YOUTH UNEMPLOYMENT: INSTITUTIONS AND VET SYSTEMS – A CROSS - COUNTRY CLASSIFICATION

1. Introduction

The political, economic and social relevance of guaranteeing decent and productive employment for youth in developing and developed countries has already been recognized as one of the main issues for the new millennium (see United Nations Millennium Declaration, 2000). Nevertheless the long lasting global crisis started in 2008 has disproportionately affected young people and exacerbated the weakness of their condition in the labour market.

In particular, is a matter of concern that in developed countries the crisis has made the transition from school to work more difficult, especially for young people without an educational background that corresponds to the needs of the structural and technological change. Some countries have therefore created or reinforced institutions to support entry into the labour market.

Education and skills formation are generally related to the possibilities of a young worker of being employed: indeed, the observed differences in the severity of youth unemployment across countries can also depend on how the national school-to-work institutions are organized (Ryan, 2001). Another feature common to many economies is the fact that young people with low levels of qualification face higher risks of exclusion and lacking access to employment with respect other workers more qualified: unemployment rates of higher skilled people tend to be lower than those of low skilled and their average employment rates are higher (Biavaschi et al., 2012). Education and training are hence considered core factors in determining the chance of a successful transition into work. The expansion of general education occurred in many countries in recent years is one of the explanation of the substantial increase in overall levels of educational attainment; nevertheless, the integration of youth into the labour market is still considered a major hurdle in many countries, as the quality of the education system and its linkage to the labour market, too much often almost no existent.

This article aims to study the implementation of the VET systems (vocational education and training systems) in the institutional analysis of the unemployment (in this case only for young workers) and the elaboration of an across - country classification empirically founded. More precisely we analyse the relationship between youth unemployment (and employment) rates and the participation rates (in the) to the vocational programmes at the secondary level of education (ISCED levels 2 and 3, according to the ISCED classification) through a fixed effects approach. A further purpose is to implement an (empirical) model of cross - country classification based on this relationship.

The outline of this paper is as follows. In session one the debate on youth unemployment and on the school to work transition is reviewed. Session two discusses the effect of the participation in vocational programmes on youth unemployment rates. Session three proposes an empirical model of cross-country classification.

2. The Youth Labour Market and the Transition from School – to – Work. Specific Policies and Institutions.

Youth unemployment is one of the most arduous challenge for politics and economics, because it is a difficult issue to deal with, in terms of social and politic intervention. Differently from the total unemployment, the youth one is affected not only by labour market rules, especially with regard to hiring and firing, but rather by a series of factors including the quality of the education system, the whole of the institutions operating during the school-to-work transition, the integration between school and work-based training, the quality of the industrial relations system. Even the studies specific for youth employment outcomes are more complicated, because youth participation is often an unclear phenomenon – since amongst young population a great part of inactive people are students – and because it is not rare to experience a lack of data (Bassanini, Duval, 2006). Moreover, young workers are considered as vulnerable workers, because they are in a delicate phase of their working life, the first entry in the labour force and so in the labour market. Several reasons justifies this vulnerability: young workers show less or none working experience, which can affect negatively their productivity; they tend to be more adaptable and flexible, but they generally receive lower salaries and wages and their contracts are often temporary. These working conditions can be worsened if there are other specific characteristics, as gender, ethnicity, disability, regional disparity, differences in skills and education. In particular, the latter is the reason that originates the so called *youth experience gap*, which consists of the fact that workers at the first experience don't have the same knowledge, skills, competences that can be learnt only at work. Natural explanations for the youth-adult unemployment gap are that young people initially lack important job search skills - generic or specific - and have only little work experience to offer. As a result, young workers often show high turnover rates.

Younger workers tend to be more severely affected by economic fluctuations (Biavaschi et al., 2012; Bell and Blanchflower, 2009) and when they are caught by the crisis, they are more vulnerable to its effects than are adults (O'Higgings, 2010). The higher sensitivity to the business cycle is due to different reasons, but in particular for their disproportionate presence among temporary jobs and their high concentration in some cyclically-sensitive industries, as for example construction (Scarpetta et al., 2010). The effects of youth unemployment can be slightly more detrimental than the ones of total unemployment, because they occurs at the begin of the working life of a person and thus they can give rise to discouragement; in particular, youth unemployment can be seriously damaged the more its duration is long. The consequences are overall psychological, material, behavioural and economic. The latter are primarily two: the persistence of unemployment and the scarring effect. However, other important effects of youth unemployment are on welfare, in the longer term, on human capital accumulation, on fertility rates (Jimeno, Rodriguez-Palenzuela, 2002).

