Analysing European countries welfare system efficiency in a generational perspective using Data Envelopment Analysis

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Introduction

Welfare systems in Europe contributed to the modernisation of most economies and have been fundamental in guaranteeing demographic, social and employment equilibria. Nevertheless, The socioeconomic and demographic changes occurred over the last years generated new forms of insecurity, especially for younger citizens, and posed new questions on the very nature of welfare systems. Moreover, the transformations in the labour demand and, particularly, in the flexibility and the provisional nature of labour contracts, highlighted the need of redesigning welfare systems that were thought and organised in a completely different setting, a world where labour relations were almost exclusively standard and permanent. In the end, the economic crisis has brought into question the validity and sustainability of welfare systems, especially in those countries where they were and still are based on the labour market segmentation. This is, indeed, the case of Mediterranean countries welfare systems, where households' family-work structure relies on the gender division of labour (paid work for men and unpaid family work for women), and on the existence of a number of specific conditions: high male employment levels, employment contracts mainly of permanent nature, and generous forms of social protection (Naldini, Saraceno, 2011). Such a model has completely lost its effectiveness and, particularly as far as the younger generations are concerned, clashes with the new social structure where the stability of employment and family relations and roles is uncertain and often temporary, and labour relations are flexible.

An undeniable generational issue emerged at the European level and is showing its effects quite dramatically in the Italian case (Balduzzi, Rosina, 2010; Donati, 1997; Kertzer, 1983; Rosina, 2012). It has been underlined that the generational unbalance characterising the Italian welfare is not much due to the high level of pension expenditure but rather to the low expenditure for social shock absorbers and other services mainly directed to younger generations, as for example schooling (Pizzuti, 2011). Other authors (Fasano, Mignolli, 2012) showed how demographic, economic, and labour market indicators can help explaining that the inequalities between generations in Italy are largely based on the excessive responsibility given to the 'family' by the system. In fact, Italian families often work as social shock absorbers and as 'employment service', through informal channels, during unemployment spells (Mandrone, Radicchia, 2011). In such a context, characterised by policies often disregarding the youth situation, it can be useful to observe welfare policies in an intergenerational perspective. The idea that social policies, together with legal norms, represent the forms for regulating intergenerational responsibilities in a heterogeneous way across countries and generations, is reinforced by some studies (Naldini, Saraceno, 2011; Saraceno, Keck, 2010; Saraceno, 2010) that suggested the creation of a database[1] distinguishing social policy indicators based on generational responsibilities (Saraceno, 2011). Also the EU highlighted, over the last years, the necessity of implementing specific evaluation tools for the intergenerational equity of policies and, with the Resolution n. 1648/2009., agreed that in the period up to and including 2018, the overall objectives of European cooperation in the youth field should be to: (i) create more and equal opportunities for all young people in education and in the labour market, and (ii) promote the active citizenship, social inclusion and solidarity of all young people[2]. The same document suggests the adoption of a dual approach, i.e. "to implement specific initiatives in the youth field, as well as

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[1] See the Multilinks database developed in the MULTILINKS project, coordinated by Peal Dykstra and financed by the European Union within the EU Seventh Framework Programme (FP7/2007-2011). The database is currently available in the 'Wissenschaftzentrum Berlin für Sozialforschung' homepage, http://multilinks-database.wzb.eu/info/project-info.

[2] *Council Resolution on a Renewed Framework for European Cooperation in the Youth Field – 2010-2018*, 2009 (http://ec.europa.eu/youth/pdf/doc1648_en.pdf).

to promote a cross-sectoral approach to support mainstreaming of a youth perspective in other related policy fields" in this way encouraging an inclusive planning and policy evaluation method. Moreover, the European Parliament solicited Member States for a compulsory generational check indicating the generational impact of legislative measures and evaluating their long-term costs and benefits in that regard (Fasano, Mignolli, 2012).

Starting from this scenario, and drawing on a previous paper on young-friendly welfare (Bergamante, Canal, 2012), this study intends to present a 'geography' of the European welfare, explicitly considering the youth component and exploring generational dynamics within European countries. The question is to understand whether geographical areas can be identified where the welfare system, thanks to its 'generative' character manages to support youth, amidst the economic crisis, on their path to adulthood and active life. At the same time, situations will be presented where relations among generations are exclusive and problems arise that the welfare model is not able to address. The attempt is to evaluate each country performance in improving the socioeconomic and employment conditions of younger generations using the Data Envelopment Analysis (DEA) that determines the relative efficiency of each country in pursuing those policies (Bowlin, 1998).

In a first paragraph, a selection of the relevant literature is presented both for the theme of youth conditions and welfare systems, and for the different applications of the DEA methodology. A second paragraph is dedicated to empirical descriptive analyses where a set of statistics is presented, using Eurostat data, with the aim of showing the youth conditions on the labour market as well as their socioeconomic conditions in different countries. Finally, the results from the DEA are illustrated in terms of each country relative efficiency in a generational perspective. The paper ends with some conclusive remarks.

Research questions, hypotheses and objectives

The number of studies on youth living conditions carried out over the last years both academically (Balduzzi and Rosina, 2010; Cordella and Masi, 2012; Livi Bacci 2012; Pizzuti 2011; Rosina, 2012) and institutionally (CNEL[3], 2012; European Commission, 2010; ISFOL[4] 2012b) confirm the common understanding that the younger generations are those who are most suffering from the effects of demographic, economic and conjunctural changes. Nevertheless, despite the abounding studies on youth living conditions, there are still just a few analyses trying to observe social policies in a intergenerational perspective (Bergamante and Canal, 2012; Fasano and Mignolli 2012; Saraceno 2011). Embracing such a research perspective it would be possible, for example, to observe how European countries tried to deal with youth problems, each through its own welfare system, generating contexts where intergenerational relationships are virtuous and complementary or, on the contrary, where deep unbalances emerge in the access to public resources and to the labour market.

Over the years, several hypotheses have been suggested in the scientific literature on the classification of welfare state models[5] and, more recently, new classification approaches have been explored, e.g. a 'gender-oriented' classification[6]. The idea is spreading that the known Esping-Andersen classification, used

[3] Italian National Council for Economics and labour, CNEL.

[4] Italian Institute for the Development of Vocational Training of Workers, ISFOL.

[5] Some examples of classifications can be found in Esping-Andersen G. (1990), *The Three Worlds of Welfare Capitalism*, Polity Press, Cambridge; and in Millar J., Warmann A. (1996), *Family obligations in Europe*, Family Policy Studies Centre, London; and also in Ferrera M., *Il modello di Welfare sud europeo. Caratteristiche, genesi, prospettive*, in "Quaderni di ricerca Poelis", n. 5; or in Bonoli G. (1997), "*Classifying Welfare States: a two dimensional approach*", in Journal of Social Policy, n. 26(3).

[6] See: Lewis J. (1992), *Gender and the Development of Welfare Regimes,* Journal of European Social Policy, London*;* Samek M., Semenza R. (2008), *Lone women in Europe: social risks and policy responses*, paper presented during the 1st Annual ESPAnet-Italia Conference , 2008, Italian Welfare policies in the European Scenario, Session n. 4 Genere, vita e lavoro: la sfida delle politiche di conciliazione, Ancona, 6-8 November 2008; Trifiletti R. (2005), *Responsabilità familiari e welfare regimes*, in La Rivista delle Politiche Sociali, 2005, n. 4.

as a standard in the scientific debate, has lost some of its validity partly due to the insurgence of deep economic and demographic changes over the last years, and partly because the accession of new EU Member States requires new considerations and the updating of classifications. In a recent contribution (Bergamante and Canal, 2012) a 'geography' of the European welfare has been presented, that explicitly considered the youth component and explored the intergenerational dynamics in EU countries adopting a relational and life-cycle perspective (Donati, 1997). This made it possible to compare European countries by analysing the peculiarities of intergenerational relations and understanding their nature, whether they are exclusive or supportive, complementary or alternative, generative or indifferent.

The seminal contribution to the sociological concept of generation is attributed to Karl Mannheim, who connected the biological[7] and socio-historical[8] approaches by considering that a generation is not simply defined as the collection of individual with the same birth year, but that a generation can be fully defined as such only when the individuals belonging to it share relationships originating from being exposed to the same social and intellectual signs of a change process (Mannheim, 2008). However, the very concept of generation presents several aspects (Kertzer, 1983) and can be represented by several alternative definitions, depending on the adopted approach, whether demographic, social or cultural. With the purpose of studying welfare systems from an intergenerational perspective it was useful to adopt the relational approach, which considers the generations as 'social relations' within the family and the society (Donati, 1997). Hence, generations are defined as a set of persons *belonging to* and, above all, *being in conjunction with* a network of relations characterised by a definite order. Such a definition makes it possible to identify and highlight both an horizontal and a vertical dimension of generations: the former considers persons belonging to the same biological cycle (and distinguishes e.g. among youth, adults, elders), the latter considers persons living at different stages of their biological cycle who are connected by a lineage relation, e.g. parents and offspring (Lazzarini and Cugno, 1997). Considering both dimensions (horizontal and vertical) simultaneously, the generational relation is necessarily taken into consideration. This approach stresses the socio-temporal aspects of relation and uses a new criterion in the allocation and distribution of welfare resources, as resources received by past generations have to be properly managed and handed over to future generations (Lazzarini and Cugno, 1997). In the design of welfare instruments and criteria that are meaningful to generational aspects, both present and future generations have to be considered (i.e. those belonging to a certain biological cycle that in the future will belong to another cycle). This kind of approach guided the analysis of a previous study (Bergamante and Canal, 2012) where generations have been observed in a 'relational' perspective so as to highlight in which geographical areas the welfare system, thanks to its 'generative' character, managed to support youth, amid the economic crisis, on their path to adulthood and active life. Starting from empirical analyses, the condition of youth has been described as being quite critical in some countries and characterised by a high level of protection in some other countries. Hence, through a Principal Component Analysis (PCA), the positioning of youth in the labour market and as recipients of social protection programmes has been observed in each country, trying to identify the contexts where welfare best protect youth population and generates guarantee mechanisms; we define this kind of environment as being 'youth-friendly'. Overall, it was possible to identify different scenarios: those favouring generational turnover and others most likely prone to invest in the adult population only, with intermediate situations where a certain level of indifference towards the generational problem is observed or where, despite the effort to favour youth, the system still does not manage to be 'generative'.

