectional and Longitudinal Analyses, Academy of Management Meetings, Division, 1997).

Complementary to trade unions is the collective bargaining structure, with decentralised wage bargaining which is regarded by the literature as more “employment-friendly” (see F. TRAXLER, B. KITTEL, *The Bargaining System and Performance: A Comparison of 18 OECD Countries*, Comparative Political Studies, Vol. 33, N. 9, November, 2000), while medium level of centralisation/co-ordination - via compressed wage structure and wage moderation - may be detrimental for low-skilled workers, even though the possibility to sign “social pacts” could have positive effects on employment (see L. CALMFORS, *Centralisation of Wage Bargaining and Macroeconomic Performance: A Survey*, OECD Economic Studies No. 21, Winter 1993; D. SOSKICE, *Wage Determination: The Changing Role of Institutions in Advanced Industrialized Countries*, Oxford Review of Economic Policy, Vol. 6, No. 4., 1990). For a review and cluster classification of 23 European countries plus US and Japan see P. DU CAJU, E. GAUTIER, D. MOMFERATOU, M. WARD-WARMEDINGER, *Institutional features of wage bargaining in 23 European countries, the US and Japan*, ECB Working Paper Series No. 974, December 2008.

Literature on the role of pay setting has however mainly focused on statutory minimum wage effects, failing to detail the effect of collectively bargained wages that apply to everyone, acting *de facto* as a similar wage floor. In particular, several studies have indicated statutory minimum wage as a determinant of youth labour market performance, suggesting that making youth labour more expensive, i.e. increasing the minimum wage, reduces youth employment (for a review of the literature see C. BROWN, *Minimum Wages, Employment, and the Distribution of Income*, In *Handbook of Labor Economics*, edited by Orley Ashenfelter and David Card. Vol. 3, pp. 2101–63. New York: Elsevier, 1999; D. NEUMARK, W. WASCHER, *Minimum Wages*, Cambridge, MA: MIT Press, 2008). However ensuing research, by better considering selectivity and heterogeneity problems, failed to find such negative effect (see S. ALLEGRETTO, A. DUBE, M. REICH, *Do Minimum Wages Really Reduce Teen Employment? Accounting for Heterogeneity and Selectivity in State Panel Data*, *Industrial Relations* 50, 5: 205-40, 2011).

2.2 Shape of educational and school-to-work transition institutions: Training contracts in selected countries

Either one follows Becker's seminal work on human capital theory (G. BECKER, *Human capital*, Chicago: The University of Chicago Press, 1967) - providing that education increases wages through the increase of the productivity of individuals - or signalling theories (M. SPENCE, *Job Market Signalling*, Quarterly Journal of Economics, Vol. 87, No. 3, 1973) - suggesting that individuals would not decide to invest in education in order to increase their potential productivity, but rather to send a signal of their ability, it is a matter of fact that education represents one of the main determinants of youth condition in the labour market, both in terms of wages and employability. Pushed by the observation of increased inequality in earnings, researchers have been estimating the returns of educational investment since the 1950s (see among others J. MINCER, *Investment In Human Capital and the Personal Income Distribution*, Journal of Political Economy, 66:281-302, 1958; D. CARD, *The Causal Effect of Education on Earnings*, in Handbook of Labor Economics, Vol. 5, ed. O. Ashenfelter, New York: North-Holland, 1999; J. J. HECKMAN, L. J. LOCHNER, P. E. TODD, *Fifty Years of Mincer Earnings Regressions*, NBER Working Paper No. 9732, May 2003). Not only higher education is connected to higher salaries, but also to higher employment probabilities (ILO, 2013; OECD, *Employment Outlook 2013*, OECD Publishing, 2013). Given the positive role of education in general, it is however mandatory to disentangle between educational specificities.

The general versus vocational education policy debate is still going on, given, on the one side, the increased popularity of apprenticeship and combined school and work programmes and, on the other side, emerging rapid technological change and the need of advanced education.

Literature analysing the "skill-based" versus "concept-based" type of education argued that vocational training and apprenticeship show only little relationship to labour market success (see European Centre For The Development Of Vocational Training (CEDEFOP), *The Benefits of Vocational Education and Training*, Publications Office, Luxembourg, 2011; EUROPEAN CENTRE FOR THE DEVELOPMENT OF VOCATIONAL TRAINING (CEDEFOP), *From Education to Working Life: The Labour-Market Outcomes of Vocational Education and Training*, Publications Office,

Luxembourg, 2012), while academic performance in high school is positively related to both employment and wages (see earlier contribution from R. H. MEYER, D.A. WISE, *High School Preparation and Early Labor Force Experience*, NBER Chapters, in: *The Youth Labor Market Problem: Its Nature, Causes, and Consequences*, National Bureau of Economic Research, Inc, 1982; J. FERSTERER, J. S. PISCHKE, R. WINTER-EBMER, *Returns to Apprenticeship Training in Austria: Evidence from Failed Firms*, NBER Working Paper No. 13344, August 2007). There seems to be some consensus on the fact that the main difference between general and vocational education lies in the temporal location of their effect, with individuals with general education initially facing worse employment outcomes, but increased employment probability as they become older relative to individuals with vocational education. Moreover, there is some evidence supporting the fact that VET labour market advantages decreases with age and so the existence of a trade off between short- and long-term effects (see L.VOLKER, F.PFEIFFER, *Abschreibungsraten allgemeiner und beruflicher Ausbildungsinhalte: Empirische Evidenz auf Basis subjektiver Einschätzungen (Depreciation rates of general and vocational training capital: Evidence based on subjective ratings)*, *Jahrbücher für Nationalökonomie und Statistik / Journal of Economics and Statistics* 226, no. 3: 260-284, 2006 and E. A. HANUSHEK, L. WOESSMANN, L. ZHANG, *Vocational education and labor market outcomes over the life-cycle*, NBER Working Paper 17504, 2011).

The specific versus general skill approach has also been theorized as one of the sources of the wage growth divergence between Europe and US (see D. KRUGER, K. KUMAR, *Skill-Specific Rather Than General Education: A Reason for US-Europe Growth Differences?*, *Journal Of Economic Growth*, 9(2):167-207, June 2004) and its developments are shown to interact with the level of development, reflecting the complex interaction between economic and political forces (see G. BERTOCCHI, M. SPAGAT, *The evolution of modern educational systems Technical vs. general education, distributional conflict, and growth*, *Journal of Development Economics* 73, 559– 582, 2004).