A simple descriptive analysis of youth labour market is different from the one which studies the general labour market: it is necessary to combine different indicators, which could describe the picture of youth unemployment, even with respect to the adult unemployment. If one considers only the conventional indicators of labour market performance – unemployment and employment rates – the results can be a deceptive idea of

the youth labour market (ILO 2011). For Martin et al. (2007) this is mainly due to the fact that many young workers conciliate part-time job with the study and/or the searching activities for a work, alternating frequently periods in the work force with periods of inactivity, giving rise to a transition school-to-work not always linear.

In order to understand how youth labour market works, it is necessary to take into account additional aspects, as demographic factors and the labour demand patterns (Biavaschi et al., 2012).

The demographic structure affects young employability possibilities for two reasons: because it influences the size of younger cohorts and so determines young people's labour supply; and because it can affect the social and cultural approach of a country towards young people.

The most important determinants of fluctuations in youth unemployment are mainly due to the interactions between the variation of the aggregate demand, the youth wages, the size of the youth labour force. These interactions are even the main causes of youth unemployment, in conjunction with the lack (initial or not) of skills and the differences in education (O' Higgings, 2001). The latter, indeed, are strongly influencing the quality of work and the growth of potential output.

2.1. The Youth Labour Market: Specific Policies and Institutions.

Cross-country and intertemporal variations of youth integration into employment can be explained by the interaction of these above discussed features with the labour market institutions (O'Higgings, 2001). According to this statement, the institutions can play a key role in determining the successful of the younger workers, especially during the phase of the transition from school to work, which is not always clearly defined: it can vary according to the statistical uses and to the interpretations; Elder (2010) states that defining the school-to-work transition is a matter worthy of careful consideration, since it is the definition that determines the interpretation. A more general definition of the transition is just the change from the schooling stage of a person to the working life, where the wording schooling stage includes any level of education and any training program. As in Jimeno and Rodriguez-Palenzuela (2002) two institutional characteristics seem to be the most relevant for the study of youth unemployment rates: those that increase the overall cost of the standard labour contract, for instance employment protection, and those which does not make provision for some contractual flexibility for the specificities of young workers. The first ones could make younger workers less attractive than the prime age ones, because the average lower job experience tends to decrease their average productivity. The second characteristics leave youth in a relative disadvantage with respect prime age workers, if the general labour market setting is predominantly rigid.

Other institutions and policy can play a role in fighting unemployment, especially considering the different tactics of a full strategy against it, viz. activation, employability, skills and knowledge improvement, which are targets respectively of short and medium/short run. Actually, the analysis of the youth unemployment problem according to an institutional view is quite recent, partly due to the fact that it has become a serious issue for industrialized countries during the 1980s. While labour markets were booming in the early part of this century, youth unemployment was still a concern and its particularly rapid increase during the current recession has once again sharpened the policy focus on this issue. During the last twenty years, the studies and the

academic debate on high unemployment have been mainly based on the role of the labour market institutions. More precisely, the debate has started from the comparison among the European and the US labour markets, the first characterised by higher unemployment rates and rigid labour market institutions, the latter by lower unemployment rates and less rigid institutions. The European unemployment hysteresis - persistence over time of high unemployment rates - or the so-called *eurosclerosis* has been explained by the prevailing theories as a consequence of the rigidity of institutions. Several studies have been developed on this issue, but less attention has been devoted to the specific problem of youth unemployment, although in 1994, the OECD has recommended the investment in skills and human capital as the right way to improve employability and reduce youth unemployment (OECD, 1994).

Ryan and Piopiunik (2012) propose a useful classification of the policy interventions specific for the transition school-to-work into three groups: active labour market programmes, full time vocational schooling, apprenticeship system. Actually, the distinction between the second and the third group can be equivocal. Finally the youth guarantee or job guarantee must be mentioned: it is a system such that a government or a local authorities and the public employment services commit to offering a young person a job, training or re-training within a certain period of being made unemployed or leaving formal education (European Youth Forum, 2012). The main scope is to ensure equality of opportunity for young people in the labour market.