This study allowed the observation of welfare systems' generational effectiveness, generally underlining how countries investing more in welfare are also those showing higher protection level of the youth population. Nonetheless, since, in some cases, the mere increase of investment is neither sufficient nor

[7] According to this approach, based on persons' life cycle, individuals with the same birth year belong to the same generation. Alternatively, one can use the demographic concept of 'cohort', i.e. the group of individuals born in the same year or in the same time interval.

[8] For historicists, generations are defined as the set of individuals sharing a relevant experience in the same historical period, when this experience formed, somehow, their vision of things. See Dilthey W., 2007, Introduction to Human Sciences (*Introduzione alle scienze dello spirito*, Milano, Bompiani), original edition: Dilthey W., 1922, *Einleitung in die Geisteswissenschaften, Stuttgart, Leipzig: B. G. Teubner.*

possible, a comparative analysis was necessary to verify the relative efficiency of welfare systems in different countries. To this purpose we used the Data Envelopment Analysis (DEA), introduced by Charnes, Cooper and Rhodes in 1978, a methodology developed within operational research and aimed at studying the relative efficiency of Decision Making Units (DMU), i.e. of organisations using a set of inputs to generate a given set of outputs. This non-parametric method allows for the determination of an efficiency frontier for the units analysed (Farrell, 1957).
DEA's objective is to study the productive efficiency of DMU's striving to identify the best ratio between used resources and produced output and has been applied to different fields (banking, healthcare, educational, social, etc.) and for the comparison of different territories (Staničkova and Skokan, 2013; Coelli et al., 2011; Staničkova and Skokan, 2011; Afonso and St. Aubyn, 2004).

A glimpse at youth conditions in different welfare systems

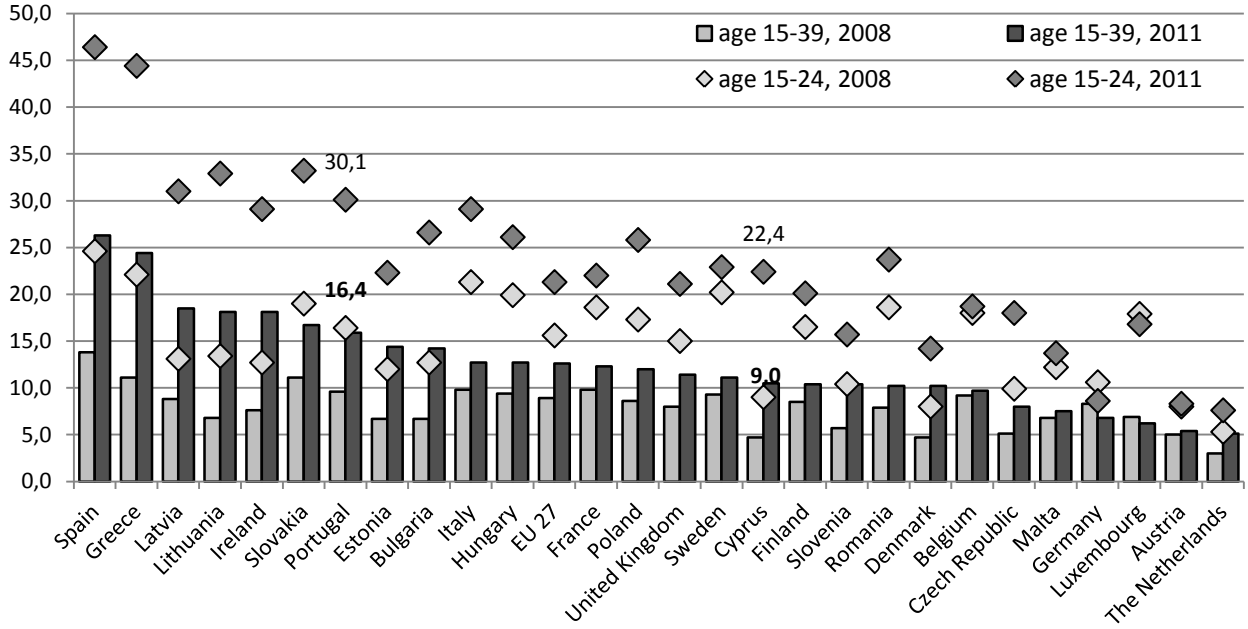
A number of descriptive statistics is presented in this paragraph that allow a comparative analysis of youth conditions in different EU countries, also in consideration of the generosity of their respective national welfare systems. The focus here is on four themes that are considered to be fundamental in understanding youth conditions and the development of the life cycle: unemployment, employment contractual forms, independence and fertility. These four aspects characterise, in a structural way, the positioning of youth on the labour market and in the society, portraying the unbalances for younger generations in terms of life cycles. In this sense, such analyses represent the starting point for the development of a multivariate analysis that aims at verifying how the youth situation in each country originates from the efficiency of the respective welfare system and from the implemented policies in the country. Featured data refer to the period 2008-2011, and represent the pre-economic crisis situation as well as the current one.

Unemployment rates
The main indicator to understand youth situation in different economic contexts is the unemployment rate (Fig.1) that notoriously peaked over the last years, especially for the younger and less educated share of the population. Mainly due to the adverse business cycle between 2008 and 2011, an increase in the share of unemployed in the population was observed in almost all the EU countries (with the only exceptions of Luxembourg and Germany), especially in the age class 15-24. The average EU-27 unemployment rate for the age group 15-39 increased of 3.7 percentage points (from 8.9% in 2008 to 12.6% in 2011); the same indicator for the age group 15-24 increased of 5.7% (reaching 21.3% in 2011). Moreover, in 2011, over 20% of the people aged 15-24 who were active on the labour market showed to be job-seeking in 18 out of the 27 Member States; in particular, Spain and Greece showed values above 44%, and the situation is critical also in Slovakia, Lithuania, Latvia, and Portugal (as well as in Italy and Ireland following immediately after), where the share of unemployed youth aged 15-24 is always above 30%. At the same time, it is worth noting that Malta, Germany, Austria, the Netherlands, Denmark (and also Slovenia) showed values that are definitely below the European average.
Considering the age class 15-39, some similarities in the unemployment rate 'performance' of different countries emerge. As it happened for the age 15-24, Spain and Greece performance is the worst and is closely followed by that of Slovakia, Latvia, Lithuania, Portugal and Ireland. The geographical areas where the problem of youth unemployment is less evident are the same as for the class age 25-39 with the additional entry of Luxembourg and Czech Republic.
The results in terms of youth participation to the labour market present some similarities that need to be explained by exploring the relation that they have with the welfare effort, so as to represent its efficacy.
Looking at countries with lower unemployment rates, we observe that they are either countries characterised by a well-developed and generous welfare (with the exception of Malta), or newly accessed EU member states that enjoyed remarkable incentives upon their accession, besides being generally dynamic economies.
The highest unemployment rates are, instead, shown by countries like Greece and Portugal where active and passive labour market policies are more modest (both in terms of state investment volumes and of

number of policy recipients). However, a larger expenditure in labour policies (both active and, especially, passive ones) not always correspond to lower youth unemployment rates: in Spain and Ireland, the high level of welfare effort does not seem to limit the negative effects of the current economic crisis on younger people.

Beyond unemployment levels, it is important to consider the NEET (Not in Employment, Education or Training) phenomenon, interesting young people aged 15-29, which is particularly severe in Italy (but also in Ireland, Spain, Greece, Hungary, Bulgaria and Slovakia) and show worrying dynamics also as a consequence of the economic crisis. In the period between 2008 and 2011, not only youth employment has reduced but the number of graduates flowing into NEET's has increased, this confirming the difficulties that some countries face in implementing effective policy measures for school-to-work transition (ISFOL, 2012b).

Fig.1 Unemployment rates by age groups, 2008 and 2011 (%)



Source: elaboration on Eurostat data

Generally speaking, a higher education is associated to a higher employability and the earnings' levels of employed people with a university degree are key to highlight the dynamics of the market for highly skilled labour. From a theoretical perspective, when earnings' levels are high and with a positive trend, highly skilled labour supply is lower than its demand, and when in presence of low employment earnings for graduates then this is indicative of a high supply of high skilled labour (OECD, 2011a). In this sense, Italy shows a clearly paradoxical situation where the low share of graduate people in the population is combined with a low earning premium for education (Bergamante and Gualtieri, 2012; Cipollone and Sestito, 2010; Visco, 2008). This paradox is distinctly shown by looking at different generations: if compared to people aged 55-64, those aged 25-34 are much more educated but their educational qualification gives a lower yield in earnings terms. The explanation for such differences in earning premiums among generations is provided by the importance of the professional experience, but OECD (2011b) studies underline that in Italy the relative value of the professional experience vs. that of education is excessive (Gualtieri, 2011). In fact, OECD Countries' employers pay, on average, graduates workers with 20-30 years of professional experience 50% more than those just graduated; in Italy experienced workers are paid 120% more than younger graduates (OECD, 2011b)[9]. This unbalance, beyond explaining the differences in earnings among

[9] OECD data have been considered here, as they show in a clear way the differences among the earnings premiums realised by those with higher levels of education for different generations. Eurostat data were not suited for such a comparison.

generations, also shows the insufficient development of technological innovations that is a specific Italian feature (Ricci, 2011).

