

Luigi Paganetto *Editor*

Sustainable Growth in the EU

Challenges and Solutions

 Springer

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Editor
Luigi Paganetto
FUET, Economics Foundation
University of Rome Tor Vergata
Rome
Italy

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Capital Intensity and Growth in the European Union

D. Salvatore and F. Campano

Abstract This paper concludes that more rapid growth can return to the Europe Union (EU) in the future only if member countries can return the efficiency to that they had in converting gross capital formation into the growth of GDP during the 2000–2007. A few countries, such as Germany, have done that and are now growing even faster than before the 2008/2009 recession. It is a mistake, however, to think of efficiency purely in terms of automation. Investment in new machines (which increase the capital/labor ratio) may even lead to slower growth because in most EU countries the output elasticity with respect to labor is higher than the elasticity with respect to capital. Italy will start growing again if its firms start hiring and stop thinking in terms of substituting more capital for labor. If firms avoid hiring because of rigidities in the labor laws which were implemented under previous governments, these must be reviewed and revised.

Keywords European Union · Eurozone · ICOR · Harrod-Domar model · Generalized Cobb-Douglas model · Output elasticity of labor and capital

1 Introduction

Despite maintaining gross capital formation as a percentage of GDP at approximately the same level before the recession of 2008–2009, the *Eurozone* countries struggled to maintain the same growths rates as before the recession.

We see in Fig. 1 below that the United States had no trouble doing that (see CBO 2016). Its recovery began in 2009 and GDP climbed steadily without any more setbacks to 2014. Likewise, the non-euro EU countries followed the same

D. Salvatore (✉)

Department of Economics, Fordham University, Bronx, New York, NY, USA

e-mail: salvatore@fordham.edu

F. Campano

Department of Economics, Fordham University at Lincoln Center, New York, NY, USA

e-mail: campano@fordham.edu

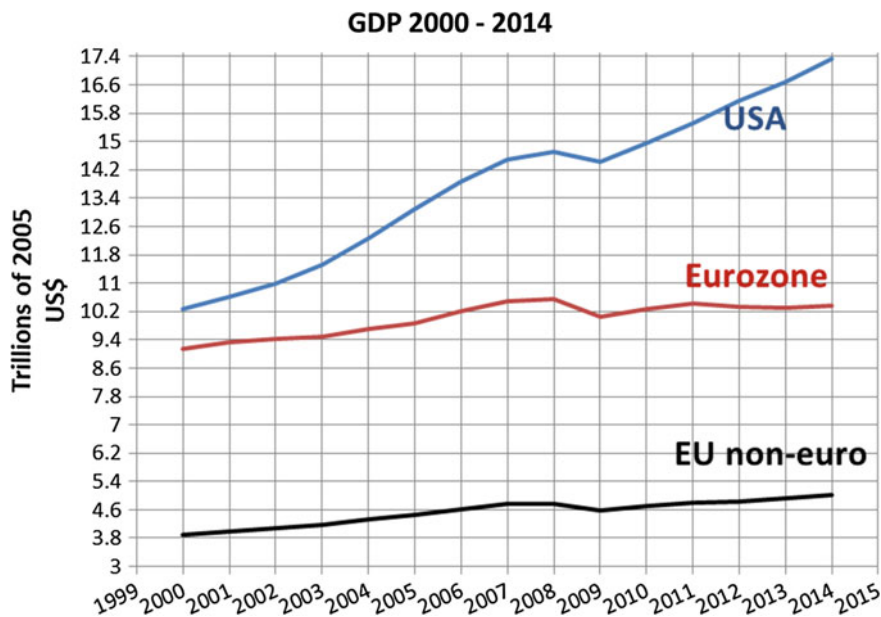


Fig. 1 The path of real GDP from 2000 to 2014 for the United States, Eurozone and the non-euro EU countries

pattern, although their pre-2008 growth rate was less than that of the US. However, once they got passed 2009 they grew steadily without any setbacks at a growth rate that was slightly less than their 2000–2007 rate.

The Eurozone countries however, had a small increase in growth between 2009 and 2011, which then became negative until 2013, followed by a slight increase from 2013 to 2014 (note: not all countries in this group followed the same pattern; Germany, for example, suddenly started growing at a faster rate after 2009 than that for the period between 1995 and 2007). The question that arises is why can't the countries of the Eurozone group do as well as they did before the 2008/2009 crisis?

In this paper we examine the performance of the 28 European Union countries (EU-28) over the long-run period from 1995 to 2014, by separating the period from 2000 to 2007 (which was a relatively good period for most countries of the group) and the period from 2009 to 2014 (which was not as good). We project GDP by country from 2015 to 2021 under two scenarios, an optimistic scenario where countries make an effort (incrementally over six years) to return to the efficiency that they had in converting gross capital formation into growth of GDP during the 2000–2007 period, and a pessimistic scenario where they move forward without any improvement, but also without any further deterioration of the long-run performance.

2 The Long-Run Parameters

Although most countries in the European Union have been investing a reasonable percentage of their gross domestic product, they still have difficulty growing in terms of GDP. In order to get a macro view of where the problem lies, we estimated the incremental capital-output ratios as used in a Harrod-Domar model (see Van den Berg 2013) and the elasticities of output with respect to labor and capital that are parameters of the generalized Cobb-Douglas model. The labor data come from the ILO statistics, and the GDP and gross capital formation are from the United Nations Statistical Division.

The estimates are shown in Table 1. Of the 28 countries, half show decreasing returns to scale. Of the 15 countries that are in this category, 10 are eurozone countries, and 5 (namely, Hungary, Poland, Romania and Sweden) are non-euro EU countries. Two of the countries, namely Cyprus and Italy, show negative elasticities for capital, but both of these have positive elasticities (both greater than 1) for labor, which are high enough to raise the sum of $\alpha + \beta$ over 1, thereby making them capable of increasing returns to scale by raising employment levels.

Another measure of the efficiency of investment is given by the incremental capital-output ratio or ICOR. Generally the lower the ICOR, the more efficient is the country in converting gross capital formation into extra GDP. However, as countries become more developed, they depend more and more on capital for growth. That is, the capital-output ratio rises as countries develop. It is a rather counter-intuitive notion that as a country becomes more developed and consequently more capital-intensive, it becomes less efficient in converting investment into growth. This is best illustrated by comparing the incremental capital output ratio (ICOR) for different countries. In Table 1 we see that the ICORs for France, Germany, the Netherlands and the United Kingdom are higher than the ICORs for Lithuania, Malta, Romania and Slovakia. Italy has the highest ICOR even though it is not necessarily the most advanced or developed country in the group.

While the ICOR rises as the per capita GDP rises, so does the capital-intensity rise. Hence, the more developed a country is, the more difficult it is to get growth from increases in capital. However, rises in the ICOR can be caused by many other reasons besides development. Some examples of these other reasons include: a lack of project oversight, improper balance between capital and labor in production, poor planning, duplication without coordination, overregulation, and corruption.