The research question finds, in particular, its motivation to the fact that, during the current recession, the best performances in terms of youth labour market outcomes have been observed in the countries where a dual scholastic system is prevailing, that is Germany, Austria, Denmark (Tiraboschi, 2012). Moreover, the debate around youth employability is centred on several proposal to the introduction and/or the enforcement of vocational educational systems, such that to make stronger the link between skills needed and required by the labour market demand and the school institutions. So, a more direct question is about the validity and efficacy of these kind of systems (Rodríguez-Planas et al. 2015)

Actually, detecting the relationship between youth unemployment and the educational organization is quite audacious, at least for five reasons. First of all, youth unemployment rates are not synthetic and/or complete indicators of the youth labour market. For instance, they can be lower for a higher duration of years spent in education or for a higher percentage of inactive youths, so these are measures that must be used jointly with other indexes. Improving the rates of youth unemployment, that is lowering it, does not imply that the youth condition gets for sure better (since this indicator is not always representative of the actual youth workers' condition), but it can be a good signal of an easiest entry in the labour market after education. Second, there is no a uniform definition across countries about vocational and training systems, nor data are complete or available, at least for quite long time series. Third, the use of evaluation methods could be a possibility to answer about the efficacy of VET systems on employability, but the lack of data and the distortive effects of these programmes suggest us to use more cautious strategies. Fourth, since school and education are part of institutions, the problem must be analyzed in an institutional view, that is taking into account in the analysis also other institutions. According to this statement, endogeneity of institutions is another possible source of weakness for the analysis, which is a discussed problem in literature: the risk of reverse causality, reflecting

some degree of endogeneity of policies and institutions with respect to unemployment patterns, consists of the possibility that causality runs from unemployment changes to policy changes (Bassanini, Duval, 2006). Finally, an eventual negative causal relationship between youth unemployment and VET systems tells something about the transition of young workers in the labour market, but it is not sufficient to give statement on the permanence of them in the employment (or in the labour force). This is to say that one can expect that VET system can almost for sure make easy the transition school-to –work, at least in the dual system type, but it does not guarantee that the worker will remain employed in his young age. As clearly explained by Ryan and Piopiunik (2012), the fact that 'mass apprenticeship' countries have developed a range of programmes helping youth to cross the threshold from school to apprenticeship, is associated with less severe problems for young people at the next threshold, from apprenticeship to regular employment, but this does not imply the absence of problems at the second threshold; indeed, such problems have led even the mass apprenticeship countries to adopt interventions like active labour market policies to assist young people at and after arriving at the second threshold. Another problem arises from the long time consequences, in fact with rapid technological change, gains in youth employment from vocational education may be offset by less adaptability and thus diminished employment later in life (Hanushek et al. 2011)

3. The effect of the participation in vocational programmes on youth unemployment rates. A fixed effects approach

The aim of this section is to study the effect of the participation to vocational programmes on the youth unemployment and employment indicators, through a fixed effects panel model. The choice of this methodology is justified since the estimations done by Bassanini and Duval (2006) are a sort of benchmark in the institutional literature, so in this work it is reproduced the same strategy. The fixed effects model controls for all time-invariant differences between the individuals, so the estimated coefficients cannot be biased because of omitted time - invariant characteristics (like culture, religion, gender, race, etc.). So, one side effect of the features of fixed effects models is that they cannot be used to investigate time invariant causes of the dependent variables. The data used are an unbalanced panel dataset elaborated starting from the CEP – OECD Institutions Data Set (1960-2004) by Nickell (2006), which has been the main source. Data are for twenty OECD countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, Norway, New Zealand, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States, for the period 1985 – 2010. The CEP - OECD dataset has been updated until 2010 and upgraded with other variables, all from the OECD website or from the World Bank data website. The dataset contains information about variables specific of the labour market institutions, youths, population. The greater part of this dataset is based on the labour market institutional variables, chosen according to the prevailing literature; more specifically, variables can be grouped according to what they refer: employment protection legislation; unemployment benefits; labour market policies; system of wage determination and taxes; labour force indicators; population indicators; education variables; macroeconomic indicators. The reason of considering

these several institutional variables is explained as follows. The employment protection legislation is one of the key factor in the generation of rigidity in the labour market. This legislation imposes to the employer some costs and severance pay in the case of dismissing, in order to protect the worker and the equity in the labour relationship. By the way empirical evidence of its impact on unemployment rate is varying. Unemployment benefits entail several forms of support to the employee's income in an unemployment status. The systems of wage determination are multidimensional: they refer to the union density, the union coverage, the degree of coordination and centralization of the bargaining. The collective bargaining is the main channel to establish wages in the greater part of OECD countries. The tax wedge is the difference between the labour cost sustained by the employer and the net wage perceived by the employee.