Flexibility and atypical employment contracts

Subordinate employment is still the main contractual work relation for people aged 15-39, accounting for roughly 70% of all employment relations in Spain, Poland and Portugal and for over 95% of them in Romania, Lithuania, Estonia, Latvia and Malta (data from 2011).

The share of autonomous work is residual (10.4% was the European average in 2011) but reaches peaks well above the European average in some countries (Greece, Italy, Slovakia, Czech Republic, Poland and Romania). In Greece and Italy, about 20% of youth is self-employed, and the figure drops to around 5% in countries like Sweden, Denmark and Luxembourg.

Over the last years, the atypical component of employment has seriously increased and, even if it sometimes involves older employees, it largely represents the employment relation for younger generations (Bergamante and Canal, 2012). On the one hand, the increased flexibility had positive effects on the occupational levels in the years immediately preceding the economic crisis but, at the same time, it has weakened, in the Italian case, the specific human capital with all the obvious negative consequences on productivity and profitability (Draghi, 2010). In this framework, it then becomes important to consider the share of temporary workers[10] on the number of employees and study its variations at geographical level, as well as looking at the voluntary or involuntary nature of the self-employment ore part-time choices[11] (Fig.2).

By looking at the share of temporary workers on the total number of employees in 2011 it is possible to notice the high values for Germany, the Netherlands, Poland, Portugal, Slovenia, Spain and Sweden but the most remarkable figure is the one on the involuntary nature of such a condition that, in countries like Spain, Cyprus and Slovakia, reaches 90%, and 80% in Portugal, Czech Republic, Greece and Romania; Italy shows a share of temporary workers slightly above 20% accompanied with a high share of involuntariness (62.5%). Countries with a high share of involuntary temporary workers also show a relatively high number of people aged 25-34 living by their parents and who have not been able to form their own nuclear family.

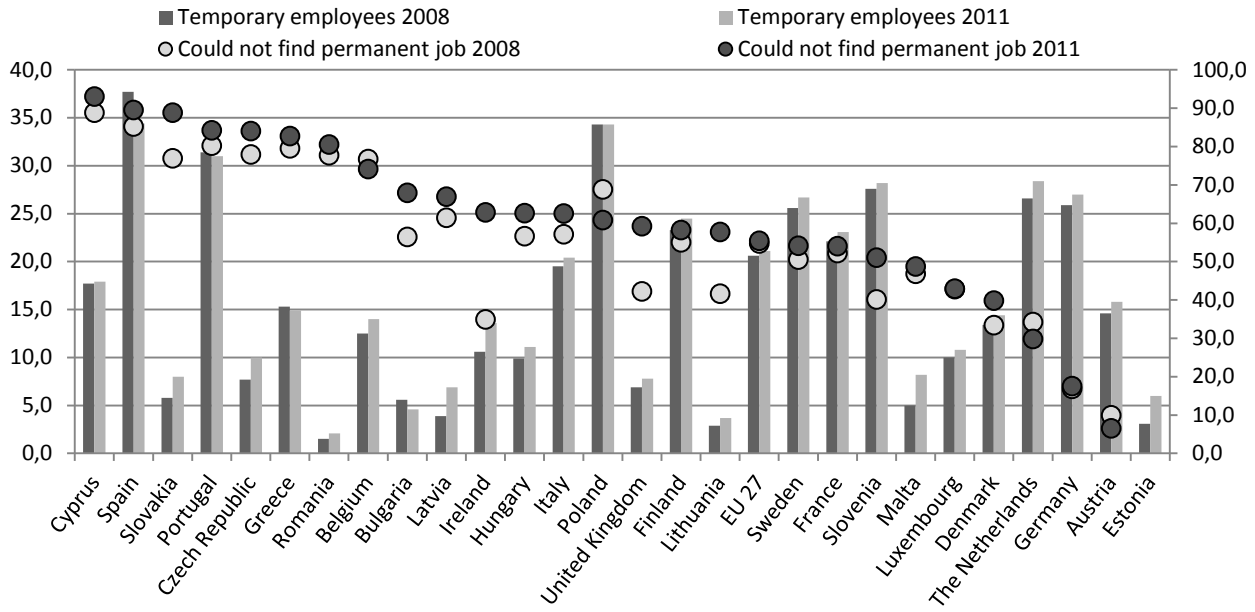
The involuntariness of temporary jobs is often associated to the presence of involuntary part-time (this happens, for example, in Italy, Spain, Greece, Cyprus and some Eastern European Countries). This kind of association reveals a serious weakness of the labour market that translates into a lower labour productivity and a reduced ability by households to generate wealth. In fact, in countries where involuntary temporary work is associated to involuntary part-time (with the exception of Cyprus where households' wealth is quite high), the median equivalised net income of households is lower. On the opposite, voluntary part-time and temporary contracts are more common in situations where households have a larger wealth, where a lower percentage of people aged 25-34 still live with their parents, and where labour productivity is generally higher.

In terms of affinity between employment quality in different generations, it can be interesting to highlight the sharp difference among European countries in the share of temporary workers and the discriminatory way that flexibility is applied. The labour market 'flexibilisation' process concerned youth much more than older employees; In Italy the difference between the share of temporary jobs for people aged under 30 and the employees over 50 exceeds 22.5 percentage points and is one of the larger in Europe (the average difference is 16 points), whilst in UK the difference is almost null. In Lithuania and Estonia it happens that older employees have proportionally more temporary jobs than younger people (Bergamante and Canal, 2012).

[10] It is well known that temporary contracts are not fully representative of atypical contracts in the labour market; however, in the comparison at the European level, it is not always possible to find comparable data for other contractual forms.

[11] The importance of analysing choices' dynamics in terms of contractual forms and working hours has been widely underlined in the debate on the identification of indicators able to characterise youth participation to the labour market (ISTAT, 2012).

Fig.2 Temporary employees as percentage of the total number of employees (left) and temporary employees who could not find a permanent job as a percentage of the total number of temporary employees (right), age 15-39, 2008 and 2011



Source: elaboration on Eurostat data

The flexibility and contractual atipicity issues have to be considered together with the level of national employment protection. Looking at the OECD Employment Protection Index, measuring the strictness of employment protection legislation, one notices the sharp tendency of Italy towards a progressive reduction of employment rigidity especially for temporary employment. Starting from the second half of 1990's, atypical contractual arrangements flourished in Italy but this did not correspond to an increase of employment protection: between 1998 and 2008 the sharpest decline in temporary work protection has occurred. This also happened in Greece and Portugal that, however, started off with higher level of employment protection.

Besides the degree of temporary work protection it is convenient to consider the level of effort that governments exerted to support income. In some countries a higher level of income support to the unemployed is observed when employment protection decreases while, in Italy such a mechanism did not take place, creating a system that is detached from labour market characteristics where flexibility and security are not associated (CNEL, 2010). Moreover, Italy, Greece, and Hungary, unlike the other European countries, do not have any form of guaranteed minimum income, which is often considered as an effective protection instrument, especially for young people entering the labour market (CIES, 2010).

The relation between independence and fertility

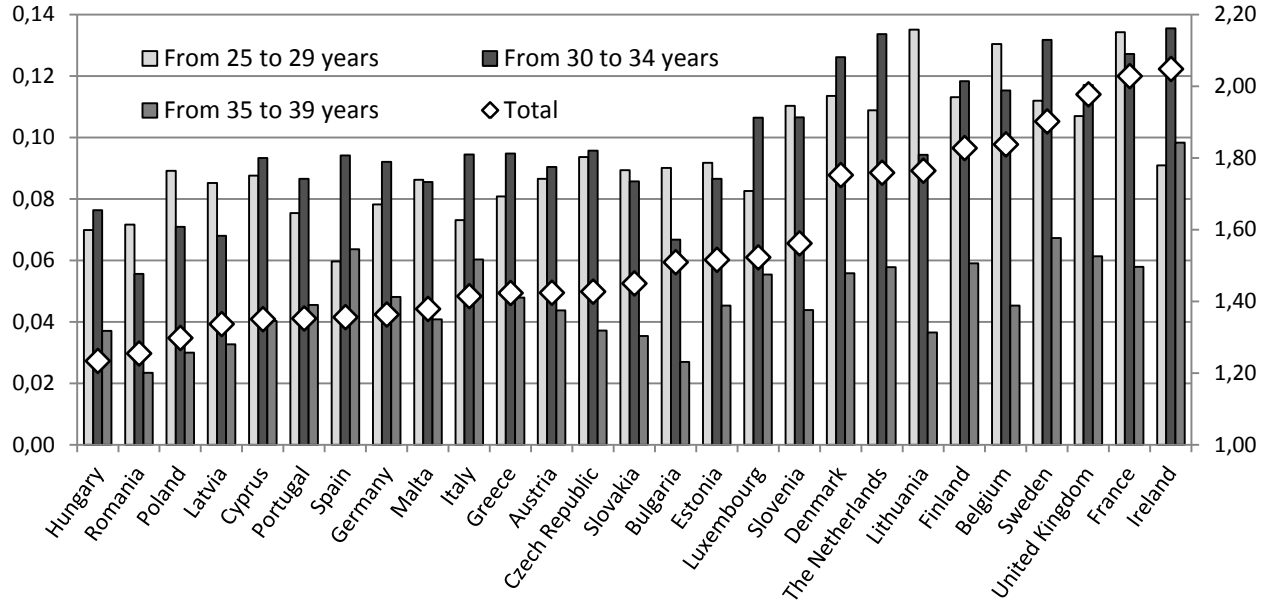
Many studies underlined the relation between employment and fertility, looking at the changes of this relation over times and pointing out at the presence of virtuous mechanisms where high employment levels are associated to high fertility rates (D'Addio, Mira D'Ercole, 2005; Adsera, 2005; Aaberge et al., 2005; ISFOL, 2011; Bergamante, 2011).