In any case, despite the contents of education, large consensus exists on the fact that school-to-work transition pathways providing work experiences and connections with the labour market during school or universities, instead of “sequential ones” provide

better employment outcomes for youth. For a review on school-to-work transition models in Europe and US see G. QUINTINI, T. MANFREDI, *Going Separate Ways? School-to-work Transitions in the United States and Europe*, OECD Social, Employment and Migration Working Paper, No. 90, OECD Publishing, 2009.

In particular, an appealing solution to ease youth transition from school to work is apprenticeship (for a review see C. BIAVASCHI, W. EICHENHOST, C. GIULIETTI, M. J. KENDZIA, A. MURAVYEV, J. PIETERS, N. RODRIGUEZ-PLANAS, R. SCHMIDL, K. ZIMMERMANN, *Youth Unemployment and Vocational Training*, IZA DP No. 6890, October 2012 P. RYAN, *Apprenticeship: between theory and practice, school and workplace*, in Pilz, M.(ed), *The Future of VET in a Changing World*, VS Verlag, Springer, pp. 403--32.), representing a bridge between the abstract, class-based academic education and the concrete world of work and being a learning environment for youth. Apprenticeship and job-based learning are also seen as beneficial for youth thanks to the reduction of the skill mismatch between labour demand and supply (for a comprehensive review on skill mismatch see G. QUINTINI, *Over-Qualified or Under-Skilled: A Review of Existing Literature*, OECD Social, Employment and Migration Working Papers, No. 121, OECD Publishing, 2011; for an approach measuring the extent of the qualification mismatch in the labour market see M. ESTEVÃO, E. TSOUNTA, *Has the Great Recession Raised U.S. Structural Unemployment?*, IMF Working Paper WP/11/105, 2011). Apprenticeships are also seen as effective in leading workers to a stable job relationship (see A.L. BOOTH, S.E. SATCHELL, *Apprenticeships and job tenure: A competing risks model with time-varying covariates*, CEPR Discussion Papers 762, CEPR Discussion Papers 1993; M. PICCHIO, S. STAFFOLANI, *Does Apprenticeship Improve Job Opportunities? A Regression Discontinuity Approach*, IZA Discussion Papers No. 7719, November 2013).

Particularly, dual system of apprenticeship has been considered as to contradict Becker's theory since it involves a wide part of general training and firms seem to bear a net cost for such training provision (see D. SOSKICE, *Reconciling Markets and Institutions: The German Apprenticeship System*, in *Training and the Private Sector*, L. Lynch, University of Chicago Press, 1994). Other authors pointed out the selecting-screening and signalling functions of apprenticeship (see D. ACEMOGLU, J. S. PISCHKE, *Beyond Becker: Training in Imperfect Labor Markets*, NBER Working

Papers, N. 6740, 1998), thanks to credible certificates of qualification (D. ACEMOGLU, J. S. PISCHKE, *Certification of training and training outcomes*, European Economic Review, Elsevier, vol. 44(4-6), May 2000).

Despite the common name, however, apprenticeship's institutional setting strongly differs among countries (see P. RYAN, *School-to-work transition: a cross-national perspective*, Journal of Economic Literature, Vol. XXXIX, March 2001; M. TIRABOSCHI, *Young Workers in Recessional Times: A Caveat (to Continental Europe) to Reconstruct its Labour Law?*, E-Journal of International and Comparative Labour Studies, Vol. 1, No. 1-2, ADAPT University Press, March-June 2012), with German speaking countries implementing an "investment model approach" and most of other countries a "production approach".

Apprenticeship has however also some critical aspects: differently from traditional education, apprenticeship is market-driven and its use is found to be pro-cyclical (see for a review G. BRUNELLO, *The Effect of Economic Downturns on Apprenticeships and Initial Workplace Training: A Review of the Evidence*, OECD Publishing 2009). For a review of theoretical and empirical models for evaluating apprenticeship see L. GAMBIN, C. HASLUCK, T. HOGARTH, P. RYAN, P. ELIAS, *Options study for the long-term evaluation of apprenticeships*, BIS research paper 56, BIS; Department for Business Innovation and Skill, October 2011.

Besides apprenticeships, traineeships or internships represents the most common way for youth to enter the labour market. Though so spread and widely-used, traineeships and internships lack of strong and stable regulatory frameworks within and between countries, with high heterogeneity with regards to basic definitions and legal aspects. For a review of traineeships arrangements at the EU level see EUROPEAN COMMISSION, *Study on a comprehensive overview on traineeship arrangements in Member States (Final Synthesis Report)*, 5 May 2012; while for the US framework see U.S. DOL, *Internship Programs Under The Fair Labor Standards Act*, April 2010 and M. H. NELSON, *Internships and Federal Law: Are Interns Employees?*, Employee Relations Law Journal, Vol. 36, No. 2, Autumn 2010. Due to high instability and risk of abuse connected to traineeships and internships European institutions have launched public initiatives aiming at supporting and protecting trainee and interns (see European Parliament,

Report

on promoting youth access to the labour market, strengthening trainee, internship and apprenticeship status, A7-0197/2010, 14 June 2010; European Commission, *Quality Framework for Traineeships*, Accompanying the document Towards a job-rich recovery, COM(2012) 173 final, 18 April 2012).

II. Empirical Analysis on the Determinants of Youth Unemployment

Empirical literature on the effects of labour market institutions on (youth) unemployment has mainly relied on reduced-form panel data estimates. Mostly used estimation methods are FGLS random effects, motivated by the interest on the effects of time invariant institutions (see D. BAKER, A. GLYN, D. HOWELL, J. SCHMITT, *Labor Market Institutions and Unemployment : A Critical Assessment of the Cross-Country Evidence*, in D. Howell (ed.), *Fighting Unemployment: The Limits of Free Market Orthodoxy*, Oxford, Oxford University Press, 2004; J. ELMESKOV, J. MARTIN, S. SCARPETTA, *Key Lessons for Labour Market Reforms: Evidence from OECD Countries' Experiences*, Swedish Economic Policy Review, Vol. 5, Issue 2, Autumn, 1998; S. NICKELL, 1997; S. NICKELL, *Unemployment: Questions and Some Answers*, The Economic Journal, Vol. 108, Issue 448, May 1998; S. NICKELL, L. NUNZIATA, W. OCHEL, *Unemployment in the OECD Since the 1960s: What Do We Know?*, The Economic Journal, Vol. 115, No. 500, January 2005; S. SCARPETTA, 1996).