Two countries at the same level of development can have very different ICORs and two projects selected for investment may respond differently to the same amount of investment. If a country has consistently low returns in terms of growth to its projects, then a comprehensive study should be made to determine why this is happening. There may be poor economic planning or a lack of project oversight that is at the root of the low return. Whatever the reason for a sudden rise in the ICOR, all agencies engaged in the country's economic health should co-ordinate their research with the aim of discovering what is going wrong. If they identify the

Table 1 Estimated parameters for the Harrod-Domar and the Generalized Cobb-Douglas function (using employment data from the ILO) (Harrod-Domar 1995–2014 and Cobb-Douglas 2000–2014)

		ICOR	α (labor)	β (capital)	$\alpha + \beta$
1.	Austria	13.8	0.318	0.133	0.451
2.	Belgium	13.6	0.604	0.093	0.697
3.	Bulgaria	8.2	0.855	0.354	1.208
4.	Croatia	14.4	0.881	0.055	0.936
5.	Cyprus	9.6	1.285	−0.048	1.238
6.	CzechRep	11.2	2.345	0.159	2.504
7.	Denmark	21.7	1.044	0.072	1.116
8.	Estonia	8.8	1.663	0.196	1.859
9.	Finland	12.5	2.049	0.075	2.124
10.	France	15.2	0.283	0.092	0.375
11.	Germany	16.5	0.750	0.059	0.809
12.	Greece	24.9	1.233	0.104	1.337
13.	Hungary	12.2	0.646	0.166	0.812
14.	Ireland	7.8	0.632	0.173	0.805
15.	Italy	51.0	1.471	−0.072	1.400
16.	Latvia	8.7	1.267	0.303	1.570
17.	Lithuania	5.9	1.361	0.406	1.767
18.	Luxembourg	7.0	−0.137	0.269	0.132
19.	Malta	8.1	0.445	0.174	0.619
20.	Netherlands	13.7	0.801	0.087	0.888
21.	Poland	5.5	0.552	0.311	0.863
22.	Portugal	30.1	0.683	0.088	0.772
23.	Romania	8.0	0.205	0.309	0.515
24.	Slovakia	6.7	1.207	0.320	1.527
25.	Slovenia	11.7	1.203	0.163	1.366
26.	Spain	14.6	0.560	0.085	0.645
27.	Sweden	10.1	0.088	0.183	0.272
28.	UK	10.1	1.905	0.017	1.922

National Accounts Data are in 2005 U.S. Dollars supplied by the United Nations Statistical Office

problem(s), it may be possible to make changes which will allow the ICOR to decrease to the range corresponding to the level of development of that country.

There is no doubt that if enough interested parties (i.e., national economic authorities, the European Union, the UN Economic Commission for Europe, and the OECD) review past investment performance, and seriously analyze the potential of new investment projects, they would be able to identify the reason for the rise of the ICORs above normal levels, so that efforts can be made to lower them to more optimal levels.

3 The Projection Scenarios

Table 2 shows estimates for the growth rates of GDP, gross capital formation as a share of GDP, and the corresponding ICOR for two periods (2000–2007 and 2009–2014) for each country. The growth rates are computed by regression and hence will differ from growth rates which only depend on the end years of the periods (due to compound growth rates in the former). The two periods contrast each country's performance before the 2008/2009 recession with its performance after the recession. Negative ICORs represent the extreme case of non-performing investment.

Table 2 Estimated parameters for the Harrod-Domar before and after Recession

	2000–2007			2009–2014		
	Growth rate	I/Y	ICOR	Growth rate	I/Y	ICOR
Austria	2.1	24.2	11.5	1.1	22.5	20.5
Belgium	2.2	22.8	10.3	1.0	23.4	23.4
Bulgaria	6.3	29.2	4.6	0.9	24.9	27.7
Croatia	4.7	26.1	5.5	−1.1	23.0	−20.9
Cyprus	3.9	22.4	5.7	−1.9	18.8	−9.9
Czech Republic	4.7	29.9	6.4	0.7	27.3	39.0
Denmark	1.8	22.3	12.4	0.7	20.2	28.8
Estonia	7.7	31.1	4.0	4.0	18.6	4.6
Finland	3.0	23.8	7.9	0.3	21.9	73.0
France	1.8	22.2	12.4	0.9	21.5	23.9
Germany	1.2	20.3	16.9	1.8	19.0	10.6
Greece	4.1	24.7	6.0	−5.1	14.9	−2.9
Hungary	4.0	25.9	6.5	1.0	20.1	20.1
Ireland	5.3	27.7	5.2	1.7	20.7	12.1
Italy	1.1	21.1	19.2	−0.8	18.1	−22.6
Latvia	9.1	32.6	3.6	2.7	26.1	9.7
Lithuania	8	23.0	2.9	3.6	20.2	5.6
Luxembourg	3.8	21.4	5.6	2.5	21.9	8.8
Malta	2.3	19.5	8.5	2.6	19.2	7.4
Netherlands	1.8	21.6	12.0	0.2	19.8	98.9
Poland	4.1	20.6	5.0	2.7	22.1	8.2
Portugal	1.0	24.7	24.7	−1.2	18.2	−15.2
Romania	6.3	24.2	3.8	1.4	26.3	18.8
Slovakia	6.1	28.4	4.6	2.3	22.8	9.9
Slovenia	4.2	28.7	6.8	−0.1	21.2	−211.8
Spain	3.5	29.0	8.3	−1.1	23.1	−21.0
Sweden	3.1	22.4	7.2	4.1	23.0	12.1
United Kingdom	2.8	19.0	6.8	1.8	17.8	9.9

Figures 2 and 3 contrast the outcomes of either continuing forward with the long-run ICORs or making an effort to return to the ICORs of 2000–2007 period. Since the investment shares are the same for both scenarios, the difference in outcomes represents the gains resulting only from the efficiency of lowering the ICORs to levels that the countries were able reach in the past. However, any increase in investment ratios will raise outcomes even higher than our optimistic scenario.

We see in Fig. 2 that making an effort, albeit a very gradual effort, will raise the GDP in the year 2021 by about 350 billion (in 2005 US dollars). In Fig. 3 the corresponding gain for the Eurozone countries will be about 160 billion (in 2005 US dollars). It should be noted that in projecting Germany, the ICOR in the 2009–2014 period is lower than in any preceding period. Hence it appears that Germany is on a new and higher potential GDP path, and we projected that path to 2021. Since Germany is a big component of the total of the Eurozone and its projection is the same under both scenarios, the percentage difference in GDP is not as great for the Eurozone as for the whole group of 28 countries in the EU.

The terminal growth rate for the 28 countries under the scenario of lowering the ICORs to the 2000–2007 averages is 2.3%, while it is only 1.65% with the long-run ICORs. The 2.3% average growth rate is slightly higher than what the European Commission (2016) projects for the group and 1.65% is slightly lower than their