The specification used in this work is:

$$YUR_{it} = \beta\, lrelWb_{it} + \Sigma\, \nu_j X_{it} + \chi\, G_{it} + \varepsilon_{it} \quad (1.1)$$

where YUR is the youth unemployment rate, $lrelWb_{it}$ is the variation of the rate of enrolment at vocational programmes; it is defined as the natural logarithm of the *rellenrolwb* variable. *rellenrolwb* variable is defined as technical/vocational enrolment in secondary (ISCED 2 and 3) as % of total secondary enrolment (ISCED 2 and 3) is the percentage of all lower and upper secondary students enrolled in technical/vocational education programs including teacher training, expressed as a percentage of the total number of students who are enrolled in lower and upper secondary education. The choice of using a rate of enrollment has a twofold explanation. First of all, it can be considered as an indicator of how young people take part to vocational programmes with respect other possible choices at a seondary level of education. Second, the related data are more complete than the expenditures variables. The use of the logarithm instead of the simple rate, is mainly due to the fact that it allows to convert variations of the variables in percentage variations (so, even the interpretation is simpler). X_{it} is a vector of variable representing specific policy variables - the tax wedge, employment protection legislation indicator, indicator of active labour market policies expenditures on the GDP, bargaining and union coverage, benefit duration index, union density (in the dataset these variables are named respectively TaxWedge, epoecd, almpgdp, adjcov, abd, udnetA) – and control variables, chosen taking guidance from previous literature. These are the ratio youth population on total population, the minimum wage, the average years of schooling (in the dataset these variables are named respectively YpopTpop, minw_medw, educ). G_{it} is the annual growth rate of the Gross Domestic Product (GDP). Several estimation attempts have been done. The specification has been replied using as dependent variable five alternative indicators: the four ILO indicators and the employment rate emp_{it}. For each indicators, the regression has been estimated using three alternative independent variable representing the VET education: the participation rate (source OECD - in the dataset is *lrelOECD*), the participation rate (source World Bank - in the dataset is *lrelWb*), the relative expenditure (source OECD - in the dataset is *lexp*). All the estimation has been done for the period 1985 – 2010. By the way, the best results are obtained using the participation rate from World Bank, for each youth indicators considered. So, all the specification here reported are:

$$ILO2_{it} = \beta\, lrelWb_{it} + \Sigma\, \nu_j X_{it} + \chi\, G_{it} + \varepsilon_{it} \quad (1.2)$$

$$ILO3_{it} = \beta\, lrelWb_{it} + \Sigma\, \nu_j X_{it} + \chi\, G_{it} + \varepsilon_{it} \quad (1.3)$$

$$ILO4_{it} = \beta\, lrelWb_{it} + \Sigma\, \nu_j X_{it} + \chi\, G_{it} + \varepsilon_{it} \quad (1.4)$$

$$EMP_{it} = \beta\, lrelWb_{it} + \Sigma\, \nu_j X_{it} + \chi\, G_{it} + \varepsilon_{it} \quad (1.5)$$

The results are illustrated in the table 1.1. The most interesting results are the cases which consider as independent variable the relative enrollment – source World Bank – and the dependent variable the youth unemployment and employment rate. The specification is such that the dependent variable is in level terms and the independent variable of interest is in log terms. This implies that, holding all other variables constant, one percent increase in the enrolment rate is associated with a β variation in youth unemployment (employment) rate. Considering the equation (1.1), at 1% of significance level, 1% of the variation of the rate of enrolment at vocational programmes is associated with a 0.4871 increase of youth unemployment rate. Probably, the positive effect of the main independent variable on youth unemployment rate could be explained considering that if one decides to participate in such a programme, statistically he is considered as a student, so inactive population increase and the labour force decrease; thus, who is a student, almost always declares himself as out of the labour force. So, it is a result which does not tell much over this relationship. A unit change of the employment protection legislation indicator has a negative effect on the dependent variable, equal to -5.136, while the tax wedge generates a 0.625 unit change in youth unemployment rate: the higher labour cost could discourage hiring process and so increase the unemployed labour force. The coefficient associated to the relative expenditures on active labour market policies is positive and significant at 5% level; it is clearly a controversial result, since these policies have the aim to reduce unemployment. Maybe this result can be read as a prolonged period in unemployment for people who participate in training course, guidance and counselling paths. As one can suppose, a unitary change in the youth population ratio has a positive effect, too (1.367), while it is not the case for the GDP growth rate and for the benefit duration index, *abd* . Regarding the specification (1.5), as one could expect, the coefficients show different direction with respect the previous case. At 1% of significance level, 1% of the variation of the rate of enrolment at vocational programmes is associated with a decrease equal to -0.5523 of youth employment rate. A unit change of the employment protection legislation indicator has a positive effect on the dependent variable, equal to 6.339, differently from Bassanini and Duval (the coefficient was negative and equal to -5.44); while the tax wedge generates a -0.891 unit change in youth unemployment rate, according to the results of Bassanini an Duval (but their coefficient was -0.67). The coefficient associated to the relative expenditures on active labour market policies is negative (-5.481), as well as a unitary change in the youth population ratio has a negative effect (-1.814). Excluding the education variable (which has a negative coefficient, equal to -2.219) all other variables have no significant coefficient.