However, given the fact that institutions are embedded in countries' specificities, fixed-effects estimates are actually thought to better fit data (for empirical studies on the structural determinants of unemployment using this method see M. BELOT, J. VAN OURS, *Unemployment and Labor Market Institutions: An Empirical Analysis*, Journal of the Japanese and International Economy, Vol. 15, No. 4, 2001; G. BERTOLA, F. BLAU, L. KAHN, 2002; O. BLANCHARD, J. WOLFERS, 2000; G. NICOLETTI, S. SCARPETTA, 2005).

Some studies used instead both specifications, FGLS random effects and fixed-effects (see J. BOONE, J. VAN OURS, 2004; F. DAVERI, G. TABELLINI, 2000; INTERNATIONAL MONETARY FUND, *Unemployment and Labor Market Institutions: Why Reforms Pay Off*, World Economic Outlook, Chapter IV, April 2003; L. NUNZIATA, 2002).

While most of the above mentioned literature has mainly focused on aggregate unemployment, few of them have also analysed specific age-effects, and in particular effects on youth unemployment (see G. BERTOLA, F. BLAU, L. KAHN, 2002; S. SCARPETTA, 1996).

1. The Role of Interactions among Explanatory Variables

Among the first to take up the analysis of the interactions between different labour market institutions were M.V.K. BELOT, J. C. VAN OURS, *Unemployment and labour market institutions*, Journal of the Japanese and International Economics, 15, 403-418, 2001. A first interaction occurs between training systems and labour market regulations, with specific skill training going hand in hand with rigid employment protection regimes as in Germany (see ACEMOGLU, PISCHKE, 1998). Employment protection legislation is also found to interact with wage setting mechanism, with higher protection generally associated to more compressed wage structure and lower wage inequality (see KAHN, 2007). Furthermore the interplay between employment protection legislation and unemployment insurance has been considered as to reflect different attitudes towards labour market risk (T. BOERI, J. CONDE-RUIZ, V. GALASSO, *Protecting Against Labor Market Risk: Employment Protection or Unemployment Benefits*, CEPR Discussion Paper N. 3990, 2003). Finally, as far as industrial relations are concerned, important interactions has been indicated with regards to taxes on labour and unemployment benefits, union density and decentralization of collective bargaining and employment protection legislation and centralization (see M.V.K. BELOT, J. C. VAN OURS, 2001). Again, for the evolution of unemployment do matter the interaction of macroeconomic shocks and institutions, fitting quite well the evolution of European unemployment both over time and across countries, according to O. BLANCHARD, J. WOLFERS, *The role of shocks and institutions in the rise of European unemployment: the aggregate evidence*, NBER Working Paper n. 7282, 1999 and J.P FITOUSSI, D. JESTAZ, E.S. PHELPS, G. ZOEGA, *Roots of the recent recoveries: labour market reforms or private sector forces?*, Brookings Papers on Economic Activity, 1, 237-291, 2000. Similarly, studies have pointed out the interdependence of product and labour market regulations (see among others O. BLANCHARD, F. GIAVAZZI, *Macroeconomic effects of regulation and deregulation in goods and labor markets*,

Quarterly Journal of Economics, Vol. 118(3), 2003; A. BASSANINI, R. DUVAL, *Unemployment, Institutions, and Reform Complementarities: Reassessing the Aggregate Evidence for OECD Countries*, Oxford Review of Economic Policy 25, 40-59, Spring 2009).

Despite most of the literature on labour market institutions is in support of the “orthodox” and mainstream view according to which several institutions interact with market forces thus contributing to unemployment, few studies have opposed such results, claiming a lack of robustness (see D. BAKER, A. GLYIN, D. HOWELL, J. SCHMITT, *Unemployment and labor market institutions: the failure of the empirical case for deregulation*, CEPA Working Paper, 2004 and D. BAKER, A. GLYIN, D. HOWELL, J. SCHMITT, *Labor market institutions and unemployment: a critical assessment of the cross-country evidence*, in D. Howell (Ed.), *Fighting unemployment: the limits of free market orthodoxy*, Oxford University Press, New York, 2005).

2. Social Capital and Different Welfare Regimes: Social-Democratic, Christian-Democratic, Liberal and Mediterranean countries

The economic and institutional context shapes youth labour market performance determining wide divergences among countries, it is therefore important to account for countries heterogeneity when looking at youth unemployment. Economic and sociological literature identified, however, some commonalities among countries, according to their welfare types and institutional settings, that can be taken into account in order to search for common roots for youth conditions in the labour markets.

Developed economies have been traditionally grouped by the Variety of Capitalism literature in three clusters: Social-democratic, Liberal and Christian-democratic (or conservative-corporatist), the latter being associated with the Catholic countries in Continental and Mediterranean Europe (see seminal contribution on welfare types by G. ESPING-ANDERSEN, *The Three Worlds of Welfare Capitalism*, Cambridge, 1990 and the variety of capitalism approach by P.A. HALL, D. SOSKICE, *An introduction to variety of capitalism*, in P.A. HALL, D. SOSKICE (Eds.), *Variety of capitalism, the institutional foundations of competitive advantage*, 1-68, Oxford, 2001).

Later, scholars identified Mediterranean countries as a single and independent group (see S. LEIBFRIED, *Towards a European Welfare State? On Integrating Poverty*

Regimes into the European Community, In Z. Ferge and J. E. Kolberg, eds., *Social Policy in a Changing Europe*, Campus and Westview, Boulder/Col., pp. 245 – 279).

Other than considering welfare types *per se*, literature has linked these to different behaviours, performances and institutions in the labour markets. Labour market institutions vary with respect to welfare regime in place, as well as countries have different welfare regimes according to their civic qualities, these affecting in turn labour market institutions (see Y. ALGAN, P. CAHUC, M. SANGNIER, *Efficient and Inefficient Welfare States*, IZA DP No. 5445, January 2011). Countries have been grouped also on the basis of the recognition of different family values, influencing as well the specific institutions' mix of a country (see A. ALESINA, Y. ALGAN, P. CAHUC, P. GIULIANO, *Family values and the regulation of labor*, IZA DP No. 4747, February 2010; Y. ALGAN, P. CAHUC, *The Roots of Low European Employment: Family Culture*, IZA DP No. 1683, July 2005; Y. ALGAN, P. CAHUC, *Job Protection: The Macho Hypothesis*, IZA DP No. 1192, June 2004). Specifically addressing youth unemployment, few studies have underlined the fact that historically based institutions and political tradition, cultural values, social capital provide a more satisfying interpretation than mainstream economics (see B. CONTINI, *Youth Employment in Europe: Institutions and Social Capital Explain Better than Mainstream Economics*, IZA Discussion Paper No. 4718, January 2010).