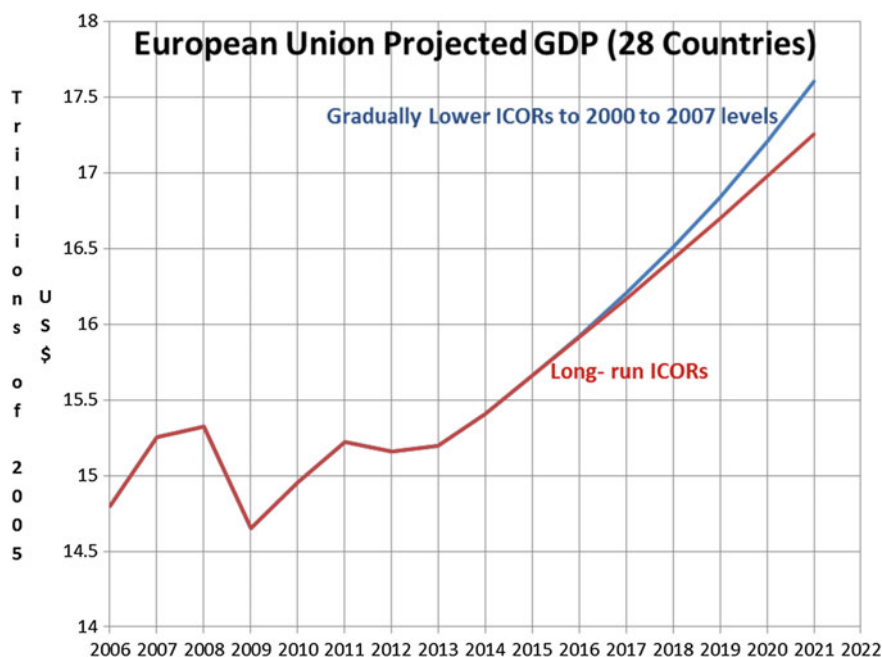


Fig. 2 Aggregate projections of the 28 EU countries

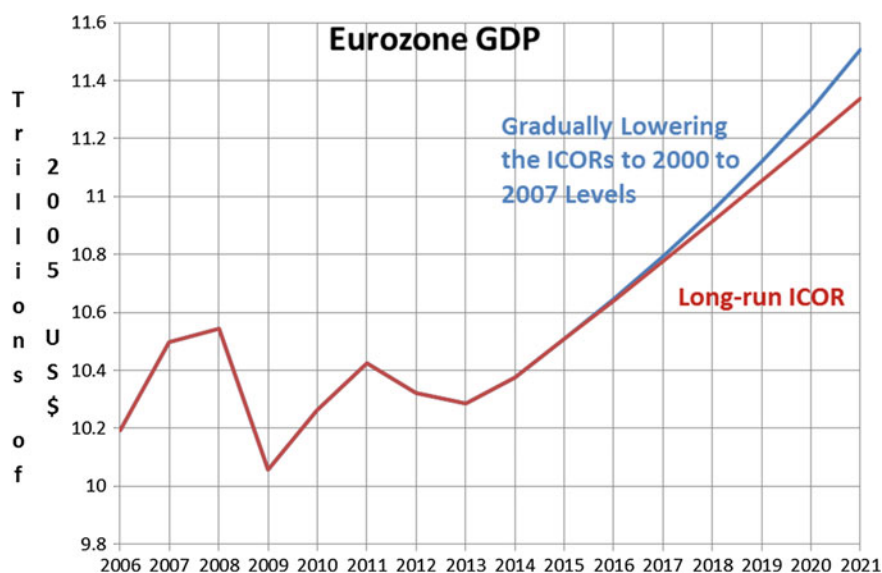


Fig. 3 Aggregate projections of the Eurozone countries

projection. However, their assumptions are based more on increasing investment than on improving efficiency. Obviously, doing both would be ideal.

4 Conclusions

There is reason for optimism for more rapid growth the European Union (EU) in the future. However, this hinges on whether or not the member countries can return to the investment efficiency they were capable of achieving during the period 2000–2007. A few countries, such as Germany, have done that and are now growing even faster than before the 2008/2009 recession. It is a mistake, however, to think of efficiency purely in terms of automation. Investment in new machines (which increase the capital/labor ratio) may even lead to slower growth because in most EU countries the output elasticity with respect to labor is higher than the elasticity with respect to capital. Italy will start growing again if its firms start hiring and stop thinking in terms of substituting more capital for labor. If firms avoid hiring because of rigidities in the labor laws which were implemented under previous governments, these must be reviewed and revised. There are certainly enough agencies that are commissioned to study the EU countries, and there is no shortage of experts in each of these countries. What is needed is more collaboration between these groups so that what needs to be done becomes obvious and it is then implemented.

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Youth Employment and Social Capital in Europe

A. Arnorsson and G. Zoega

Abstract We estimate social capital by region in Europe and relate it to youth unemployment and youth labor force participation. Social capital is measured by the level of trust to fellow citizens as well as the set of shared values that have to do with behavior in the labor market. The results show a clear relationship between social capital and youth unemployment and participation, also when differences in institutions and the state of the business cycle between countries are taken into account.

Keywords Youth unemployment · Values and attitudes · Trust

JEL codes J6

1 Introduction

Youth unemployment ranks among Europe's biggest problems. Unemployed young people are a waste of resources but their unemployment is also likely to affect the rest of their lives, as well as their outlook on society. The unemployed do not have the opportunity to develop their skills, to learn the habits of productive employment nor to discover their talents. Unemployment may also hamper their social life, ability to have and raise a family and find happiness in life. Persistent youth

A. Arnorsson · G. Zoega
Department of Economics, University of Iceland, Reykjavík, Iceland

G. Zoega (✉)
Department of Mathematics, Statistics and Economics, Birkbeck College,
University of London, London, UK
e-mail: gz@hi.is

unemployment may even create a threat to political stability and the future of the European Union since the unemployed may become disillusioned and vote for extreme political parties.¹

The standard approach to explaining youth unemployment is to invoke institutions and institutional differences. In this paper we follow an alternative path by exploring to what extent the regional variation observed in Europe can be explained by differences in what we call social capital. We define social capital as consisting of several layers of trust and values that have to do with employment. We explore the inter-country variation in youth unemployment rates and rates of youth labor force participation and relate it to differences in social capital.

2 How Big Is the Problem?

The data speak volumes. The youth unemployment rate was on average 22.4% in the euro zone in 2015, 20.4% in the European Union as a whole while it was significantly lower or 13.9% in the OECD. In Europe, youth unemployment in 2015 ranged from 7.3% in Germany to a staggering 48.4% in Spain and 49.8% in Greece. The actual number of unemployed individuals between the ages of 15 and 24 in the European Union ranges between four and five million, roughly equivalent to the population of Denmark.²

The youth unemployment rates for 2015 in 27 OECD countries are shown in Table 1. Note the difference between the EU countries and the non-EU countries. The highest rate outside the EU is in New Zealand, 14.7%, but that is only marginally higher in one of the European Union's best performer, which is the United Kingdom. Unemployment is lower in only six countries that belong to the European Union.

A mitigating factor, though, is the large fraction of this age group still registered in the school system. The unemployment rates clearly only apply to those who are not in school. The table also shows the rate of youth labor force participation and the ratio of employment to the working-age population. According to ILO, the labor force participation rate for the 15–24 years age group was 30% in Greece, 37% in Spain and 50% in Germany. In comparison it is 51% for the United States and 59% for the United Kingdom. Thus the participation rate is also lower in the high youth unemployment countries. The employment to working-age population rate was lowest in Greece at 15%, then 16.1% in Italy and 18.9% in Spain. In contrast, it was

¹Scarpetta et al. (2010) discuss the scarring effects of youth unemployment and list measures that could be applied to ease the transition from school to work. Bell et al. (2011) find significant effects at the age of 50 from early adulthood unemployment in the form of lower wages and reduced happiness.

²The exact figure was 4.3 million in March 2016. Source: Eurostat.