4. A cross-country classification based on the effect of vocational programmes on youth unemployment rates

The purpose of this section is the development of a cross country classification based on the relationship between participation to VET programmes and youth unemployment (employment) rate. This classification tries to have a stronger empirical justification with respect a simple classification VET based, as it already has been

elaborated in literature (Ryan and Piopiunik, 2012; Brewster et al., 2011; Tiraboschi, 2012). The classification is elaborated using a methodology based on the work by Bonhomme and Manresa (2012), which is a grouped fixed effects (GFE) estimation. The use of GFE estimator in the study of the effect of vocational programmes participation on youth unemployment and employment rates could be helpful in taking into account time – varying unobservables related to changes due to scholastic reforms, new political strategies, even linked to the active labour market policies. Through the grouped fixed-effects estimator strategy the parameters are estimated minimizing a least-squares criterion with respect to all possible groupings of the cross-sectional units, relying on recent advances in the clustering literature for fast and efficient computation. A distinctive feature of this approach is that group membership is estimated from the data. The grouped fixed-effects estimator (GFE), is based on an optimal grouping of the N cross-sectional units, according to the least-squares criterion. Units whose time profiles of outcomes – net of the effect of covariates – are most similar are grouped together in estimation.

The sequence of the methodology is the following. First of all, one must compute the minimization of the objective function, but it is quite difficult due to the piecewise-quadratic nature of the criterion. Direct minimization is not well-suited, so the procedure develops through algorithms. Two are the types of possible algorithms: a simple iterative algorithm and an alternative and more efficient algorithm. The output of this computation are reported in tables 1.2. The baseline simple linear model with grouped patterns of heterogeneity takes the following form:

$$y_{it}=x'_{it}\vartheta + \alpha_{git} + v_{it}, \quad i= 1, \ldots N, t= 1,\ldots T, \tag{1.6}$$

where the covariates x'_{it} are contemporaneously uncorrelated with v_{it}, but may be arbitrarily correlated with the group-specific unobservables α_{git}. The group membership variables $g_i = \{1, ...,G\}$ are unrestricted, and will be estimated along with the other parameters of the model. The group-specific time dummies α_{git}, for $g_i = \{1, ..,G\}$, are fully unrestricted as well. As an example, all units in the first group (that is, all i such that gi = 1) share the same unrestricted time profile α_{1t}. T the number of groups G is to be set or estimated by the researcher. This model contains three kinds of parameters: the parameter vector ϑ, common across individual units; the group specific time dummies $\alpha_{git} \in A$, for all $g \in \{1,\ldots, G\}$ and all $t \in \{1,\ldots, T\}$ and the group membership variables g_i for all $i \in \{1,\ldots, N\}$. With respect the application illustrated in this article, the model is:

$$YUR_{it} = \vartheta\, lrelWb_{it} + \Sigma \lambda_j X_{it} + \chi G_{it} + \alpha_{git} + v_{it} \qquad i= 1, \ldots N, t= 1,\ldots, T \tag{1.7}$$

where X_{it} represent the control variable as in the fixed effects model. The grouped fixed-effects estimator is defined as the solution to the following minimization problem: $YUR_{it} = \beta\, lrelWb_{it}$

$$(\theta, \alpha, \gamma) = \text{argmin} \Sigma\Sigma \; (YUR_{it} - \vartheta\, lrelWb_{it} - \Sigma \lambda_j X_{it} - \chi G_{it} - \alpha_{git})^2 \tag{1.8}$$