Labour market models (and embedded institutions mix) have been evaluated in terms of their performance, revealing two peaks models which are connected to best outcomes: Liberal, Anglo-Saxon models on the one side and Co-ordinated market economies (as Germany) on the other side (see P.A. HALL, D.W. GINGERICH, *Varieties of capitalism and institutional complementarities in the macroeconomy. An empirical analysis*, MPIfG Discussion Paper 04/5, 2004).

III. The Relationship between Young and Old in the Labour Market: A Comparative Analysis

As already noted a wide literature has attributed the youth unemployment problem to the existence of an insider-outsider dualism, between, on the one side, youth who are either unemployed or in precarious positions (outsiders), and, on the other side, adults that are over-protected and stable in the labour market (insiders). Such a dualism has moreover brought some labour market policy makers and social partners to the firm

belief that older workers crowd out younger and that, therefore, releasing jobs by older workers through early retirement or work-sharing or “bridge” schemes would be beneficial for youth employment. Despite the “Lump of labour” theory can be considered the most famous fallacy of economics and related literature has rejected the old/youth crowding out hypothesis. Empirical literature on the relationship between youth employment and employment of older workers is relatively small (see J. GRUBER, D. A. WISE, *Social Security Programs and Retirement around the World: The Relationship to Youth Employment*, University of Chicago Press, 2010 and, specifically, the Introduction by Gruber, Milligan and Wise; A. KALWIJ, A. KAPTEYN, K. DE VOS, *Retirement of older workers and employment of the young*, *De Economist*, 158, No. 4, 2010; A. H. MUNNEL, *Will delayed retirement by the baby boomers lead to higher unemployment among younger workers?*, CRR WP 2012-22, Center for Retirement Research at Boston College, October 2012; W. EICHHORST et al, *Combining the entry of young people in the labour market with the retention of older workers*, European Parliament, IP/A/EMPL/ST/2012-04, April 2013; W. EICHHORST, T. BOERI, A. DE COEN, V. GALASSO, M.J. KENDZIA, N. STEIBER, *How to Combine the Entry of Young People in the Labour Market with the Retention of Older Workers?*, IZA DP No. 7829, December 2013), this idea seems to have gained new momentum.

Spurred by the persistency of the economic crisis, new government interventions or proposals focused on the youth and old relationship in the labour market have been issued. Italian Government led by Enrico Letta has in fact proposed the introduction of a bridge scheme between youth and old in the labour market, with the latter reducing their working hours in exchange of the incentives to the hiring of youth (see, for a comment on a recent proposal by the Italian government, M. SQUEGLIA, *La "staffetta intergenerazionale" tra discutibili modelli e dubbie prospettive*, *Bol. Speciale ADAPT* n. 14/2013 and for details on the project Law see M.C. AMORIGI, R. ZUCARO, *La solidarietà intergenerazionale tra part time e staffetta: commento al DDL Santini-Ghedini del 21 marzo 2013*, in *Boll. Speciale ADAPT*, 30 maggio 2013, n. 14). Even though the project law pretends to be inspired by the European year for active ageing and solidarity between generations, its contents are contradictory (EUROPEAN COMMISSION, *Accompanying document to the Decision of the European Parliament*

and of the Council on the European Year for Active Ageing (2012), SEC(2012)1002 final, in ADAPT International Bulletin, Special Issue n. 2/2012).

The Italian proposal has been inspired, though with important differences, by recent French law on “Contrat de Generation”, which instead aims to the promotion of youth employment and the retention of senior employees at the same time (see the policy document suggesting a bill introducing the ‘contrat de génération’: MINISTERE DU TRAVAIL, DE L’EMPLOI, DE LA FORMATION PROFESSIONNELLE ET DU DIALOGUE SOCIAL, *Document d’Orientattion Negociation Nationale Interprofessionnelle sur le Contrat de Generation*, 4 September 2012 ; see a comment on the French law L. CASANO, *La riforma francese del lavoro: dalla sécurisation alla flexicurity europea?*, ADAPT Labour studies e-book series, n. 7, ADAPT University Press, 2013).

Appendix

1) Labour market institutions correlation matrix

Table 49 - Labour market institutions correlation matrix

Youth unemployment	Output gap	ALMP	Product market regulation	Employment protection legislation (regular employment)	
1,0000	-0,3762	-0,3811	0,2970	0,2150	Youth unemployment
	1,0000	0,1897	-0,2037	-0,0513	Output gap
		1,0000	0,0388	0,2602	ALMP
			1,0000	0,4047	Product market regulation
				1,0000	Employment protection legislation (regular employment)
Employment protection legislation (regular employment and collective dismissals)	Employment protection legislation (temporary work)	Tax wedge	Union density	Corporatism	
0,2150	0,4619	0,4488	-0,1008	-0,1988	Youth unemployment
-0,0513	-0,0590	-0,1146	-0,0465	0,0340	Output gap
0,2602	0,1860	0,2740	0,4688	0,4237	ALMP
0,4047	0,5787	0,1556	0,1817	0,1626	Product market regulation
1,0000	0,5954	0,4745	0,1038	0,4478	Employment protection legislation (regular employment)
1,0000	0,5954	0,4745	0,1038	0,4478	Employment protection legislation (regular employment and collective dismissals)
	1,0000	0,5423	0,0816	0,1573	Employment protection legislation (temporary work)

		1,0000	0,3561	0,2512	Tax wedge
			1,0000	0,3433	Union density
				1,0000	Corporatism
				Unemployment benefit	
				-0,0879	Youth unemployment
				0,0116	Output gap
				0,4187	ALMP
				-0,0285	Product market regulation
				0,3274	Employment protection legislation (regular employment)
				0,3274	Employment protection legislation (regular employment and collective dismissals)
				0,0702	Employment protection legislation (temporary work)
				0,1857	Tax wedge
				0,2436	Union density
				0,3143	Corporatism
				1,0000	Unemployment benefit

2) Active labour market policy is instrumented in multiple versions.