In Scandinavian countries especially, female employment rates and fertility rates are both high, also when considering the younger portion of the population (Fig.3). Italy, on the contrary, is an example of the coexistence of reduced employment rates and low fertility (D'Addio and Mira D'Ercole, 2005; Bergamante, 2012), especially in the age classes 25-29 and 30-34, being fertility rates higher for more advanced ages.

These results support the idea that systems exist where a functioning labour market (flexible but also protected) is sustained by a diffused welfare, not only supporting people financially, but allowing for a work-life balance compatible with maternity and the participation to the labour market (Bergamante, 2012).

In studying fertility, a further element is provided by the analysis of the relation between schooling and fertility: in countries with high levels of schooling, more educated people typically show higher fertility rates (D'Addio and Mira D'Ercole, 2005). In this sense, the lower fertility rates characterising young people in Mediterranean countries and many countries in Eastern and South-Eastern Europe, can also be associated to the low share of population with university-level higher education.
Among other elements affecting fertility there is the State effort in supporting child-care and families (e.g. with housing policies) and the job stability of younger generations. Public expenditure in family and housing support seems to have more impact on maternity choices than it does the expenditure in child-care, anyway regarded as fundamental in providing incentives to female employment. In countries where this type of State effort is higher, we observe the higher share of people aged 25-34 with housing independence. Youth independence is typically associated to high fertility in those countries where family support is guaranteed both financially and in terms of services provided (Sweden, Finland, Denmark, France and Belgium). Moreover, in UK and the Netherlands, the high expenditure level dedicated to housing policies seems to compensate for the modest investment in care policies, guaranteeing high fertility rates and the transition to independent living.

Fig.3 Fertility rates by age group (left) and total fertility (right)



Source: elaboration on Eurostat data

As for the contractual temporary nature, the distinguishing element seems to be involuntariness (also in part-time), which may also be considered as a synonymous of job-insecurity and, then, be related to the impossibility of planning to have a family. This is not only the case of Spain and Portugal where the share of temporary employment is high, but also of countries like Italy, Cyprus, and Greece where the share of temporary workers is not particularly high, but the temporary employment contract is often involuntary. Low fertility rates associated to a reduced share of temporary employment but high levels of involuntariness for such contracts also characterise some Eastern European countries and Malta.

European Union policy efficiency towards younger generations

In the preceding section we analysed youth situation in different geographical contexts in relation to the effort produced by each welfare system also in terms of expenditure levels. Some contexts manage to facilitate youth entry in the labour market also guaranteeing quality employment both in terms of job protection and voluntariness in the contractual form choice, as well as supporting younger generations' housing independence and the creation of a new household. Some other contexts are characterised by the

partial exclusion of youth from permanent employment, the constrained choice of contractual form and low fertility rates.
However, the studies presented show that a high level of investment in individual countries does not always correspond to a better positioning of youth in the labour market. In fact, some contexts exist where high levels of public expenditure are not associated to a positive impact on youth situation. Some other contexts are characterised by dynamic labour markets and/or strong incentives provided by the accession to the EU that created virtuous mechanisms for youth labour market entry even in presence of modest welfare systems.
In this sense, in order to verify the productivity of investments by individual EU countries, we decided to carry out an efficiency analysis through the Data Envelopment Analysis (DEA)[12]. The purpose is to evaluate, in relative efficiency terms, the impact of welfare investments on younger generations. Such impacts are measured in terms of youth situation and conditions on the labour markets of each EU countries, while the different types of welfare are identified through indicators on financial investments and/or services provided.
The chosen methodological instrument allows for the evaluation of the relative efficiency of each EU economy in comparison to the others by determining an efficiency frontier.

Methodological choices

The applied DEA model is output-oriented and uses variable returns to scale, meaning that we focus on output maximisation and that a Decision-Making Unit (a DMU in our analysis is represented by a specific country considered) is efficient when its outputs are adequate to the inputs used. On the contrary, for inefficient DMU it is possible to identify their distance from the efficient frontier as the result of the highest proportional increase of outputs necessary to reach the frontier, keeping the inputs fixed.
This choice is related to the objective of understanding whether EU countries, given their financial resources and investment decisions, are relatively efficient in both allocating individuals on the labour market and solving youth problems.
The DEA used in this paper, admitting multiple-output and multiple-input relations, makes it possible to summarise in a single measure a variety of elements intervening in the processes. The inputs and outputs introduced in the model are not constrained by measurement units and this allows the comparison of heterogeneous elements.
As anticipated, the considered DMU's are the 27 EU countries, while the input and output variables are those described in Table 1. The devised DEA has been applied to evaluate individual country's efficiency towards the youth component, comparing it with the entire population aged 15-64. In this sense, the analysis has been developed through two models: in a first model, a set of inputs has been identified that generated a DEA model where the outputs refer to the population aged 15-64 (DEA1 Model); in the second model, the same inputs have been used but output variables refer to youth only (DEA2 Model).
Comparing the two different specifications it is possible to understand whether using the same inputs, i.e. the same variables used as proxies for the 'welfare system', different countries show different levels of relative efficiency when the output relative to youth population is considered.
The input variables used - identical for both models - have been identified with the purpose of considering indicators representing the financial (public expenditure) and material (number of policy recipients) effort by each individual welfare system, mainly with respect to labour market policies and family support policies. Moreover, labour productivity and median equivalised net income have been considered as indicators of the country's ability to produce wealth.
The output variables choice has been driven by the willingness of taking a snapshot of each country's situation in terms of labour market quality (measured through unemployment rate, specific occupation rates for educational level, share of employees with permanent contracts, share of part-time workers declaring the part-time was their choice), and the difficulties met by youth in entering occupation and gaining independence from their original household (share of youth not classified as NEET and share of

[12] Details on DEA in the Appendix.

youth not living with their parents)[13]. Of the 27 variables initially identified, we finally chose 10 input variables and 12 output variables. This final choice was determined by two considerations mainly: the constraints on the number of inputs and outputs, given the number of DMU's, for the DEA to have some discriminatory power, and the use of the parsimony criterion prescribing the avoidance of redundant information. To this purpose, a multivariate regression was carried out to study their linear relation, and the variables with a strong, statistically significant, correlation with many of the survived variables, have been eliminated.

Tab.1 – Input and Output variables used in the two DEA model specifications.

	DEA 1 Model	DEA 2 Model
Inputs	Expenditure on ALMP as % of GDP	Expenditure on ALMP as % of GDP
	Expenditure on PLMP as % of GDP	Expenditure on PLMP as % of GDP
	ALMP interventions	ALMP interventions
	PLMP interventions	PLMP interventions
	Labour productivity - Percentage of EU27 total (based on PPS per hours worked)	Labour productivity - Percentage of EU27 total (based on PPS per hours worked)
	Family and children policy expenditure	Family and children policy expenditure
	Median equivalised net income	Median equivalised net income
Outputs	People aged 25-34 not living with their parents	People aged 25-34 not living with their parents
	Non NEET aged 15-29	Non NEET aged 15-29
	Voluntary part-time workers aged 15-64	Voluntary part-time workers aged 15-39
	Employment rate, age 15-64 with secondary education	Employment rate, age 15-39 with secondary education
	Employment rate, age 15-64 with tertiary education	Employment rate, age 15-39 with tertiary education
	100-Unemployment rate, age 15-64	100-Unemployment rate, age 15-39
	% full-time employees on total employees, age 15-64	% full-time employees on total employees, age 15-39

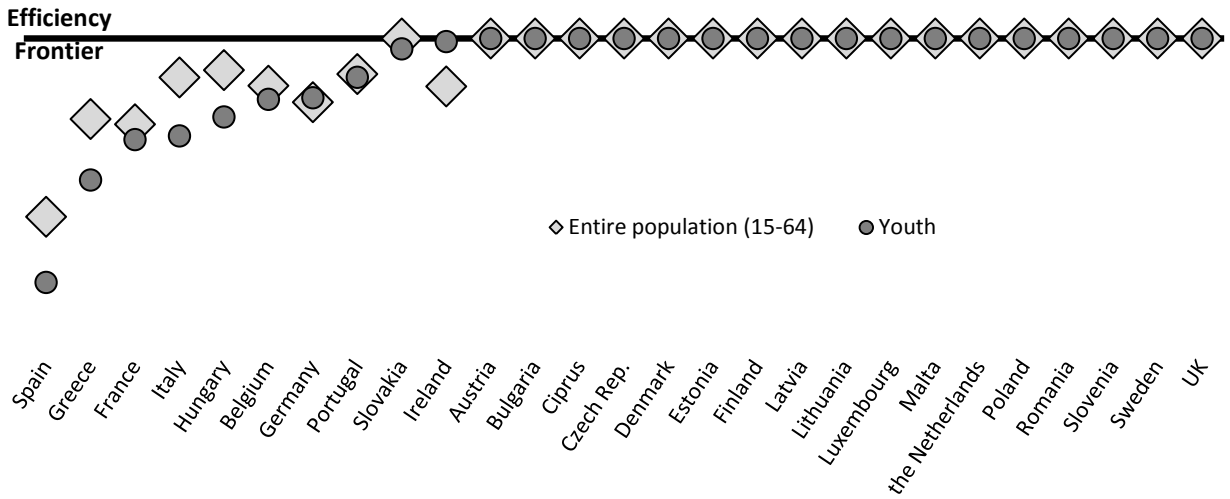
In order to compare the results from both models (population aged 15-64 and youth) we used the same outputs with the only difference of varying the indicators to account for different age classes.
All the analyses have been carried out using data from the Eurostat data warehouse and refer to 2008. The decision of analysing data from a pre-economic crisis period was taken to avoid distortions due to conjunctural phenomena.