where the minimum is taken over all the possible groupings $\gamma = \{g_1,..., g_N\}$, of the N units into G groups, common parameters θ and group-specific time effects α. The algorithms are applied in order to do this minimization. The first algorithm iterate back and forth between group classification (computation of g_i) and estimation of the other parameters (θ and α), until numerical convergence. This iterative scheme is a clustering algorithm. In Algorithm 1, the objective function is non-increasing in the number of iterations. Numerical convergence is typically very fast. However, a drawback of Algorithm 1 is its dependence on the chosen starting values. One

way to overcome this problem is to choose many random starting values, and then select the solution that yields the lowest objective.

Algorithm 2 is more efficient and it is based on the Variable Neighborhood Search method has been pointed out as the state-of-the-art heuristic to solve the minimum sum-of-squares partitioning problem. Actually, it combines two different search technologies: a local search that guarantees the attainment of a local optimum; and a reassignment of several randomly selected units into randomly selected groups, which allows for further exploration of the objective function. This is done by means of neighbourhood jumps of increasing size, where the maximum size of the neighbourhood is chosen by the researcher. Local search allows to get around local minima that are close to each other, whereas random jumps aim at efficiently exploring the objective function while avoiding to get trapped in a valley. Algorithm 2 depends on two parameters set by the researcher: the maximum neighbourhood size and a maximum number of iterations. The algorithm may also be run using different starting parameter values, even though the choice of starting values tends to matter much less than in the case of Algorithm 1.

Several attempts have been done, both with the two algorithms, with different starting values and different possible number of groups. The choice of the best results is based on the Bayesian information criterion (BIC), that in this case is better when it is lower. Results are reported in tables 1.2, where for the algorithm 1 the key elements are reported: the objective function output, the corresponding BIC, the number of simulation; for the algorithm 2, additionally, there are the number of neighbours and the number of steps.

The estimation have been done using employment and unemployment rate as dependent variable. These are reported in the tables 1.2 and 1.3. Numbers highlighted in blue are the best results. The classification output has been chosen looking at the lower value of the objective function and the BIC. Looking at the results for the first algorithm, coefficients are quite different from what we have found in the fixed effects approach. From the comparison of the groups, it is clear a heterogeneity among the three alternative classification (see tables 1.2c, 1.2d, 1.3b). From a numerical point of view, the best seems to be the classification obtained through the algorithm 2, using the youth unemployment rate as dependent variable, with 100 simulations, 20 steps, 20 neighbourhood. In this case, the four groups are the following. The first includes Belgium, Canada, Denmark, France, Ireland, Italy, New Zealand, United Kingdom; these are countries with heterogeneous regulation of vocational education: for almost all, the school-based education system is prevailing, so it is not a dual scheme. Similar characteristics belong to the second group – composed by Australia, Finland, Norway, Sweden, United States - although the links between school and labour market seem to be stronger, but in different ways: for instance Australia has more specific vocational and professional tracks, while the Scandinavian countries take advantage from the tradition of youth guarantee which encourages the social and economic realization of younger people. Group 3 is composed by Austria, Germany, Japan, Netherlands, Portugal, Switzerland. In the third group there are countries all endowed with a strong VET system: Austria, Germany, Switzerland are dual system countries, similarly Netherlands, characterized by an apprenticeship regulated as the job contract and a well-regulated educational path in the technical professional system. Japan is the most different: there, the vocational education system has been praised for reducing the need for job search by young workers, but its

qualitative efficiency is questionable, since it matches jobs and school-leavers across two essentially uni-dimensional rankings, one of school quality and pupil achievement, the other of company job rewards and reputation (Ryan, 2001). In Portugal the system is different from a dual one, but vocational education was unified in the general education path in the early 1970s, in order to prevent premature specialisation and to promote teacher-training structures correctly coordinated with the industrial, agricultural and service sectors, as an essential condition for expanding courses leading to a professional qualification. The idea was to give pupils access to higher education and, simultaneously, to give them easy access to a professional career through a network of training systems already available or about to be created. Last group is just one country, Spain, a particular case, since it exhibits a deeply polarized educational structure with a very high early school leaving rate on the one hand and one of the largest shares of university graduates between 25 and 34 in Europe. The access to vocational training is limited, since after compulsory education (at age 16), youths in Spain have two options: the enrollment in vocational training (*Ciclo Formativos de Grado Medio - CFGM*) or the choice of a general academic curriculum for two more years, the so called *Bachillerato*. At the tertiary education level, there is again a dual track: youths can enroll in college or vocational training of higher education (C*iclo Formativo de Grado Superior - CFGS*). The relatively marginal role of vocational training can be explained by a limited interest of employers in more formal vocational training (given the dual employment structure), but also by strong expectations of upward social mobility on behalf of young people and their families which creates strong preference in favor of academic training (Biavaschi et al., 2012).