Table 50 - Lagged first difference of the residual of a regression of ALMP on up to three lags of the output gap (3 lags output gap)

Fixed-effects, 290 observations
21 cross section
Lenght of time-series: minimum 2, maximum 18
Dependent variable: Youth unemployment

	<i>Coefficient</i>	<i>Std.Error</i>	<i>t-statistic</i>	<i>p-value</i>	
const	2,40615	4,89631	0,4914	0,62357	
Unemployment benefit	0,0795689	0,0483821	1,6446	0,10134	
Tax wedge	0,192969	0,0520464	3,7076	0,00026	***
Union density	0,0596852	0,0831677	0,7176	0,47366	

EPL (regular employment)	4,01341	1,10426	3,6345	0,00034	***
Product market regulation	0,714595	0,469035	1,5235	0,12892	
Corporatism	-4,27171	0,852574	-5,0104	<0,00001	***
Output gap	-1,20054	0,124627	-9,6330	<0,00001	***
ALMP	-0,165968	0,0498353	-3,3303	0,00100	***
dt 8	-5,05653	1,81739	-2,7823	0,00582	***
dt 10	-5,25003	1,74507	-3,0085	0,00290	***
dt 12	-6,0248	1,70871	-3,5259	0,00050	***
dt 14	-3,43895	1,61312	-2,1319	0,03402	**
dt 15	-2,22822	1,48465	-1,5008	0,13469	
dt 16	-2,4391	1,36977	-1,7807	0,07621	*
dt 17	-2,52453	1,31653	-1,9176	0,05633	*
dt 18	-1,8689	1,239	-1,5084	0,13275	
dt 19	-2,6726	1,17718	-2,2703	0,02406	**
dt 20	-2,41203	1,08889	-2,2151	0,02767	**
dt 21	-2,73149	1,02448	-2,6662	0,00818	***
dt 22	-4,48396	1,01909	-4,4000	0,00002	***
dt 23	-3,99866	1,00002	-3,9986	0,00008	***
dt 24	-4,23866	1,01274	-4,1853	0,00004	***
dt 25	-2,88806	0,99932	-2,8900	0,00420	***
dt 26	-1,44831	0,942161	-1,5372	0,12553	
dt 27	-0,529167	0,907945	-0,5828	0,56055	

Media var. dipendente	14,27471	SQM var. dipendente	7,191379
Somma quadr. residui	1696,950	E.S. della regressione	2,637179
R-quadro	0,886461	R-quadro corretto	0,865521
F(45, 244)	42,33405	P-value(F)	8,05e-92
Log-verosimiglianza	-667,6647	Criterio di Akaike	1427,329
Criterio di Schwarz	1596,144	Hannan-Quinn	1494,965
rho	0,756440	Durbin-Watson	0,488698

Test per la differenza delle intercette di gruppo -
Ipotesi nulla: i gruppi hanno un'intercetta comune
Statistica test: $F(20, 244) = 39,1803$
con p-value = $P(F(20, 244) > 39,1803) = 1,38931e-064$

Test di Wald per la significatività congiunta delle dummy temporali
Statistica test asintotica: $\text{Chi-quadro}(17) = 63,1934$
con p-value = $3,09369e-007$

Table 51 - 3 lags of output gap in the preliminary regression, not differencing residuals

Fixed-effects, 308 observations
21 cross section
Length of time-series: minimum 1, maximum 19
Dependent variable: Youth unemployment

	<i>Coefficient</i>	<i>Std.Error</i>	<i>t-statistic</i>	<i>p-value</i>	
const	-3,23841	4,83972	-0,6691	0,50400	
Unemployment benefit	0,083019	0,0476367	1,7428	0,08255	*
Tax wedge	0,190232	0,0501108	3,7962	0,00018	***
Union density	0,114004	0,0771651	1,4774	0,14077	
EPL (regular employment)	4,93912	1,08684	4,5445	<0,00001	***
Product market regulation	-0,223661	0,451256	-0,4956	0,62057	
Corporatism	-2,03484	0,774124	-2,6286	0,00908	***
Output gap	-1,24504	0,118184	-10,5348	<0,00001	***
ALMP	-0,124358	0,0203176	-6,1207	<0,00001	***
dt_6	-0,801265	1,91485	-0,4184	0,67596	
dt_8	-1,76249	1,80784	-0,9749	0,33050	
dt_10	-1,99174	1,72422	-1,1552	0,24908	
dt_12	-3,2535	1,60451	-2,0277	0,04361	**
dt_14	-1,92583	1,58814	-1,2126	0,22637	
dt_15	-0,809924	1,46505	-0,5528	0,58085	
dt_16	-1,2134	1,36167	-0,8911	0,37369	
dt_17	-0,844839	1,30746	-0,6462	0,51874	
dt_18	-0,317979	1,23638	-0,2572	0,79724	
dt_19	-1,10502	1,18822	-0,9300	0,35324	
dt_20	-0,822312	1,1097	-0,7410	0,45935	
dt_21	-1,40156	1,04479	-1,3415	0,18093	
dt_22	-2,81404	1,0468	-2,6882	0,00765	***
dt_23	-3,09728	1,02253	-3,0290	0,00270	***
dt_24	-3,15159	1,02783	-3,0663	0,00240	***
dt_25	-2,00233	1,00063	-2,0011	0,04642	**
dt_26	-1,00037	0,943758	-1,0600	0,29013	
dt_27	-0,156532	0,927906	-0,1687	0,86617	

Media var. dipendente	14,23697	SQM var. dipendente	7,361659
Somma quadr. residui	1914,189	E.S. della regressione	2,708146
R-quadro	0,884948	R-quadro corretto	0,864670
F(46, 261)	43,64207	P-value(F)	3,79e-98
Log-verosimiglianza	-718,3833	Criterio di Akaike	1530,767
Criterio di Schwarz	1706,081	Hannan-Quinn	1600,865
rho	0,824761	Durbin-Watson	0,354137

Test per la differenza delle intercette di gruppo -
 Ipotesi nulla: i gruppi hanno un'intercetta comune
 Statistica test: $F(20, 261) = 42,0079$
 con $p\text{-value} = P(F(20, 261) > 42,0079) = 9,7523e-070$