Table 1 Youth unemployment, participation and employment-to-population rate in 2015

European union				Non-EU countries			
Country	U (%)	LFP (%)	E/P (%)	Country	U (%)	LFP (%)	E/P (%)
Austria	10.6	58.2	52.0	Australia	13.1	66.4	57.7
Belgium	22.1	30.4	23.7	Canada	13.2	64.4	55.9
Czech R.	12.6	32.2	28.1	Iceland	8.8	74.2	67.7
Denmark	10.9	61.6	54.9	Japan	5.6	43	40.6
Estonia	13.2	40.0	34.7	New Zeal.	14.7	59.1	50.4
Finland	22.0	52.5	41.0	Norway	9.9	55.5	50.0
France	24.7	36.7	27.6	Switzerland	8.6	67.7	61.9
Germany	7.3	49.7	46.1	United States	11.6	51.4	45.4
Greece	49.8	29.8	15.0				
Hungary	17.3	29.9	24.7				
Ireland	20.9	38.4	30.4				
Italy	40.3	26.9	16.1				
Netherlands	11.3	68.1	60.4				
Poland	20.8	34.4	27.2				
Portugal	32.0	34.1	23.2				
Slovakia	26.4	31.1	22.9				
Spain	48.4	36.7	18.9				
Sweden	20.3	56.4	45.0				
United Kingdom	14.6	59.1	50.5				

Source OECD (2016) and International Labour Office (2016)

45.4% in the United States and 50.5% in the United Kingdom. In the Eurozone it was 46.1% in Germany.³

Many reasons have been proposed for this problem, including the effect of minimum wages, insider-outsider relations and a lack of opportunities for vocational training. Minimum wages may reduce employment among the young as explored by, amongst others, Neumark et al. (2004). These authors estimated the effects of changes in national minimum wages on employment using a pooled cross-section time-series data set including 17 OECD countries for the period 1975–2000 and found adverse effects on youth employment. Moreover, they found that the adverse effects depended on other institutions such as unions and employment protection, both of which mitigate the adverse employment effects. In a recent paper, Herwartz et al. (2015) analyze differences in labor markets between European regions for *Nomenclature des unités territoriales statistiques 2 (NUTS 2)*

³The recent crisis years in Europe have increased the problem significantly, as described by Eichhorst et al. (2013), who describe the increase in youth unemployment due to the financial crisis in the euro zone.

regions, as we do in this paper, for the period 1980–2008. They find differences in wage

elasticities of employment across regions and countries that depend on institutions in addition to finding that some characteristics of regional labor markets matter.

Insider-outsider relations may protect the jobs of entrenched, established workers and reduce the demand for entrants. The idea, originally proposed by Lindbeck and Snower (1988), is that established, entrenched workers are expensive to replace because of mandatory redundancy payments and the cost of training replacement workers. These workers then take advantage of their position by demanding higher wages and also keeping young entrants into the labor market out of work by not cooperating with them in the workplace, which reduces their productivity, or harassing them, which increases their disutility of work. This framework can be used to explain the emergence of temporary contracts that give jobs to young workers without the prospects of long-term employment with adverse effects on the employment outlook of these workers. According to Cahuc et al. (2013) 90% of employees in France are hired on fixed-term contracts. Dual labor markets may sentence young workers to an apparently endless sequence of fixed term jobs without ever having the prospects of stable employment. This may affect their accumulation of skills on the job as shown by Arulampalam et al. (2010) who find a negative effect of fixed-term contracts on on-the-job training using the European Community Household Panel.

Finally, there is a lack of training opportunities in many countries for the unskilled young workers. The lower youth unemployment rate in the European Union is in Germany where an established system of apprenticeship has managed to divert the unskilled away from unemployment into productive jobs in industries. Wolberts (2007) finds that national institutional differences in employment protection legislation and vocational training systems affect cross-national differences in labor market entry patterns, although the impact of both institutional features varies considerably by level of education. As an empirical fact, youth unemployment is lowest in Germany where the vocational training system is most advanced although attempts to introduce such a system in other OECD countries have been met with mixed success.

We do not deny that high unemployment and low participation rates among the young may be due to institutions. However, in this paper we study the relationship between values and trust and labor market outcomes for young workers. These values may affect the design of institutions as well as having an independent effect on labor market outcomes.

3 Social Capital and Labor Market Outcomes

Coleman (1990) explained how social capital is created when individuals find it in their self-interest to cooperate with others and form relationships. The different ingredients of social capital, such as trust, can then help individuals achieve their goals. It follows that social capital exists at the micro level in people's lives but also at the macro level for society as a whole. An economy's level of output depends not only on the stock of physical capital, the level of education, human capital, and technology but also on the quality of its social capital. Social capital may both affect economic performance directly as well as indirectly through the choice of institutions.

We are not the first to relate economic performance to social capital measured by a set of shared values and the level of trust. There are studies that find an effect of trust on output and income, such as Knack and Keefer (1997), Zak and Knack (2001), Algan and Cahuc (2013) and Bjørnskov (2012).⁴ Tabellini (2010) explains the variation in output per capita and the growth of output in European regions by cultural variables. The cultural variables are based on responses to three questions from the World Values Survey that are supposed to have a positive effect on output and growth: one measured trust towards other people, another tolerance and respect for others and the third the extent to which people feel they can control their own lives. There is one cultural trait that is thought to affect output and growth negatively, the extent to which parents try to teach their children to be obedient. Tabellini found that the principal components of these four variables could explain output and growth.

In Arnorsson and Zoega (2016) we explore social capital and labor market outcomes in European regions. We found that social capital depends positively on parents wanting to teach their children to be independent, imaginative and tolerant; it also depends positively on trust towards fellow citizens. Social capital measured in this way is positively correlated with male labor force participation, and negatively with unemployment and the average hours of work across regions. In this paper we focus on youth unemployment and youth labor force participation and extend our measure of social capital to include confidence in institutions, measures of traditional Versus modern values and participation in voluntary organizations. Modern Versus traditional values may be important for youth unemployment. The family is important in a traditional society and the family may serve a social insurance purpose in providing income to unemployed young workers and thus discouraging them from taking part in the labor market. Putnam (2000) argues that participation in voluntary organizations is important because social networks were created through voluntary work. A good example in the United States is voluntary fire departments, which bring people together on a regular basis to serve a common purpose.

⁴Delhey and Newton (2003) explored the origins of trust using survey data from the *Euromodule*. They found that social trust is higher where the public feels safe. Informal social networks are also associated with trust and those who are successful in life tend to be more trusting.

4 Statistical Methods

We use a method proposed by Hotelling in (1936). While Hotelling is primarily known for his location theory as well as the theory about the optimal extraction of natural resources, he also contributed in a very significant way to the development of modern statistical methods. One contribution was principal-components analysis. Another one was the use of what has been called canonical correlations. In principal components analysis the information given in a matrix is summarized by a set of principal components, each being a weighted sum of the variables in the matrix where the weights are chosen so as to maximize the variance explained. The method of canonical correlations is related to principal components analysis in that the information contained in a matrix is summarized by a set of derived variables. The difference lies in these variables being separated into two groups so that the weights are chosen so as to maximize the correlation between two latent variables, each latent variable summarizing the information contained in one group of variables. In our context, we take measures of values, trust, confidence in institutions and participation in voluntary organizations taken from surveys, and relate them to measures of labor market performance, in particular youth unemployment and youth participation. Thus we hypothesize that there are two latent variables; social capital and labor market performance, each of which depends on a set of variables describing values and labor market outcomes. Hotelling's method can then be used to calculate the latent variables by taking a weighted average of the underlying variables so as to maximize the correlation between the two latent variables, which are social capital S and labor market performance L . The canonical correlation is the bivariate correlation between two multivariate latent variables. The estimated model consists of several observed measures, which are summarized by two different variable sets, S and L , and represent the latent variables.