5. Conclusions

This work studies the relationship between youth employment and participation to VET programmes. After a brief overview of youth labour market characteristics, a fixed effects methodology has been applied. Basing on these results, an across country classification has been elaborated using the Grouped Fixed Effects approach.

As a first comment from a policy point of view, a VET system can be a policy tool helpful in giving skills to younger and/or future workers, but from this first empirical analysis it seems unclear if it could directly contribute to the reduction of youth unemployment. Since this is a work in progress, a lot must be done: in terms of diagnostics, improvements of the estimations and the interpretations, hoping that this will be helpful in the clarification of the results.

APPENDIX – TABLES

Table 1.1 – Effect of the variation in the participation rate in VET programmes on the youth indicators (youth unemployment rate; ILO 2, ILO 3 and ILO 4 indicators; youth employment rate). A Fixed Effects Approach.

	YUR	ILO2	ILO3	ILO4	Epr1524
lrelWb	4.871	-0.295	-4.254	1.806	-5.523
	(0.921)**	(0.081)**	(0.809)**	(0.460)**	(0.986)**
epoecd	-5.136	0.076	1.940	-1.989	6.339
	(0.866)**	(0.076)	(0.761)*	(0.433)**	(0.927)**
TaxWedge	0.625	-0.006	-0.058	0.242	-0.891
	(0.128)**	(0.011)	(0.113)	(0.064)**	(0.137)**
almpgdp	2.423	-0.238	-2.991	0.630	-5.481
	(0.987)*	(0.086)**	(0.868)**	(0.493)	(1.056)**
YpopTpop	1.367	0.050	1.799	0.615	-1.814
	(0.284)**	(0.025)*	(0.250)**	(0.142)**	(0.304)**
gdpoecd	-0.331	-0.022	-0.237	-0.172	0.134
	(0.116)**	(0.010)*	(0.102)*	(0.058)**	(0.124)
adjcov	-0.002	0.000	0.001	-0.001	0.000
	(0.003)	(0.000)	(0.002)	(0.001)	(0.003)
Minw_medw	-1.699	1.224	11.077	-0.647	-2.178
	(3.251)	(0.285)**	(2.857)**	(1.624)	(3.479)
abd	-4.664	-0.091	-4.276	-2.636	-0.152
	(2.197)*	(0.192)	(1.931)*	(1.097)*	(2.351)
educ	-0.408	0.120	-1.331	-0.475	-2.219
	(0.599)	(0.052)*	(0.526)*	(0.299)	(0.641)**
udnetA	0.067	-0.043	-0.420	0.049	-0.001
	(0.079)	(0.007)**	(0.070)**	(0.040)	(0.085)
_cons	-28.838	3.230	50.057	-7.034	139.677
	(11.173)*	(0.979)**	(9.820)**	(5.581)	(11.957)**
R^2	0.31	0.39	0.58	0.30	0.35
N	351	351	351	351	351

*p<0.05; ** p<0.01

Tables 1.2 – Results Algorithm 1.

Table 1.2a - Epr1524 as dependent variable.

$$Epr1524it = \vartheta\ lrelWbit + \Sigma\ \lambda j\ Xit + \chi\ Git + \alpha\ git + vit \qquad i = 1, \ldots N$$

N observations	Objective function	BIC	AIC	N simulations	N groups
351	4672.34	2460.67	2398.89	10	2
351	3753.60	2481.90	2416.26	100	2
351	3708.63	2489.11	2423.48	1000	2
351	3708.63	2489.11	2423.48	10000	2
351	4202.29	2377.32	2442.95	10	3
351	3392.05	2421.21	2359.44	100	3
351	2851.96	2392.04	2326.40	1000	3
351	2505.74	2362.53	2296.89	10000	3
351	2743.93	2399.92	2334.29	10	4
351	2584.18	2422.80	2364.89	100	4
351	2293.22	2341.64	2287.58	1000	4
351	2049.08	2221.25	2159.47	10000	4

Table 1.2b - YUR as dependent variable.