Test di Wald per la significatività congiunta delle dummy temporali

Statistica test asintotica: Chi-quadro(18) = 39,8603
 con p-value = 0,00218058

Table 52 - 2 lags of output gap in the preliminary regression), lagged difference of residuals

Fixed-effects, 291 observations
 21 cross sections
 Length of time-series: minimum 2, maximum 18
 Dependent variable: Youth unemployment

	<i>Coefficient</i>	<i>Std.Error</i>	<i>t-statistic</i>	<i>p-value</i>	
const	2,49877	4,93867	0,5060	0,61334	
Unemployment benefit	0,0813063	0,0487754	1,6670	0,09680	*
Tax wedge	0,193248	0,0524058	3,6875	0,00028	***
Union density	0,0491459	0,0836192	0,5877	0,55725	
EPL (regular employment)	4,12866	1,11203	3,7127	0,00025	***
Product market regulation	0,558772	0,46721	1,1960	0,23286	
Corporatism	-4,11057	0,85711	-4,7958	<0,00001	***
Output gap	-1,22582	0,125098	-9,7989	<0,00001	***
ALMP	-0,153896	0,050687	-3,0362	0,00265	***
dt 8	-4,62647	1,8212	-2,5403	0,01169	**
dt 10	-4,62777	1,74557	-2,6512	0,00854	***
dt 12	-5,60174	1,7143	-3,2676	0,00124	***
dt 14	-3,1737	1,62346	-1,9549	0,05173	*
dt 15	-1,77783	1,49239	-1,1913	0,23470	
dt 16	-2,5574	1,3797	-1,8536	0,06500	*
dt 17	-2,15383	1,32282	-1,6282	0,10477	
dt 18	-1,74725	1,24584	-1,4025	0,16204	
dt 19	-2,3692	1,18285	-2,0030	0,04628	**
dt 20	-2,10049	1,09851	-1,9121	0,05703	*
dt 21	-2,54873	1,03118	-2,4717	0,01413	**
dt 22	-4,21005	1,02423	-4,1105	0,00005	***
dt 23	-3,8773	1,01112	-3,8347	0,00016	***
dt 24	-4,20152	1,02075	-4,1161	0,00005	***
dt 25	-2,61591	1,00555	-2,6015	0,00985	***
dt 26	-1,39312	0,949242	-1,4676	0,14349	
dt 27	-0,395482	0,912634	-0,4333	0,66515	

Media var. dipendente	14,25378	SQM var. dipendente	7,187848
Somma quadr. residui	1731,430	E.S. della regressione	2,658394
R-quadro	0,884440	R-quadro corretto	0,863214
F(45, 245)	41,66896	P-value(F)	2,43e-91

Log-verosimiglianza	-672,3928		Criterio di Akaike	1436,786
Criterio di Schwarz	1605,759		Hannan-Quinn	1504,477
rho	0,756287		Durbin-Watson	0,480273

Test per la differenza delle intercette di gruppo -
 Ipotesi nulla: i gruppi hanno un'intercetta comune
 Statistica test: $F(20, 245) = 39,3222$
 con p-value = $P(F(20, 245) > 39,3222) = 7,32404e-065$

Test di Wald per la significatività congiunta delle dummy temporali
 Statistica test asintotica: $\text{Chi-quadro}(17) = 59,392$
 con p-value = $1,32359e-006$

Table 53 - 2 lags of output gap in the preliminary regression), not differencing residuals

Fixed-Effects, 309 observations
 21 cross sections
 Length of time series: minimum 1, maximum 19
 Dependent variable: Youth unemployment

	<i>Coefficient</i>	<i>Std.Error</i>	<i>t-statistic</i>	<i>p-value</i>	
const	-3,07397	4,82996	-0,6364	0,52505	
Unemployment benefit	0,0823749	0,0475981	1,7306	0,08469	*
Tax wedge	0,190162	0,0500055	3,8028	0,00018	***
Union density	0,108219	0,0769558	1,4063	0,16083	
EPL (regular employment)	4,99652	1,08094	4,6224	<0,00001	***
Product market regulation	-0,28678	0,445772	-0,6433	0,52057	
Corporatism	-1,98192	0,77018	-2,5733	0,01062	**
Output gap	-1,25352	0,117855	-10,6362	<0,00001	***
ALMP	-0,126886	0,0201993	-6,2817	<0,00001	***
dt_6	-0,627841	1,90159	-0,3302	0,74154	
dt_8	-1,64513	1,79499	-0,9165	0,36024	
dt_10	-1,79488	1,71277	-1,0479	0,29563	
dt_12	-3,11782	1,59677	-1,9526	0,05193	*
dt_14	-1,94398	1,58619	-1,2256	0,22146	
dt_15	-0,697184	1,45846	-0,4780	0,63303	
dt_16	-1,04617	1,35669	-0,7711	0,44133	
dt_17	-0,839538	1,3	-0,6458	0,51897	
dt_18	-0,292914	1,22984	-0,2382	0,81193	
dt_19	-1,02918	1,18361	-0,8695	0,38535	
dt_20	-0,802069	1,10379	-0,7266	0,46809	
dt_21	-1,33089	1,04153	-1,2778	0,20244	
dt_22	-2,76111	1,04432	-2,6439	0,00869	***

dt_23	-3,13374	1,019	-3,0753	0,00233	***
dt_24	-3,09638	1,02739	-3,0138	0,00283	***
dt_25	-1,97805	0,999669	-1,9787	0,04890	**
dt_26	-0,966304	0,943201	-1,0245	0,30655	
dt_27	-0,203352	0,926845	-0,2194	0,82651	

Media var. dipendente	14,21540		SQM var. dipendente	7,359479
Somma quadr. residui	1918,123		E.S. della regressione	2,705749
R-quadro	0,885018		R-quadro corretto	0,864830
F(46, 262)	43,83933		P-value(F)	1,28e-98
Log-verosimiglianza	-720,5321		Criterio di Akaike	1535,064
Criterio di Schwarz	1710,531		Hannan-Quinn	1605,216
rho	0,825536		Durbin-Watson	0,355183

Test per la differenza delle intercette di gruppo -

Ipotesi nulla: i gruppi hanno un'intercetta comune

Statistica test: $F(20, 262) = 42,7084$

con $p\text{-value} = P(F(20, 262) > 42,7084) = 1,41185e-070$

Test di Wald per la significatività congiunta delle dummy temporali

Statistica test asintotica: $\text{Chi-quadro}(18) = 39,4425$

con $p\text{-value} = 0,00248419$

Table 54 - 1 lag of output gap in the preliminary regression, lagged difference of residuals