Analysis' results

In both models we observe a preponderance of efficient countries (Fig.4 and Tab.1). Inefficient countries are represented by contexts where the generated outputs are below the efficiency frontier, given the inputs used. In the DEA1 Model, we find 18 countries on the efficient frontier; the efficient countries become 17 when the model for the youth only component is considered (DEA2 Model). Analysing the inefficient situations, the comparison of the two model specifications show a different ranking in terms of inefficiency.
Generally speaking, efficient countries in the first model are also efficient in the second model, with the exception of Slovakia that results efficient for the entire population and inefficient for youth. Efficient countries seem to be quite capable of transforming the inputs in results that are invariant for different age groups. Most of the countries that are definable as efficient joined the EU more recently: Scandinavian countries, Austria, the Netherlands, Luxembourg, and UK.

[13] Since the model is finalised to results maximisation, output variables are all positively oriented.

Fig.4. Efficiency frontier and inefficient values for both DEA Models



As for inefficient countries, the situations of Greece, France, and Spain seem to be particularly critical in their scarce ability to produce outputs based on the realised investments, both when we consider the entire population (DEA1 Model), and the younger generations (DEA2 Model). Portugal and Belgium show inefficiency levels in both models but a better ranking. In Hungary and Italy we observe a ranking deterioration when passing from DEA1 Model to DEA2 Model, meaning a worse ability to transform inputs in outputs when youth conditions are considered. On the contrary, Germany and Ireland rank better in the DEA2, even if they are below the efficiency frontier.

Tab.2 – Country ranking and efficiency values for the two DEA models.

DEA 1 Model (entire population)			**DEA 2 Model (youth)**		
	Rank	Theta		Rank	Theta
Austria	1	1	Austria	1	1
Bulgaria	1	1	Bulgaria	1	1
Cyprus	1	1	Cyprus	1	1
Czech Republic	1	1	Czech Republic	1	1
Denmark	1	1	Denmark	1	1
Estonia	1	1	Estonia	1	1
Finland	1	1	Finland	1	1
Latvia	1	1	Latvia	1	1
Lithuania	1	1	Lithuania	1	1
Luxembourg	1	1	Luxembourg	1	1
Malta	1	1	Malta	1	1
Netherlands	1	1	Netherlands	1	1
Poland	1	1	Poland	1	1
Romania	1	1	Romania	1	1
Slovakia	1	1	Slovenia	1	1
Slovenia	1	1	Sweden	1	1
Sweden	1	1	United Kingdom	1	1
United Kingdom	1	1	Ireland	18	1.0012
Hungary	19	1.0127	Slovakia	19	1.0042
Portugal	20	1.0142	Portugal	20	1.0155
Italy	21	1.0156	Germany	21	1.0237
Belgium	22	1.0189	Belgium	22	1.0244
Ireland	23	1.0192	Hungary	23	1.0314
Germany	24	1.0255	Italy	24	1.0390
Greece	25	1.0323	France	25	1.0405
France	26	1.0344	Greece	26	1.0567
Spain	27	1.0714	Spain	27	1.0977

For each inefficient unit, DEA identifies the reference targets. Known as 'peer units', they are the efficient units with a similar structure to the inefficient ones and represent, for this reason, a sort of benchmark[14]. The frequency by which an efficient unit appears in the peer groups can be seen as a robustness indicator, as it measures how many times an individual unit may be considered as a valid reference for inefficient units. If the frequency is high, compared to the total number of examined units, then the same unit will be efficient not just with its set of weights, but also with that of many other DMU's, meaning that its set of weights is quite balanced. In our study this clearly happens for the Netherlands and Estonia, both representing a benchmark for many inefficient units (Table 3).

Tab.3 – Inefficient countries and peer groups for the two DEA models (different colours for peer units with higher frequency)

Inefficient countries	**Model DEA 1 (entire population)**							
	Peer units							
Hungary		Estonia		Poland		Slovakia	Romania	
Portugal	The Netherlands			Poland	Slovenia	Latvia	Romania	
Italy				Czech Rep.	Poland	Bulgaria		
Belgium	The Netherlands	Estonia	Denmark	UK		Malta		
Ireland		Estonia	Denmark	Czech Rep.	Austria			
Germany	The Netherlands		Denmark	UK	Slovenia	Sweden	Lithuania	
Greece		Estonia		Czech Rep.	Slovenia	Malta	Cyprus	
France	The Netherlands	Estonia	Denmark	UK		Sweden		
Spain	The Netherlands			Latvia	Lithuania			
Inefficient countries	**Model DEA 2 (youth)**							
	Peer units							
Ireland				Czech Rep.		Latvia	Austria	Denmark
Slovakia					Poland	Latvia	Lithuania	Bulgaria
Portugal		Estonia	Romania		Poland	Latvia a	Slovenia	
Germany	The Netherlands		Romania			Sweden	UK	
Belgium	The Netherlands	Estonia	Romania			UK		Denmark
Hungary	The Netherlands	Estonia	Romania	Czech Rep.		Lithuania	Bulgaria	
Italy		Estonia		Czech Rep.	Poland	Bulgaria		
France	The Netherlands	Estonia				Denmark	UK	Sweden
Greece	The Netherlands	Estonia		Czech Rep.		Cyprus	Malta	Slovenia
Spain	The Netherlands		Romania		Poland	Slovenia		

Source: elaboration on Eurostat data

Slacks analysis: Italy's weak points.

In the comprehensive analysis of technical efficiency, it is also possible to look at the 'slacks'[15], which give an indication on the attainment of efficiency. In fact, a given DMU is considered to be efficient if and only if its efficiency is equal to 1 and all the slack variables are null. The slacks analytically provide, for each unit, an estimate of the possibility of expanding outputs (or reducing inputs in input-oriented models), compatibly with the characteristics of the reference DMU. Output slacks are the result of the difference between target outputs and real outputs for the inefficient DMU.

In this sense, an inefficient unit could reach the efficiency frontier it is manages to increase a single output compatibly with its input endowment, keeping all the other outputs constant. In Fig.5 we show the results for the output slacks in the case of Italy, with the aim of analysing those output variables that mainly determine the inefficiency, assuming that the other outputs remain constant.

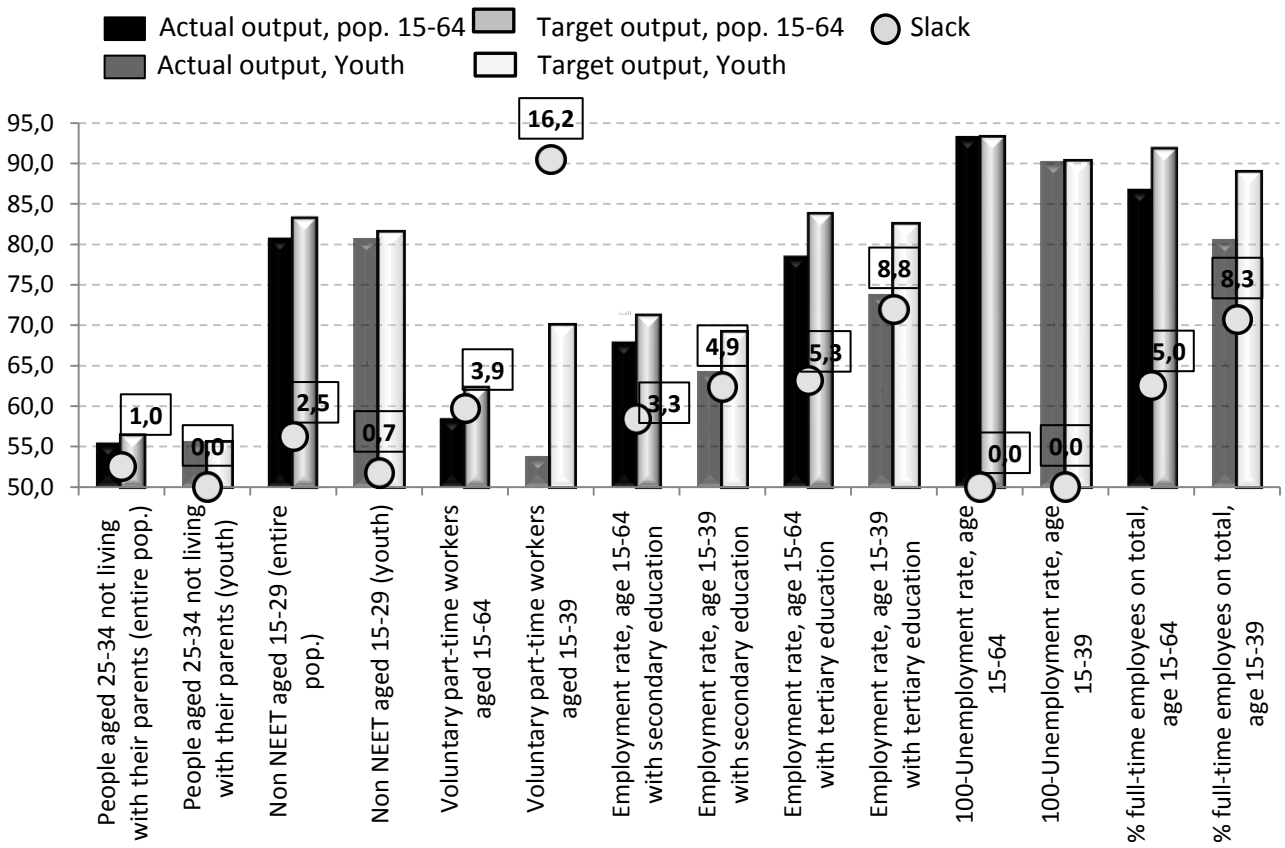
We can see that a situation of marked disadvantage is obtained with respect to the youth employment rate, which is even more evident for people with higher education. A similar result, with a higher intensity, is found also with respect to involuntary part-time work. Looking, instead, at the employment contractual