The results of the analysis report several statistics, defined in an appendix. These include the *Canonical correlation coefficient*, which measures the correlation between the two latent variables S and L on a given canonical function; the *Canonical function*, defined as a set of standardized coefficients from the observed variable sets; the *Standardized coefficient*, defined as the set of weights attached to observed variables in the two variable sets to yield the linear combinations that maximize the correlation between the two latent variables, i.e., the canonical correlation;⁵ and the *Structure coefficient*, defined as the bivariate correlation between an observed variable and a latent variable, S^* or L^* , which help to define the structure of the latent variable by estimating which observed variables contribute to the creation of the latent variable; the *Squared structure coefficient*, measuring the proportion of variance an observed variable linearly shares with a latent variable and, finally, the *Communality coefficient* that gives the proportion of variance in

⁵They are standardized due to the constraint that the variance of the pair of canonical variables in a canonical function are equal, $\text{var}(S_i^*) = \text{var}(L_i^*) = 1 \forall i$ where i represents the number of canonical functions. This is vital in order to obtain unique values for the coefficients.

each variable that is explained by all the canonical functions that are interpreted. It informs the researcher about the usefulness of the observed variable for the whole model.

The interpretation of each canonical correlation depends on the sign and size of both the standardized coefficient and the structured coefficient. When they have opposite signs one pays more attention to the structured coefficient because if a given variable is positively correlated with the latent variable but has a negative weight (standardized coefficient) then this implies that there is multicollinearity, i.e., the variable is correlated with some of the other variables that are included.⁶

5 Results from the Canonical Correlation Analysis

We study the relationship between social capital and youth unemployment and other labor market outcomes in 224 NUTS2 regions in Europe (*Nomenclature des unités territoriales statistiques*). Both variables are non-observable but we use Hotelling's canonical correlation method to construct them on the basis on observable variables. We denote our measure of social capital by S^* and our measure of labor market outcomes by L^* .

The components of social capital fall into three categories. First, there are two variables that measures confidence in public institutions, on the one hand, and trust towards fellow citizens, on the other hand. The second group of variables is included to capture the distinction between traditional and modern values and measure attitudes towards employment and parenting. The third group includes variables that measure work ethics and other values related to working, including what people like to teach their children. The fourth group has variables that measure group participation⁷ and an emphasis on resolving problem through discussions. There are two variables that are used to measure labor market outcomes. These are the rate of youth (15–24 years) unemployment and the rate of youth labor force participation.

The observed measures for social capital—the S^* variable—are measured in 2008 and include *Confidence* (the average percentage of those who reported that they had a great deal of confidence in various organisations), *Trust* (the percentage of respondents that believe most people can be trusted), *Importance of family* (the percentage of those who listed family as a very important factor in their life), *Children need both parents* (the percentage of respondents that tend to agree that children need both a father and mother to grow up happily), *Warm relationship of working mothers* (the percentage of those who agree strongly that working mother can establish as worm relationship with her child as a mother who doesn't work), *Fulfilling being housewife* (the percentage of those who agree strongly that being

⁶See Sherry and Henson (2005) on interpreting canonical correlation analysis.

⁷See Putnam (2000).

housewife as fulfilling as paid job), *Discuss problems* (the percentage of those who believe it is very important to be willing to discuss problems between husband and wife), *Group participation* (the average percentage of those who reported that they belong to voluntary organizations and activities).

The observed measures for the L^* variable set are: *Youth unemployment* (average unemployment percentage from 2001 to 2012 from 15 to 24 years old and the *Labor force participation rate* (average participation rate from 2001 to 2012 from 15 to 24 years old).

Table 2 Results of canonical correlation analysis

Variable	Function 1			Function 2			Com. Coef (%)
	Std. Coef	Str. Coef	Str. Coef ² (%)	Std. Coef	Str. Coef	Str. Coef ² (%)	
Input—values conducive or detrimental to labor market performance							
Trust	0.165	0.670	44.84	0.178	0.123	1.51	46.35
Importance of work	−0.200	−0.526	27.64	−0.277	−0.118	1.39	29.03
Job security	0.097	0.021	0.04	0.080	0.074	0.55	0.60
Job initiative	−0.102	0.292	8.53	0.057	0.025	0.06	8.59
Job achieve	0.129	0.173	3.00	−0.223	−0.110	1.21	4.21
Children obedience	−0.179	−0.162	2.63	−0.063	−0.217	4.71	7.34
Children independence	0.053	0.354	12.56	0.517	0.530	28.04	40.60
Children hard work	−0.262	−0.576	33.17	0.530	0.243	5.89	39.06
Children imagination	0.073	0.418	17.48	0.046	0.272	7.41	24.90
Children tolerance	0.197	0.355	12.59	0.050	−0.057	0.33	12.91
Children determination	−0.053	0.051	0.26	0.088	0.297	8.79	9.05
Children responsibility	−0.237	−0.110	1.22	−0.127	0.134	1.79	3.01
Warm relationship of working mothers	−0.144	−0.113	1.27	0.458	0.305	9.33	10.59
Fulfilling being housewife	0.052	−0.097	0.93	0.317	0.109	1.19	2.12
Children need both parents	−0.141	−0.645	41.65	0.520	0.306	9.36	51.02
Confidence	0.076	−0.057	0.32	−0.269	−0.317	10.07	10.39
Group participation	0.483	0.768	58.91	0.279	0.204	4.17	63.07
Output—consequences—benefits							
Youth unemployment	−0.117	−0.687	47.18	1.266	−0.727	52.81	99.99
Youth participation	0.924	0.996	99.16	0.873	−0.092	0.85	100.01
Canonical correlation coefficients				Squared canonical correlation coefficients			
1	2			1	2		
0.804(<i>F</i> = 11.85)	0.529(<i>F</i> = 5.00)			0.646	0.280		

The results of the canonical correlation analysis are shown in Table 2 below where two canonical correlations—each independent of the others—are found to be statistically significant. We find that social capital depends positively on trust (structure correlation equal to 0.670) and on teaching children to be independent (structure correlation equal to 0.354), imaginative (structure correlation equal to 0.418) and tolerant (structure correlation equal to 0.355). It depends negatively on teaching children to be obedient (structure correlation equal to -0.162), valuing hard work (structure correlation equal to -0.576) and finding work to be important (structure correlation equal to -0.526). The last two may be due to reverse causality, that bad employment outcomes may make people value work while the negative weight on obedience is consistent with our earlier findings in Agustsson and Zoega (2016) and Tabellini (2010). In effect, instilling obedience in children may have a stifling effect on them later in life. We now find, in addition, that social capital depends positively on participation in voluntary organizations (structure correlation equal to 0.768) and negatively on traditional values, the latter measured by the share of respondents who agree with the statement that children need both parents (structure correlation equal to -0.645). Other variables are not significant.⁸

Labor market outcomes depend positively on youth participation (structure correlation equal to 0.996) and negatively (structure correlation equal to -0.687). It follows that social capital is positively correlated with outcomes, in particular positively with productivity and negatively with unemployment.