Fixed-Effects, 292 observations
21 cross sections
Length of time-series: minimum 2, maximum 18
Dependent variable: Youth unemployment

	<i>Coefficient</i>	<i>Std.Error</i>	<i>t-statistic</i>	<i>p-value</i>	
const	2,73016	4,9671	0,5496	0,58306	
Unemployment benefit	0,0831646	0,0491053	1,6936	0,09161	*
Tax wedge	0,198852	0,0526697	3,7755	0,00020	***
Union density	0,0322209	0,0839237	0,3839	0,70136	
EPL (regular employment)	4,23693	1,11729	3,7922	0,00019	***
Product market regulation	0,438851	0,466434	0,9409	0,34770	
Corporatism	-3,94532	0,859335	-4,5911	<0,00001	***
Output gap	-1,24729	0,125465	-9,9414	<0,00001	***
ALMP	-0,144512	0,0498919	-2,8965	0,00411	***
dt_8	-4,29894	1,82647	-2,3537	0,01938	**
dt_10	-4,28505	1,74837	-2,4509	0,01495	**
dt_12	-5,34677	1,72074	-3,1072	0,00211	***

dt_14	-2,89658	1,63462	-1,7720	0,07763	*
dt_15	-2,07167	1,49994	-1,3812	0,16848	
dt_16	-2,33759	1,38613	-1,6864	0,09298	*
dt_17	-2,16019	1,32931	-1,6251	0,10543	
dt_18	-1,57904	1,25145	-1,2618	0,20823	
dt_19	-2,20769	1,18878	-1,8571	0,06449	*
dt_20	-2,07344	1,10203	-1,8815	0,06109	*
dt_21	-2,42185	1,03681	-2,3359	0,02030	**
dt_22	-4,17421	1,03062	-4,0502	0,00007	***
dt_23	-3,95262	1,0145	-3,8961	0,00013	***
dt_24	-4,08186	1,02542	-3,9807	0,00009	***
dt_25	-2,69032	1,01218	-2,6579	0,00838	***
dt_26	-1,41973	0,955741	-1,4855	0,13870	
dt_27	-0,533543	0,921758	-0,5788	0,56323	

Media var. dipendente	14,23319	SQM var. dipendente	7,184103
Somma quadr. residui	1761,849	E.S. della regressione	2,676189
R-quadro	0,882691	R-quadro corretto	0,861232
F(45, 246)	41,13397	P-value(F)	5,44e-91
Log-verosimiglianza	-676,7454	Criterio di Akaike	1445,491
Criterio di Schwarz	1614,622	Hannan-Quinn	1513,238
rho	0,764825	Durbin-Watson	0,465080

Test per la differenza delle intercette di gruppo -
 Ipotesi nulla: i gruppi hanno un'intercetta comune
 Statistica test: $F(20, 246) = 39,3576$
 con $p\text{-value} = P(F(20, 246) > 39,3576) = 4,94424e-065$

Test di Wald per la significatività congiunta delle dummy temporali
 Statistica test asintotica: $\text{Chi-quadro}(17) = 54,8649$
 con $p\text{-value} = 7,20313e-006$

Table 55 - 1 lag output gap in the preliminary regression, not differencing residuals

Fixed-Effects, 309 observations
 21 cross sections
 Length of time series: minimum 1, maximum 19
 Dependent: Youth unemployment

	<i>Coefficient</i>	<i>Std.Error</i>	<i>t-statistic</i>	<i>p-value</i>	
const	-2,98664	4,81082	-0,6208	0,53526	
Unemployment benefit	0,0822899	0,0474259	1,7351	0,08389	*
Tax wedge	0,185714	0,0498794	3,7233	0,00024	***
Union density	0,107542	0,0766532	1,4030	0,16181	
EPL (regular employment)	5,00476	1,07708	4,6466	<0,00001	***

Product market regulation	-0,280446	0,443758	-0,6320	0,52795	
Corporatism	-1,96383	0,767001	-2,5604	0,01102	**
Output gap	-1,25926	0,117377	-10,7284	<0,00001	***
ALMP	-0,129096	0,0200071	-6,4525	<0,00001	***
dt_6	-0,710686	1,8902	-0,3760	0,70723	
dt_8	-1,63814	1,78745	-0,9165	0,36026	
dt_10	-1,78067	1,70569	-1,0440	0,29747	
dt_12	-3,12375	1,59029	-1,9643	0,05056	*
dt_14	-1,93239	1,57994	-1,2231	0,22240	
dt_15	-0,641737	1,45376	-0,4414	0,65926	
dt_16	-1,11561	1,3493	-0,8268	0,40910	
dt_17	-0,885767	1,2938	-0,6846	0,49419	
dt_18	-0,290578	1,22495	-0,2372	0,81267	
dt_19	-1,06618	1,17778	-0,9052	0,36617	
dt_20	-0,778087	1,09964	-0,7076	0,47983	
dt_21	-1,30643	1,03775	-1,2589	0,20919	
dt_22	-2,79282	1,03872	-2,6887	0,00763	***
dt_23	-3,05753	1,01667	-3,0074	0,00289	***
dt_24	-3,05886	1,02407	-2,9870	0,00308	***
dt_25	-1,9228	0,996734	-1,9291	0,05480	*
dt_26	-0,99112	0,939531	-1,0549	0,29244	
dt_27	-0,188649	0,923568	-0,2043	0,83831	

Media var. dipendente	14,21540	SQM var. dipendente	7,359479
Somma quadr. residui	1904,384	E.S. della regressione	2,696042
R-quadro	0,885841	R-quadro corretto	0,865798
F(46, 262)	44,19667	P-value(F)	5,11e-99
Log-verosimiglianza	-719,4215	Criterio di Akaike	1532,843
Criterio di Schwarz	1708,310	Hannan-Quinn	1602,995
rho	0,822427	Durbin-Watson	0,359239

Test per la differenza delle intercette di gruppo -
 Ipotesi nulla: i gruppi hanno un'intercetta comune
 Statistica test: $F(20, 262) = 43,1498$
 con p-value = $P(F(20, 262) > 43,1498) = 5,13822e-071$

Test di Wald per la significatività congiunta delle dummy temporali
 Statistica test asintotica: $\text{Chi-quadro}(18) = 38,6142$
 con p-value = 0,0032096