[14] The similarity between a given inefficient DMU and its peer units is calculated applying the unit's set of weights to the efficient units and verifying whether they still remain efficient. The set of such units is said 'peer group' to the respective inefficient unit, i.e. the set of its virtuous reference units. Each DMU's peer group varies according to the evolution of the returns to scale and the model's input vs. output orientation.

[15] The additional improvement (increase in outputs and/or decrease in inputs) needed for a unit to become efficient.

form, we observe the necessity of reducing the share of temporary contracts, especially for the youth component.

Fig.5 – Output slacks in the two models – Italy

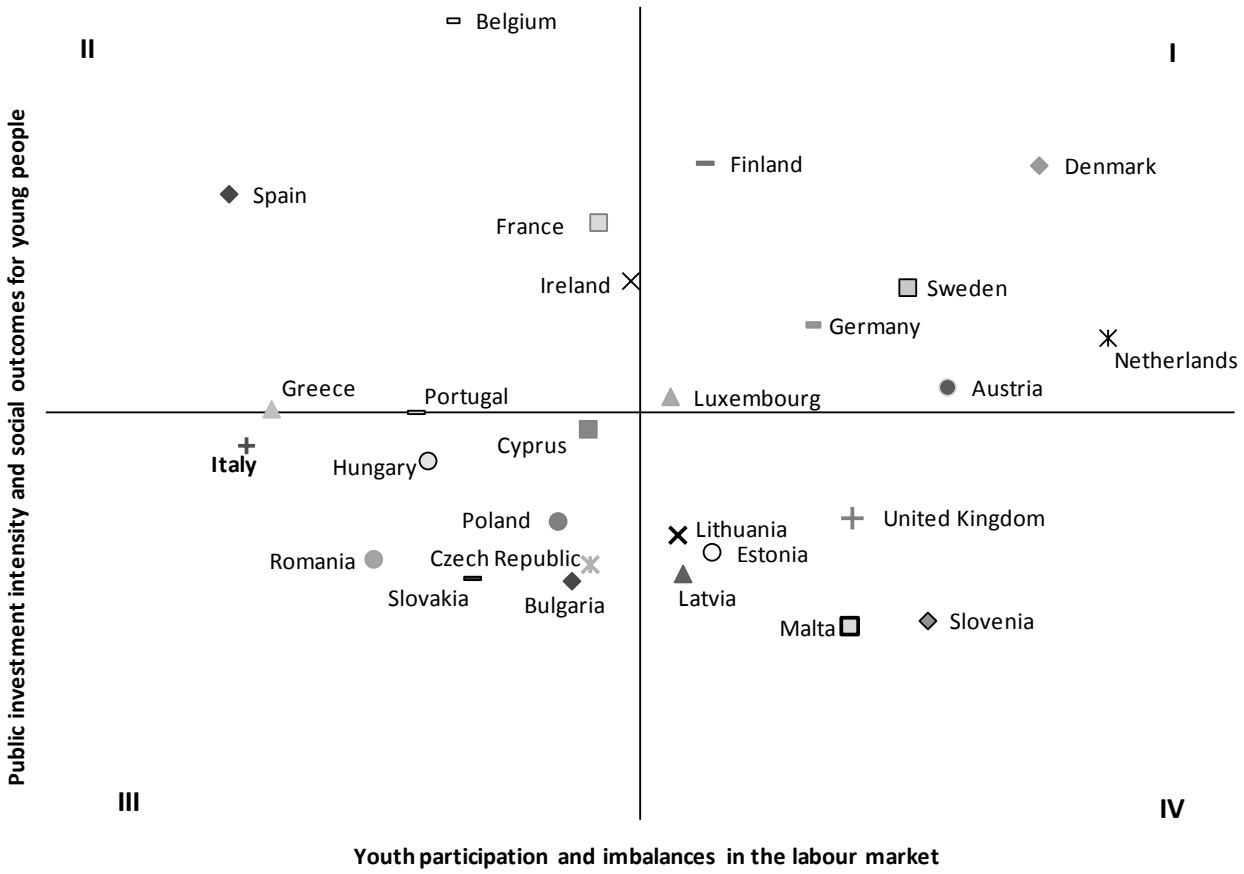


Welfare efficiency and effectiveness in addressing youth conditions

It has been observed that, in order to support different generations, it is necessary that policies assume a 'life cycle' perspective. A previous study presented some analyses for the comparison of different welfare systems, considering the level of attention and support given to the younger generations (Bergamante and Canal, 2012).

A multivariate analysis has been performed for exploring and describing different welfare models in an intergenerational perspective. Through this analysis one can observe the position occupied by youth in each country both with regard to the labour market and as recipients of national social protection policies, in this way trying to identify those contexts where the welfare system better protects younger citizens, generating guarantee mechanisms. In order to offer a representation of different European countries with respect to the mentioned aspects, the relation between youth participation to the labour market, and the investment in education and in labour market support programmes has been considered in a principal component analysis (PCA). The PCA considered six variables related to welfare policies in terms of education, labour market and family support, and nine related to welfare outcomes in terms of labour market balances and unbalances, as well as social conditions. The results from the PCA were projected using a Cartesian coordinate system that gave an immediate representation of EU countries' positioning (Fig.6).

Fig. 6 – Principal component analysis score plot (components 1 and 2)



Source: Bergamante and Canal, 2012.

These results allowed to synthetically represent and characterize different contexts, differentiated among 'generative', 're-generative', 'de-generative', and 'non-generative' ones. 'Generative' contexts are represented by those countries where the welfare system supports and creates generations taking into account the socio-temporal character of relations and considering the needs of both present and future generations. Example of generative contexts are countries like Sweden, Denmark, Finland, the Netherlands, Germany, Austria, and Luxembourg, characterized by high levels of youth employment and where job protection is associated to the diffusion of temporary labour contracts. This set of countries seems to favour the generational turnover, as confirmed by the high fertility rates. The 'regenerative' countries are those where younger generations are somehow supported, but just in some dimensions and in a fluctuating fashion, in this way disregarding life cycles. Examples of 'regenerative' countries are Belgium, France, Ireland, and Spain; despite having invested in public policies supporting employment, they have not obtained high levels of youth employment and did not manage to establish an effective relation between welfare expenditure and higher employment. The 'degenerative' connotation identifies the group of systems with an exclusive vision of generations, completely disregarding their relational nature. This typology of systems created a discriminatory mechanism for the access to economic and social resources, producing and favouring a generational conflict over the allocation of resources and social positioning. The countries showing 'degenerative' contexts resulted to be Italy, Greece, Portugal, Cyprus and some Eastern European countries, where younger generations seem to suffer from conditions of disadvantage and discomfort. This group is characterised by the lowest levels of youth employment and investment in education and welfare, as well as by the higher share of youth living with their parents. The last scenario identifies 'non-generative' contexts, characterised by a certain degree of indifference towards generations

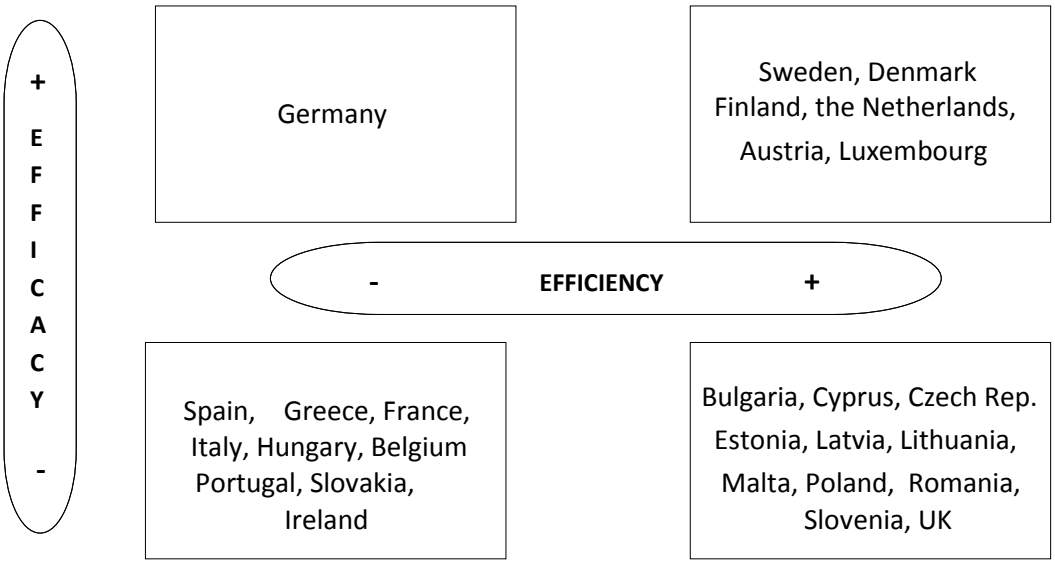
and their needs, and based both on the idea of a self-regulating labour market and on the confidence in determined sectors' ability to work as a driving force for the economy. Belonging to this group are countries like Lithuania, Estonia, Latvia, UK, Malta, and Slovenia that managed to have good levels in the indicators for the youth component, independently on the investment in education and welfare (Bergamante and Canal, 2012).