To summarize our results so far, we have found that better labor market performance—lower youth unemployment and higher youth participation rates—is positively correlated with trust, teaching children to be independent, imaginative and tolerant and taking part in voluntary associations. It is negatively correlated with finding work important and teaching children to be obedient and hard working. Moreover, traditional values, captured by agreeing with the statement that children need both parents, are negatively correlated with labor market performance measured by youth unemployment and youth participation.

The relationship between S^* (social capital) and L^* (labor market performance) is shown in Fig. 1 below, first for each region and then as simple averages for each country. In the upper right-hand corner, we have mostly countries in northern Europe as well as Switzerland, Austria and Germany while in the bottom left-hand corner we have Eastern European countries and countries in southern Europe. It is interesting that France is one of the low S^* countries in the bottom left-hand corner, alongside Italy, Spain and Portugal. However, the Mediterranean countries appear to perform slightly better than countries in Eastern Europe. The laggards are Slovakia, Romania, Hungary, Bulgaria and Slovenia.

⁸The table reports two canonical function, each giving a relationship between the latent variables S^* and L^* . The standardized coefficients are the weights used on each underlying variable, the structured coefficient is the correlation between each of these variables and the latent variable, S^* or L^* . The *squared structure coefficient* measures the proportion of the variance an observed variable linearly shares with a latent variable (S^* or L^*) and the *communality coefficient* gives the proportion of the variance in each variable that is explained by all three canonical functions.

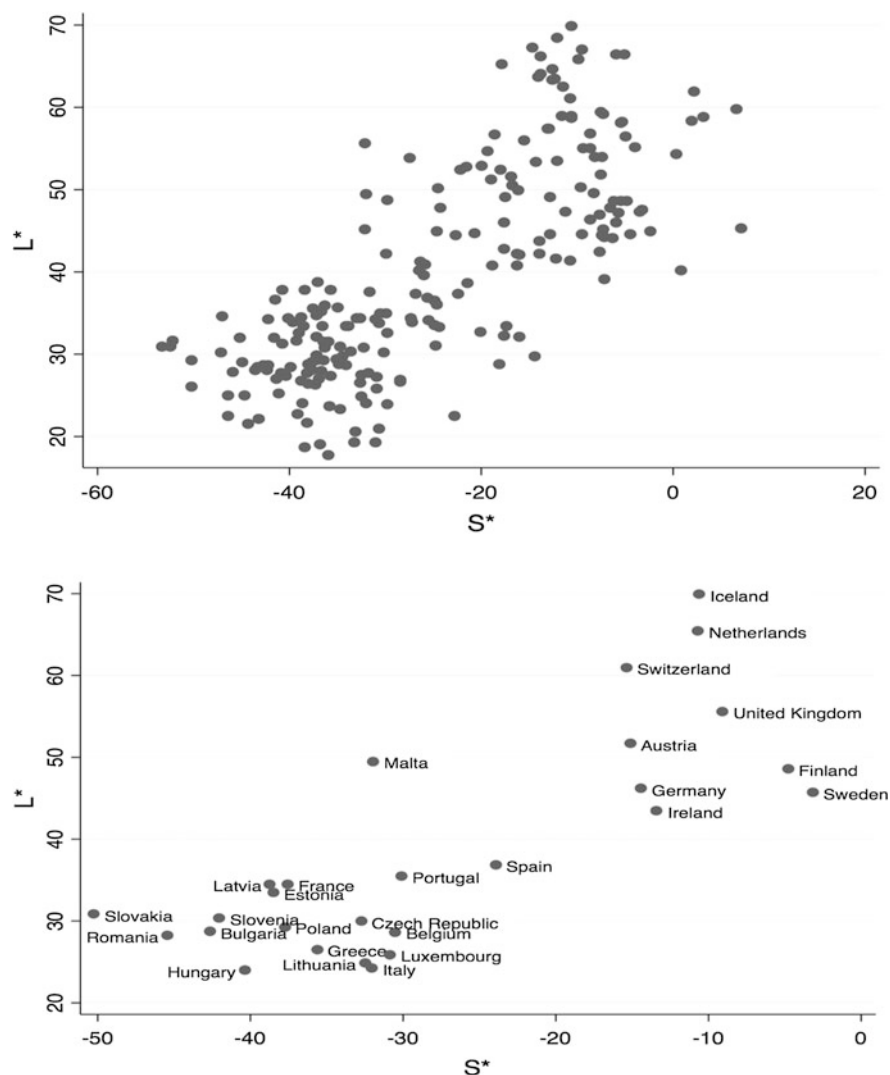


Fig. 1 Social capital and labor market performance

Figures 2 and 3 show the relationship between social capital and youth labor force participation and youth unemployment, first for the regions and then for averages for each country. Figure 2 shows a very strong relationship between labor force participation and S^* . There is a clear upward-sloping relationship and the country groupings are similar to Fig. 1. In Fig. 3 there is a downward-sloping relationship so that higher social capital generates lower youth unemployment. Note

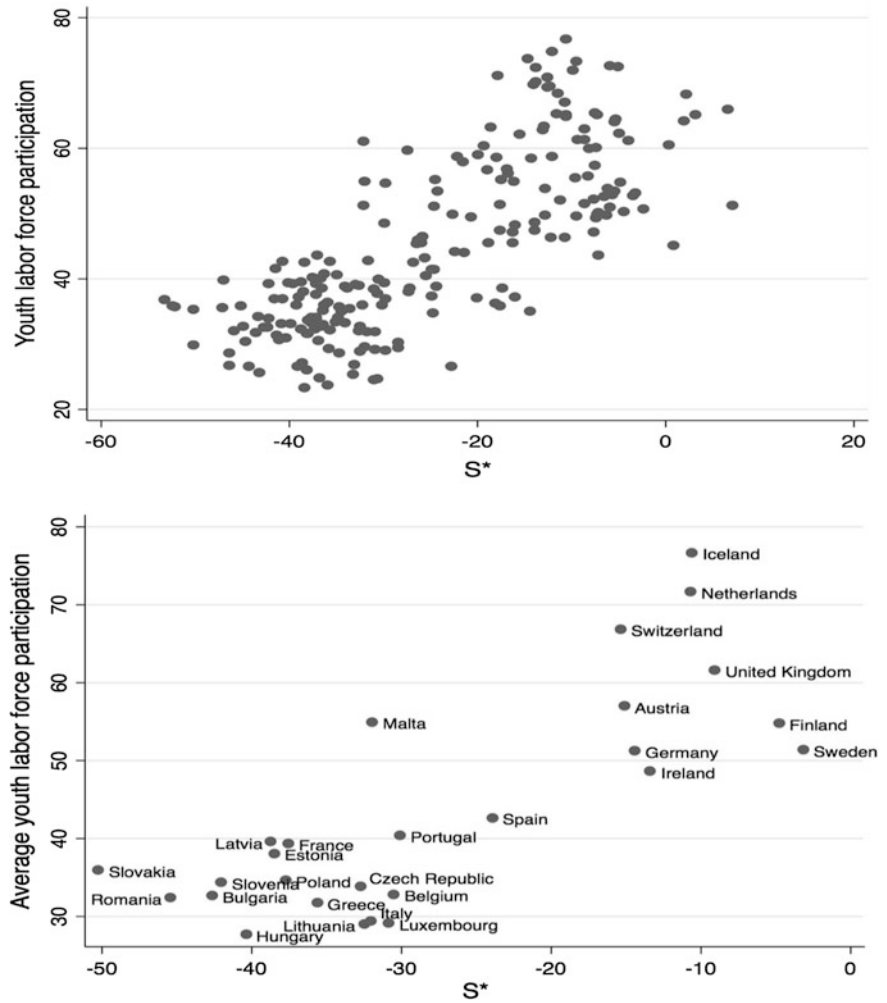


Fig. 2 Social capital (inverse of S^*) and youth labor force participation

that Greece, Spain and Italy (and also Poland) are outliers in that their youth unemployment rates are higher than their level of S^* would predict. This may indicate that institutions hurt youth employment in these countries and cannot be explained by social capital. For example, the entrenched insiders may have influenced politics so as to make governments pass laws that protect their insider status

at the expense of young entrants. Thus laws may make it difficult to fire insider workers by imposing mandatory redundancy payments on young workers and