Table 56 - Levels, excluding top spender countries (Scandinavian plus the Netherlands)

Fixed-Effects, 217 observations
 16 cross sections
 Length of time series: minimum 1, maximum 19
 Dependent variable: Youth unemployment

	<i>Coefficient</i>	<i>Std.Error</i>	<i>t-statistic</i>	<i>p-value</i>	
const	12,3211	4,33563	2,8418	0,00502	***
Unemployment benefit	0,0839861	0,0638474	1,3154	0,19009	
Tax wedge	0,153229	0,0524599	2,9209	0,00395	***
Union density	-0,129885	0,0775172	-1,6756	0,09561	*
EPL (regular employment)	3,90385	1,03193	3,7831	0,00021	***
Product market regulation	0,713931	0,464684	1,5364	0,12625	
Corporatism	-3,20959	0,880544	-3,6450	0,00035	***
Output gap	-0,812412	0,146858	-5,5320	<0,00001	***
ALMP	-0,397224	0,0602661	-6,5912	<0,00001	***
dt_5	0,31732	1,89368	0,1676	0,86712	
dt_7	-0,07416	1,79403	-0,0413	0,96707	
dt_9	-1,27941	1,67367	-0,7644	0,44564	
dt_11	-1,0629	1,57278	-0,6758	0,50006	
dt_13	-0,661763	1,57069	-0,4213	0,67404	
dt_14	-0,14764	1,4375	-0,1027	0,91831	
dt_15	-0,519571	1,36938	-0,3794	0,70484	
dt_16	-0,15183	1,32446	-0,1146	0,90887	
dt_17	0,0669287	1,26366	0,0530	0,95782	
dt_18	-0,78013	1,21539	-0,6419	0,52179	
dt_19	-0,216013	1,14066	-0,1894	0,85002	
dt_20	-0,941693	1,07018	-0,8799	0,38010	
dt_21	-1,79742	1,10736	-1,6232	0,10636	
dt_22	-2,0269	1,05826	-1,9153	0,05708	*
dt_23	-1,73142	1,07284	-1,6139	0,10836	
dt_24	-1,34603	1,01746	-1,3229	0,18758	
dt_25	-0,682331	0,968037	-0,7049	0,48183	
dt_26	-0,0970911	0,952993	-0,1019	0,91897	

Media var. dipendente	14,70988	SQM var. dipendente	7,818123
Somma quadr. residui	961,0809	E.S. della regressione	2,343478
R-quadro	0,927205	R-quadro corretto	0,910150
F(41, 175)	54,36617	P-value(F)	7,27e-80
Log-verosimiglianza	-469,3752	Criterio di Akaike	1022,750
Criterio di Schwarz	1164,706	Hannan-Quinn	1080,095
rho	0,806854	Durbin-Watson	0,359557

Test per la differenza delle intercette di gruppo -

Ipotesi nulla: i gruppi hanno un'intercetta comune

Statistica test: $F(15, 175) = 31,2368$

con $p\text{-value} = P(F(15, 175) > 31,2368) = 1,25813e-041$

Test di Wald per la significatività congiunta delle dummy temporali

Statistica test asintotica: Chi-quadro(18) = 14,6546
 con p-value = 0,685533

Table 57 - Instrumented variable, excluding top spender countries (Scandinavian plus the Netherlands)

Fixed-Effects, 202 observations
 16 cross sections
 Length of time series: minimum 2, maximum 18
 Dependent variable: Youth unemployment

	<i>Coefficient</i>	<i>Std.Error</i>	<i>t-statistic</i>	<i>p-value</i>	
const	9,88759	4,6467	2,1279	0,03487	**
Unemployment benefit	0,0387703	0,0686184	0,5650	0,57285	
Tax wedge	0,163911	0,0588384	2,7858	0,00598	***
Union density	-0,0555357	0,0903513	-0,6147	0,53964	
EPL (regular employment)	1,79355	0,531836	3,3724	0,00093	***
Product market regulation	3,72258	1,12798	3,3002	0,00119	***
Corporatism	-6,64918	1,24823	-5,3269	<0,00001	***
Output gap	-1,1519	0,155571	-7,4043	<0,00001	***
ALMP	-0,31176	0,105482	-2,9556	0,00359	***
dt 7	-4,93963	2,00663	-2,4616	0,01488	**
dt 9	-5,32768	1,87309	-2,8443	0,00503	***
dt 11	-6,74478	1,85833	-3,6295	0,00038	***
dt 13	-4,64624	1,70073	-2,7319	0,00700	***
dt 14	-2,68119	1,57337	-1,7041	0,09029	*
dt 15	-3,5179	1,4855	-2,3682	0,01906	**
dt 16	-3,54353	1,43646	-2,4669	0,01468	**
dt 17	-2,56812	1,36294	-1,8842	0,06133	*
dt 18	-3,51643	1,29341	-2,7187	0,00727	***
dt 19	-3,39722	1,20093	-2,8288	0,00527	***
dt 20	-3,49228	1,12454	-3,1055	0,00225	***
dt 21	-5,2218	1,1214	-4,6565	<0,00001	***
dt 22	-4,43731	1,09032	-4,0697	0,00007	***
dt 23	-4,08479	1,10871	-3,6843	0,00031	***
dt 24	-3,02523	1,0822	-2,7955	0,00581	***
dt 25	-1,72863	1,03605	-1,6685	0,09716	*
dt 26	-0,175114	0,993922	-0,1762	0,86037	

Media var. dipendente	14,79717	SQM var. dipendente	7,599411
Somma quadr. residui	955,6529	E.S. della regressione	2,436336
R-quadro	0,917673	R-quadro corretto	0,897219
F(40, 161)	44,86518	P-value(F)	1,20e-68

Log-verosimiglianza	-443,5924		Criterio di Akaike	969,1848
Criterio di Schwarz	1104,824		Hannan-Quinn	1024,065
rho	0,674822		Durbin-Watson	0,610881

Test per la differenza delle intercette di gruppo -

Ipotesi nulla: i gruppi hanno un'intercetta comune

Statistica test: $F(15, 161) = 43,8637$

con p-value = $P(F(15, 161) > 43,8637) = 5,83458e-049$

Test di Wald per la significatività congiunta delle dummy temporali

Statistica test asintotica: $\text{Chi-quadro}(17) = 50,2298$

con p-value = $3,89058e-005$

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