Starting from the observation of the level of attention that States dedicate to younger generations and on the ability to effectively transform such attention into occupational, autonomy, and income goals for young people, this paper intended to go further and carry out a comparative analysis to verify each country's degree of relative efficiency in attaining such goals.

The main paper objective was to consider the youth situation in EU by looking at the development of welfare systems and at the type of associated expenditures, as effective systems are not necessarily efficient too. The descriptive analyses hinted at the existence of contexts where high investments in welfare do not generate particularly positive results for younger generations.

DEA results confirmed the efficiency excellence of some countries but also highlighted some contradictions, especially in those countries that are not effective but resulted relatively efficient, representing a benchmark for the others. Fig.7 represents the positioning of countries in terms of efficiency and the relation between attention to younger generations and the effectiveness in obtaining results.

Fig.7 - EU countries positioning in terms of efficiency and effectiveness in youth support policies



Among the countries where effectiveness and efficiency coexist is the Netherlands that represents a 'peer unit' for many other countries and may thus, be considered as a model in terms of convergence.

There are, then, ineffective contexts that exhibit technical efficiency and are characterized by either a certain dynamism in the labour market or by a driving capability (as in the case of Eastern European countries) that could be partially explained by the advantages for newly accessing the EU. For this type of contexts, the efficiency endurance prospects are uncertain and a future weaker efficiency could lead to a deterioration also in terms of efficacy. However, in these contexts, welfare is not particularly developed and, then, an increase in the system inputs may lead to better results, even if not proportionally.

Contexts characterised by both inefficacy and inefficiency seem to be those where either the scarce results are associated to a limited investment (e.g. Italy, Greece, Hungary, Portugal, and Slovakia) or the reasonable financial and material effort does not show adequate returns on younger generations. For this type of contexts, an efficiency improvement could be pursued by looking at the 'slacks' values so as to guide policy interventions.

It is worth signalling the case of Germany that, even amidst the current economic crisis, managed to sustain youth employment and independence, despite being distant from the efficiency frontier; if not properly addressed, this inefficiency could jeopardise efficacy levels in the medium-long run.
This study showed the benefits of using DEA in the evaluation of youth welfare policies, especially as it is useful to identify contexts that are both efficient and effective. At the same time, DEA results could represent a stimulus in terms of policy choices for those contexts that are both inefficient and ineffective, especially in times when welfare expenditures containment or reduction is regarded as a binding constraint and, in most cases, as an unavoidable objective. An output-oriented analysis can be a useful tool to guide policy to achieve better efficiency without introducing new expenses.

Conclusions

It is a shared opinion that younger generations are those who are most suffering from the effects of demographic and economic changes. Furthermore, the global economic and financial crisis aggravated the youth employment crisis present in many European countries. In this framework, it seems quite reasonable and interesting to study how effective and efficient are national welfare systems to deal with youth problems. This paper, draws on a previous work by Bergamante and Canal (2012) that presented a 'geography' of the European welfare, explicitly considering the youth component and exploring generational dynamics within European countries; this made it possible to identify different geographical contexts, each characterised by a different level of effectiveness in supporting younger generations on their path to adulthood.
This paper, keeping the intergenerational perspective, extended the analysis from the study of welfare systems effectiveness in supporting youth to the relative efficiency evaluation of country efforts to improve the socioeconomic and employment conditions of younger generations. The efficiency analysis on the EU 27 countries has been performed through a Data Envelopment Analysis (DEA) with multiple inputs and outputs. Two models are processed: one for the population between 15 and 64 years and the other for people up to 39 years. The results from DEA showed that some welfare systems are efficient for the entire population (15-64), but not considering the younger component. Furthermore not always an effective youth-friendly welfare is associated to relative efficiency in pursuing youth support goals. In fact, while DEA confirmed the efficiency excellence of some effective welfare systems and the inefficiency of some ineffective ones, it also highlighted some contradictions, especially in those welfare systems that are not effective but resulted to be relatively efficient, representing a benchmark for the others.
This study showed the benefits of using DEA in the evaluation of youth welfare policies, especially as it is useful to identify contexts that are both efficient and effective. At the same time, DEA results could represent a stimulus in terms of policy choices for those contexts that are both inefficient and ineffective, especially in times when welfare expenditures containment or reduction is regarded as a binding constraint and, in most cases, as an unavoidable objective. An output-oriented analysis can be regarded as a useful tool to guide policy to achieve better efficiency without introducing new expenses.

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Appendix

Data Envelopment Analysis

DEA is a non-parametric technique based on linear programming for the performance evaluation of a set of decision-making entities (Decision Making Units, DMU) that produce multiple outputs using multiple inputs (Charnes et al., 1978). The methodology leaves to each DMU the opportunity of weighing inputs and outputs so as to maximize its efficiency. This evaluation approach is applicable to organizational units even without knowing the details of the productions process because, being a non-parametric technique, the efficiency estimate is based on observed data.

DEA is suited for the evaluation of a limited set of observations because the efficiency of each DMU is analysed separately, formulating a single optimization programme for each of them. DEA is mainly used for the efficiency study of companies willing to identify the best relation between used resources and produced outputs. It is possible to distinguish between input-oriented models, where the outputs are given and the inputs are minimized, and output-oriented models where the inputs are given and outputs maximized. The technical efficiency of an organizational unit is then defined as the ability of producing the highest quantity of outputs with the disposable inputs or, alternatively, as the ability to invest the lowest quantity of inputs to achieve a fixed level for the outputs (Farrell, 1957). In fact, a production process will be technically efficient if, given the used inputs, it is not possible to increase all the outputs equi-proportionally or if, given the produced outputs, it is not possible to reduce all the input equi-proportionally. Another way of defining this is that efficiency is the complement to one of the highest equi-proportional expansion of all the outputs produced, given the inputs levels, or the complement to one of the highest equi-proportional reduction of all the inputs used to produce a given level of outputs. Technical efficiency is, then, the ratio between a synthetic output and a synthetic input, obtained as linear combinations with non-negative coefficients of the observed inputs and outputs. The peculiarity of DEA lies in the fact that each DMU can chose the set of weights maximizing its efficiency with the aim of improving its productive capacity. This feature was thought by Charnes, Cooper and Rhodes (1978) for the difficulty of determining a set of weights common to all the DMU's and the legitimacy each units has to establish for itself a set of weights different from those of the other DMU's.

In the basic model of Charnes et al. (1978), the efficiency score of a given DMU is given by:

$$\theta = \frac{weighted\ \ sum\ of\ \ outputs}{weighted\ \ sum\ of\ \ inputs}$$

Assuming that there are *n* DMU's, each using *m* inputs to produce *s* outputs, the relative efficiency score of DMU_0 is obtained by the following fractional optimisation program (with unknowns v and u):

$$Max \quad \theta_0 = \frac{\sum_{k=1}^{s} v_k y_{k0}}{\sum_{j=1}^{m} u_j x_{j0}}$$

s.t.

$$\frac{\sum_{k=1}^{s} v_k y_{ki}}{\sum_{j=1}^{m} u_j x_{ji}} \le 1, \qquad i = 1,\dots,n.$$

$$v_k, u_j \ge 0, \qquad k = 1,\dots,s;\ j = 1,\dots,m.$$

Where:

- DMU_0 is the decision-making unit under consideration;
- y_{k0} is the amount of output *k* produced by DMU_0;
- x_{j0} is the amount of input *j* used by DMU_0;
- v_k is the weight for output *k*;
- u_j is the weight for input *j*.

The previous fractional program can be transformed and converted into an equivalent linear program:

$$Max \quad \theta_0 = \sum_{k=1}^{s} v_k y_{k0}$$

s.t.

$$\sum_{j=1}^{m} u_j x_{j0} = 1$$

$$\sum_{k=1}^{s} v_k y_{ki} - \sum_{j=1}^{m} u_j x_{ji} \leq 0 \qquad i = 1,\ldots,n.$$

$$v_k, u_j \geq 0 \qquad k = 1,\ldots,s;\ j = 1,\ldots,m.$$

The choice variables of the problem are the weights *v* and *u*, that are selected by each DMU to maximise the efficiency score. This linear program is repeated *n* times to determine the relative efficiency score of each DMU.

The efficient frontier (Farrell, 1957; Farrell, Fieldhouse, 1962) is given by the set of input-output combinations for which each input quantity is associated to the highest technically possible level of production, or each output quantity is associated to the lowest technically possible level of resources (input) used. Efficient DMU's are on the efficient frontier and represent a benchmark for inefficient DMU's. The inefficiency measure is given by the distance between observations and the efficient frontier.