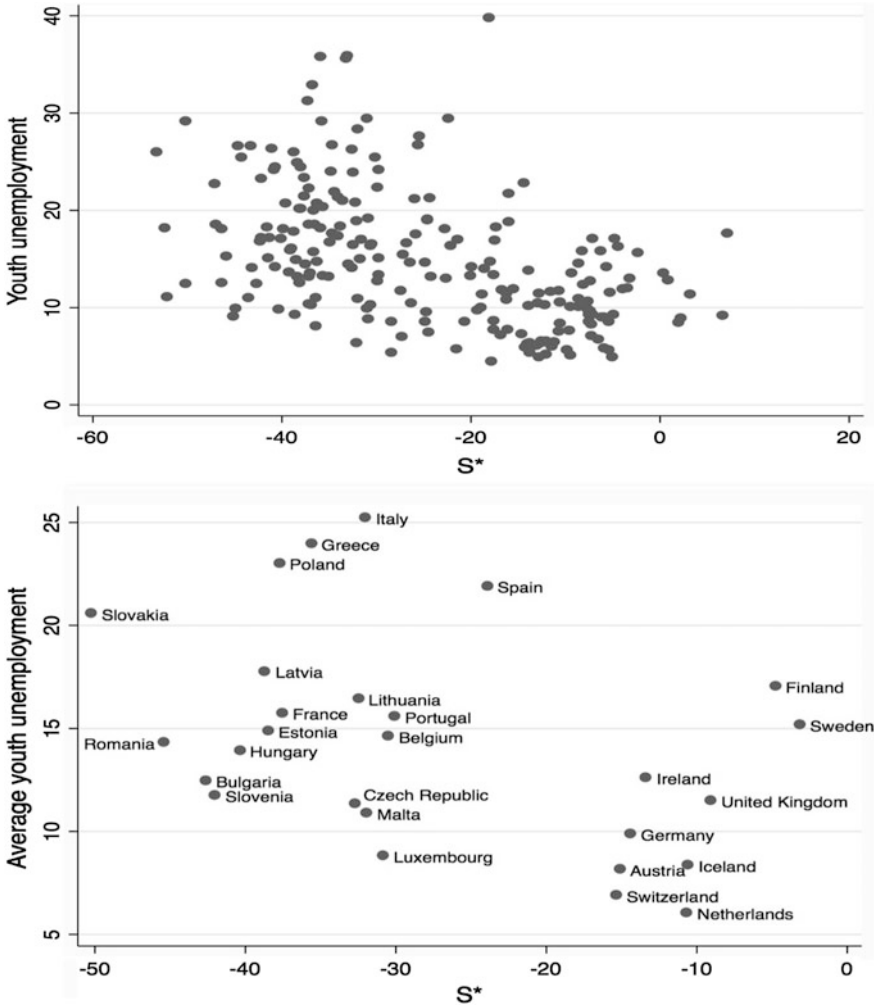


Fig. 3 Social capital (inverse of S^*) and the rate of youth unemployment

forcing firms to justify firing workers in a court of law. Such costs are included in the expected cost of employing young workers were they to be given permanent contracts.⁹

It is important to consider that the pattern revealed in Figs. 1, 2 and 3 can possibly stem from differences in shared values within each country as well as institutions. In order to test whether differences in social capital within countries are important, we used our measure of S^* as an explanatory variable in a cross-country

⁹See Bertola and Bentolila (1990) and Chen and Zoega (1999).

Table 3 Youth unemployment explained by social capital

Variable	Unemployment	Participation
S^*	-0.152 (3.25 ^{***})	0.134 (2.57 ^{**})
Austria	-3.635	16.021
Belgium	0.479	-6.005
Bulgaria	-3.522	-4.625
Czech Republic	-3.138	-4.751
France	0.536	1.393
Germany	-1.811	10.180
Greece	9.057	-6.456
Hungary	-1.677	-9.606
Ireland	-0.193	16.667
Italy	10.879	-9.290
Netherlands	-5.055	30.098
Poland	7.781	-3.319
Portugal	1.497	1.458
Romania	-2.092	-4.498
Slovakia	3.438	-0.285
Slovenia	-4.149	-2.982
Spain	8.769	2.920
Sweden	5.209	8.822
Switzerland	-4.951	25.992
United Kingdom	0.625	19.868
<i>Observations</i>	224	224
<i>Adjusted R-squared</i>	0.643	0.880

*** significant at 1% level, ** significant at the 5% level

regression for youth unemployment as well as for youth labor force participation rates. The equation has, in addition to S^* , dummy variables for countries that have more than one region and also a constant term. If the coefficient of S^* turns out not to be statistically insignificant we would conclude that the within-country differences are less important than the between-country differences, which would justify a focus on countries. If, in contrast, social capital is important then we can conclude that there are not only differences between countries but also between regions within countries. The results are reported in Table 3 below.

Social capital turns out to be statistically significant for both youth unemployment and youth labor force participation.

In Table 4 we list the youth unemployment rates for the Italian regions, as well as for the top ten highest and lowest regions in Europe and decompose it into the constant term in Table 3, the effect of differences in S^* , the country dummies from Table 3 (which can also measure differences in social capital) and an unexplained

Table 4 Decomposition of youth unemployment; Italy and the top highest and lowest regions