$YURit = \vartheta\ lrelWbit + \Sigma\ \lambda j\ Xit + \chi\ Git + \alpha\ git + vit$ $i= 1, \ldots N$					
N observations	**Objective function**	**BIC**	**AIC**	**N simulations**	**N groups**
351	3229.54	2311.57	2245.94	10	2
351	3107.67	2206.89	2145.12	100	2
351	3107.67	2206.89	2145.12	1000	2
351	3000.40	2058.89	1993.26	10000	2
351	2681.32	2175.53	2113.76	10	3
351	2643.82	2188.78	2130.87	100	3
351	2287.57	2177.02	2119.11	1000	3
351	2083.59	2161.19	2099.42	10000	3
351	2209.55	2137.84	2079.93	10	4
351	1962.02	2156.59	2098.68	100	4
351	1725.00	2144.11	2090.06	1000	4
351	1696.06	2154.67	2096.76	10000	4

Table 1.2c - Coefficients and classification based on algorithm 1, dependent variable Epr1524.

Epr1524 - Algorithm 1	
Coefficients	
lrelWb	*0.108894*
Epoecd	-0.8608
TaxWedge	1.178031
almpgdp	-3.16E-01
YpopTpop	3.48E-01
ed15	-3.72E-02
minw_medw	-0.3629
Abd	0.259509
udnetA	-0.9113
Gdpoecd	-0.7833
Adjcov	-4.47E-02
Group 1	Canada, Netherlands, Spain, United States
Group 2	Portugal
Group 3	Australia, Austria, Germany, Japan, Sweden, Switzerland, United Kingdom
Group 4	Belgium, Denmark, Finland, France, Ireland, Italy, Norway, New Zealand

Table 1.2d - Coefficients and classification based on algorithm 1, dependent variable YUR.

Yur - Algorithm 1	
Coefficients	
lrelWb	*-0.57233*
Epoecd	0.232355
TaxWedge	9.96E-02
almpgdp	2.81827
YpopTpop	-0.18851
Ed15	1.792023
minw_medw	-0.10499
Abd	1.037122
udnetA	0.38113
Gdpoecd	-0.15347
Adjcov	-2.20E-02
Group 1	Canada, Sweden, United States
Group 2	New Zealand, Spain
Group 3	Australia, Austria, Belgium, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, Norway, Portugal, Switzerland, United Kingdom
Group 4	Denmark

Tables 1.3 – Results Algorithm 2.

T able 1.3a YUR as dependent variable

$YURit = \vartheta\ lrelWbit + \Sigma\ \lambda\ j\ Xit + \chi\ Git + \alpha\ git + vit$ $i= 1, \ldots N$							
N observations	**Objective function**	**BIC**	**AIC**	**N simulations**	**N Neighbour**	**N steps**	**N groups**
351	3000.40	2058.89	1993.26	10	10	10	2
351	3000.40	2058.89	1993.26	100	10	100	2
351	3000.40	2058.89	1993.26	100	20	10	2
351	3000.40	2058.89	1993.26	100	20	20	2
351	3000.40	2058.89	1993.26	1000	20	20	2
351	2040.59	2010.904	1945.27	10	10	10	3
351	2040.59	2010.904	1945.27	100	10	10	3
351	2030.71	2236.892	2171.26	100	20	20	3
351	2040.59	2010.904	1945.27	100	10	20	3
351	2024.08	2236.892	2171.26	100	20	20	3
351	1435.49	1904.536	1842.76	10	10	10	4
351	1428.24	1904.536	1842.76	100	10	10	4
351	1428.24	1904.536	1842.76	100	20	10	4
351	1428.24	1904.536	1842.76	100	20	20	4

Table 1.3b coefficients and classification based on algorithm 2, dependent variable YUR.

Yur - Algorithm 2	
Coefficients	
lrelWb	*0.509157*
Epoecd	-3.09619
TaxWedge	0.688521
almpgdp	0.511905
YpopTpop	0.672852
ed15	0.436186
minw_medw	4.544986
Abd	-6.81169
udnetA	0.154683
Gdpoecd	-0.30052
Adjcov	2.42E-03
Group 1	Belgium, Canada, Denmark, France, Ireland, Italy, New Zealand, United Kingdom
Group 2	Australia, Finland, Norway, Sweden, United States
Group 3	Austria, Germany, Japan, Netherlands, Portugal, Switzerland
Group 4	Spain

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