Returns to scale in DEA.

Returns to scale represent the relation between the change in input and the consequent change in output for a given production unit. Returns to scale can be either constant (CRS) or variable (VRS) both increasing and decreasing. A generic production function will show

- Constant returns to scale is an increase (decrease) in inputs generates a correspondent proportional increase (decrease) in the outputs;
- Variable and Increasing if an increase (decrease) in inputs generates a correspondent more than proportional increase (decrease) in the outputs;
- Variable and decreasing if an increase (decrease) in inputs generate a correspondent less than proportional increase (decrease) in the outputs.

Depending on the assumptions on returns to scale, there are two DEA models:

- The CCR (from Charnes, Cooper, Rhodes, 1978) Model for CRS;
- The BCC (from Banker, Charnes, Cooper, 1984) Model for VRS.

Since CCR models assume constant returns to scale, they may be interpreted as the reduction of a multiple-outputs and multiple inputs problem for each given DMU to a synthetic single-output and single-input problem.

The basic BCC Model can be represented with the following linear program:

$$Max \quad \theta_0 = \sum_{k=1}^{s} v_k y_{k0} - v_0$$

s.t.

$$\sum_{j=1}^{m} u_j x_{j0} = 1$$

$$\sum_{k=1}^{s} v_k y_{ki} - \sum_{j=1}^{m} u_j x_{ji} - v_0 \leq 0 \qquad i = 1,\ldots,n.$$

$$v_k, u_j \geq 0 \qquad k = 1,\ldots,s;\ j = 1,\ldots,m.$$

v_0 unbound in sign.

The fact that v_0 is free in sign and may be negative (as well as positive or zero)allows to use optimal values of this variable to identify RTS.
The BCC Model is more flexible, allowing for VRS. Typically, the efficiency measure of a given DMU in the BCC model is non-inferior to that established in the CCR Model. There are, thus, units that are efficient in the case of VRS but not when CRS are considered. Such a relation between the two models can be used to calculate the scale efficiency, defined as the ratio between the purely technical local efficiency, calculated with the CRR model, and the global technical efficiency, calculated in the BCC model. When the scale efficiency of a given DMU is equal to one, this means that such decision making unit is efficient with CRS. If, instead, the scale efficiency measure is less than one, the DMU is in a situation of scale inefficiency that could lead to the existence of VRS: some DMU's that are efficient in the BCC model, may be inefficient in the CCR model because their dimension is not the optimal one. The BCC model aims at the evaluation of the purely technical efficiency, sterilised by possible scale inefficiency.

DATA SET USED FOR THE TWO DEA MODEL SPECIFICATIONS

	INPUT							Output for DEA 1 (entire pop.)							Output for DEA 2 (youth)						
	Expenditure on ALMP as % of GDP	Expenditure on PLMP as % of GDP	ALMP interventions (%)	PLMP interventions (%)	Labour productivity - Percentage of EU27 total (based on PPS per hours worked)	Family and children policy expenditure	Median equivalised net income	People aged 25-34 not living with their parents	Non NEET aged 15-29	Voluntary part-time workers aged 15-64	Employment rate, age 15-64 with secondary education	Employment rate, age 15-64 with tertiary education	100-Unemployment rate, age 15-64	% full-time employees on total employees, age 15-64	People aged 25-34 not living with their parents	Non NEET aged 15-29	Voluntary part-time workers aged 15-39	Employment rate, age 15-39 with secondary education	Employment rate, age 15-39 with tertiary education	100-Unemployment rate, age 15-39	% full-time employees on total employees, age 15-39
Austria	0,5	1,2	31,8	43,7	113,1	2,8	18.539	75,7	91,4	88,8	77,1	86,1	96,1	91,0	75,7	91,4	89,2	81,7	89,6	95,0	85,4
Belgium	1,1	2,0	100,0	156,0	135,3	2,1	16.743	84,3	88,0	85,6	67,0	83,0	93,0	91,7	84,3	88,0	78,3	65,6	86,7	90,8	87,5
Bulgaria	0,3	0,2	20,2	15,0	39,9	1,3	4.765	51,5	81,5	49,0	72,7	86,1	94,3	95,1	51,5	81,5	62,9	71,4	89,3	93,3	94,4
Cyprus	0,1	0,4	11,7	34,1	82,2	2,1	18.832	65,9	89,1	69,7	74,0	86,5	96,2	86,0	65,9	89,1	59,7	71,7	87,7	95,3	82,3
Denmark	1,0	1,2	63,5	54,5	114,2	3,8	17.601	98,3	95,0	87,3	81,7	88,4	96,5	91,5	98,3	95,0	88,7	84,5	91,8	95,3	86,6
Estonia	0,0	0,2	1,7	15,5	55,7	1,8	7.563	79,8	88,5	76,5	75,4	85,2	94,4	97,6	79,8	88,5	78,2	74,5	82,4	93,3	96,9
Finland	0,7	1,4	29,2	70,4	112,0	2,9	16.556	94,9	91,1	72,5	75,1	85,6	93,6	85,1	94,9	91,1	74,7	75,3	87,6	91,5	76,7
France	0,6	1,2	52,8	76,7	129,0	2,5	17.578	89,0	87,6	68,0	69,3	80,7	92,6	85,2	89,0	87,6	65,2	67,1	81,8	90,2	77,9
Germany	0,5	1,1	27,1	57,2	126,6	2,9	18.007	85,0	89,0	77,0	74,0	85,7	92,4	85,2	85,0	89,0	78,2	75,3	88,2	91,7	74,1
Greece	0,1	0,5	8,9	45,3	83,6	1,6	12.032	51,8	85,0	55,9	61,2	82,1	92,2	88,5	51,8	85,0	48,8	59,4	81,5	88,9	84,7
Ireland	0,5	1,3	32,4	104,5	115,7	3,1	18.169	75,5	84,0	76,6	71,9	84,4	93,9	91,6	75,5	84,0	87,0	71,7	85,9	92,4	89,4
Italy	0,4	0,8	26,2	18,6	104,5	1,3	15.262	55,5	80,7	58,5	67,9	78,5	93,2	86,7	55,5	80,7	53,7	64,2	73,6	90,2	80,5
Latvia	0,1	0,3	2,7	15,1	42,9	1,4	7.257	63,0	86,8	68,6	74,5	86,9	92,3	96,7	63,0	86,8	80,7	73,3	87,6	91,2	96,1
Lithuania	0,1	0,2	6,8	11,3	54,3	1,9	6.949	67,7	88,0	68,4	68,1	87,7	94,1	97,6	67,7	88,0	78,5	63,5	88,3	93,2	97,1
Luxembourg	0,3	0,5	87,1	57,7	177,9	3,9	26.943	78,4	90,8	90,6	65,3	83,6	94,9	93,8	78,4	90,8	86,3	65,4	84,2	93,1	90,0
Malta	0,0	0,3	2,2	42,0	81,9	1,2	13.324	53,5	87,9	83,9	71,8	84,5	93,9	95,8	53,5	87,9	80,3	71,8	89,0	93,2	95,0
The Netherlands	0,7	1,3	48,7	78,4	138,4	1,2	19.142	90,6	95,4	95,5	80,9	87,9	97,3	82,1	90,6	95,4	95,0	85,3	92,7	97,0	73,4
Poland	0,5	0,3	28,6	14,9	50,2	0,7	6.732	60,5	87,3	81,5	63,3	83,7	92,8	73,1	60,5	87,3	77,9	66,8	86,3	91,4	65,7
Portugal	0,4	1,0	31,3	47,7	63,6	1,3	9.504	55,8	88,1	59,2	65,8	84,7	91,9	77,1	55,8	88,1	48,9	61,9	84,7	90,4	68,6
United Kingdoms	0,0	0,2	2,2	25,8	108,5	1,7	18.543	84,8	86,9	89,4	75,1	85,3	94,3	94,7	84,8	86,9	82,7	72,5	87,7	92,0	93,1
Czech Republic	0,2	0,2	12,8	25,7	68,6	1,4	9.725	67,5	89,3	86,0	73,1	83,2	95,6	92,8	67,5	89,3	86,7	72,9	78,0	94,9	92,3
Romania	0,1	0,2	6,7	11,4	43,7	1,5	3.064	62,6	86,8	48,2	63,5	85,7	93,9	98,7	62,6	86,8	34,0	62,5	88,4	92,1	98,5
Slovakia	0,2	0,4	26,5	23,3	74,2	1,5	6.763	48,9	84,7	77,0	70,1	83,8	90,5	95,5	48,9	84,7	76,9	69,6	81,3	88,9	94,2
Slovenia	0,1	0,3	7,5	15,1	83,6	1,8	13.812	48,5	92,5	93,2	72,0	87,5	95,5	82,7	48,5	92,5	93,5	75,5	91,9	94,3	72,4
Spain	0,6	1,9	84,2	44,8	104,7	1,4	13.949	62,7	84,3	64,6	67,4	81,7	88,6	70,7	62,7	84,3	64,8	64,5	81,1	86,2	62,3
Sweden	0,6	0,5	25,5	37,0	117,9	3,0	17.799	96,3	92,0	73,9	81,6	88,1	93,7	84,2	96,3	92,0	66,5	80,4	87,6	90,7	74,4
Hungary	0,2	0,4	12,1	20,4	59,5	2,9	6.597	63,5	84,2	72,3	63,3	79,5	92,1	92,2	63,5	84,2	64,1	64,0	83,1	90,6	90,1