Italy						
Country	Region	Youth unemployment	Constant	$-0152 \times S^*$	Country dummy	Residual
Italy	Sicilia	35.833	9.478	5.038	10.879	10.438
Italy	Calabria	35.775	9.478	5.454	10.879	9.964
Italy	Campania	35.592	9.478	5.049	10.879	10.185
Italy	Sardegna	31.208	9.478	5.669	10.879	5.182
Italy	Basilicata	29.4	9.478	4.713	10.879	4.329
Italy	Puglia	28.283	9.478	4.856	10.879	3.07
Italy	Molise	25.4	9.478	6.732	10.879	-1.689
Italy	Abruzzo	18.008	9.478	3.46	10.879	-5.809
Italy	Liguria	14.925	9.478	4.833	10.879	-10.266
Italy	Piemonte	13.208	9.478	3.039	10.879	-10.188
Italy	Lombardia	9.858	9.478	4.718	10.879	-15.217
Highest						
Country	Region	Youth unemployment	Constant	$-0152 \times S^*$	Country dummy	Residual
Spain	Sur-Ciudad Aut. de Ceuta	39.789	9.478	2.749	8.769	18.793
Italy	Sicilia	35.833	9.478	5.038	10.879	10.438
Italy	Calabria	35.775	9.478	5.454	10.879	9.964
Italy	Campania	35.592	9.478	5.049	10.879	10.185
Greece	Dytiki Makedonia	32.892	9.478	5.598	9.057	8.759
Italy	Sardegna	31.208	9.478	5.669	10.879	5.182
Spain	Andalucía	29.425	9.478	3.407	8.769	7.771
Italy	Basilicata	29.4	9.478	4.713	10.879	4.329
Slovakia	Východné Slovensko	29.133	9.478	7.638	3.438	8.579
Greece	Ipeiros	29.125	9.478	5.44	9.057	5.15
Lowest						
Country	Region	Youth unemployment	Constant	$-0152 \times S^*$	Country dummy	Residual
Germany	Oberpfalz	5.742	9.478	3.264	-1.811	-5.189
Germany	Freiburg	5.65	9.478	0.812	-1.811	-2.829
Netherlands	Noord-Holland	5.625	9.478	1.491	-5.055	-0.29
Czech Rep.	Praha	5.375	9.478	4.327	-3.138	-5.292
Switzerland	Ostschweiz	5.317	9.478	2.08	-4.951	-1.291
Netherlands	Noord-Brabant	5.158	9.478	1.829	-5.055	-1.094
Netherlands	Gelderland	5.067	9.478	1.429	-5.055	-0.785
Netherlands	Utrecht	4.9	9.478	0.756	-5.055	-0.279
Germany	Oberbayern	4.883	9.478	1.935	-1.811	-4.718
Switzerland	Zentralschweiz	4.4	9.478	2.704	-4.951	-2.831

The table show the actual youth unemployment rate in 2015, the constant term from Table 2, the effect of social capital S^* , the country dummy for countries with more than one regions and the unexplained residual

Table 5 Decomposition of youth participation; Italy and the top highest and lowest regions

Italy						
Country	Region	Youth labor force part.	Constant	$0134 \times S^*$	Country dummy	Residual
Italy	Lombardia	38.3	42.863	-4.156	-9.29	8.883
Italy	Piemonte	37.033	42.863	-2.677	-9.29	6.137
Italy	Sardegna	32.292	42.863	-4.994	-9.29	3.713
Italy	Liguria	31.767	42.863	-4.258	-9.29	2.452
Italy	Puglia	29.533	42.863	-4.278	-9.29	0.239
Italy	Sicilia	26.75	42.863	-4.438	-9.29	-2.384
Italy	Abruzzo	26.5	42.863	-3.048	-9.29	-4.025
Italy	Molise	26.5	42.863	-5.93	-9.29	-1.142
Italy	Campania	25.317	42.863	-4.448	-9.29	-3.808
Italy	Basilicata	24.45	42.863	-4.152	-9.29	-4.971
Italy	Calabria	23.675	42.863	-4.804	-9.29	-5.093
Highest						
Country	Region	Youth labor force part.	Constant	$0134 \times S^*$	Country dummy	Residual
Netherlands	Noord-Brabant	74.708	42.863	-1.611	30.098	3.359
Netherlands	Drenthe	73.675	42.863	-1.957	30.098	2.672
Netherlands	Gelderland	73.158	42.863	-1.259	30.098	1.457
Netherlands	Overijssel	72.517	42.863	-0.789	30.098	0.345
Netherlands	Utrecht	72.4	42.863	-0.666	30.098	0.106
Switzerland	Ostschweiz	72.267	42.863	-1.833	25.992	5.245
Netherlands	Noord-Holland	71.85	42.863	-1.314	30.098	0.203
Switzerland	Zentralschweiz	71.058	42.863	-2.382	25.992	4.586
Netherlands	Limburg (NL)	70.717	42.863	-1.683	30.098	-0.561
Netherlands	Friesland (NL)	70.075	42.863	-1.843	30.098	-1.042
Lowest						
Country	Region	Youth labor force part.	Constant	$0134 \times S^*$	Country dummy	Residual
Italy	Abruzzo	26.5	42.863	-3.048	-9.29	-4.025
Italy	Molise	26.5	42.863	-5.93	-9.29	-1.142
Hungary	Alföld és Észak-Észak-Mag.	25.967	42.863	-5.115	-9.606	-2.175
Hungary	Alföld és Észak-Dél-Alföld	25.608	42.863	-5.777	-9.606	-1.872
Italy	Campania	25.317	42.863	-4.448	-9.29	-3.808
Greece	Dytiki Makedonia	24.7	42.863	-4.931	-6.456	-6.775
Belgium	Brabant Wallon	24.642	42.863	-4.096	-6.005	-8.12
Italy	Basilicata	24.45	42.863	-4.152	-9.29	-4.971
Italy	Calabria	23.675	42.863	-4.804	-9.29	-5.093
Greece	Kentriki Makedonia	23.267	42.863	-5.138	-6.456	-8.002

The table shows the actual youth participation rate in 2015, the constant term from Table 2, the effect of social capital L^* , the country dummy for countries with more than one regions and the unexplained residual

residual. Then in Table 4 we explore the similar decomposition of differences in youth labor force participation. Appendix A2 has the results of the decomposition for all regions in our sample while Tables 4 and 5 show the results for Italian regions and the top ten and bottom ten regions.

We start with Table 4. The first column has the name of the country, the second column has the name of each region, the third has the rate of youth unemployment (average from 2001 to 2012), the fourth has the constant in the equation in Table 3, the fifth has the effect of social capital (calculated as the product of the estimated coefficient of S^* in Table 3 and the level of S^* in each region), the sixth has the country dummy for each country from Table 3 and the seventh and final column has the residual, or the unexplained part. We should note that the country dummy captures country-specific social capital so that the total effect of social capital depends on both the direct effect at the regional level in column five as well as the country dummy. In addition, the country dummy captures the effect of institutions and the country-wide business cycle. In column five we can see that the social capital is better in the northern regions of Italy than in the south. The difference between the best social capital in Italy, which is region Piemonte, and the worst, which is in Molise, implies a difference of about 3.7% in the rate of unemployment. Interestingly, the social capital of Molise, which is just south-east of Rome, is worse than that in the regions further south, such as in Sicily. In addition, the country dummy for Italy is quite large, 10.9%, which suggests that either the social capital or institutions of Italy are contributing to youth unemployment.

Looking further down Table 4, we see the ten regions with the highest youth unemployment rates and the ten having the lowest youth unemployment rates. Youth unemployment is highest in the regions of southern Europe; it is highest in the Spanish regions of Ceuta, which is an autonomous Spanish region on the African side of the Strait of Gibraltar; it is followed by the Italian regions of Sicily, Calabria and Campania, the Greek region of Makedonia, Sardinia, Andalusia and the Italian region Basilicata. The regions having the lowest youth unemployment rates are in Northern Europe: It is lowest in Central Switzerland, then in Oberbayern in Germany, followed by the Dutch regions of Utrecht, Gelderland, and Noord-Brabant, and Eastern Switzerland. The difference between the effects of social capital at the regional level—ignoring country differences—is around 3–5%. Thus social capital would lead us to predict that youth unemployment was about 5% higher on Sicily than in Freiburg, Germany. We should also note the large differences in the country dummy variables. The difference between the Italian and the German country dummies is more than 12%, which can indicate the role of institutions but also average social capital at the country level as shown in Fig. 3 above. Finally, there is a very significant unexplained component that cannot be explained by either differences in social capital, institutions or the business cycle.

We now turn to Table 4, which analyses differences in the rate of youth labor force participation in the same way. The same pattern in Italy emerges—