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Abstract

Using canonical-correlation analysis we find significant differences in social capital between European regions. Teaching children to be independent, imaginative and tolerant contributes positively to social capital as does a higher level of trust towards fellow citizens. These differences can account for differences in unemployment, male labor force participation and average hours of work across regions. In particular, regional differences in unemployment that mirror differences in social capital dwarf differences in average levels of unemployment across countries, which are the focus of most studies on unemployment.

JEL classification: E24

Keywords: Canonical correlations; social capital; labor market performance.

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1 Introduction

We explore to what extent differences in labor market outcomes in Europe can be traced to differences in social capital. Unemployment varies greatly between countries in Europe as well as between regions within countries. In 2003 there were 68 (NUTS2) regions with unemployment rates below 5% while 15 regions had unemployment above 25 percent. The countries having the low unemployment regions in 2003 included mainly north and central European countries in addition to North Italy and Cyprus. The highest unemployment rates were in southern Italy and some eastern European regions.² In 2011 the regions with unemployment rates below 5% were only 46 in number but only 9 had unemployment rate above 20%. The geographical pattern of regions with low unemployment remained relatively constant over the period. It is however worth mentioning that high unemployment regions in 2003 didn't necessarily fall in that category in 2011 and the highest unemployment was found in regions of Spain and Greece in the latter observation. This comparison indicates that variation in unemployment is not confined to differences across countries; differences within countries are no less significant.

The question addressed in this paper is to what extent differences in social capital can explain differences in labor market outcomes in European regions. We assemble numbers from the European Values Study (2011) on values that may affect workers' performance and behavior on the job. These include the level of trust towards fellow citizens; how people value the importance of work; if they value job security, being able to take the initiative and having the opportunity to achieve on the job; and which attitudes parents would like to instill in children – such as obedience, independence, hard work, imagination, tolerance, determination and responsibility. In all these are twelve numbers for each of Europe's NUTS2 regions. Labor market performance is then made to depend on the rate of unemployment in each region, the rate of male labor force participation and average hours worked.

² Unemployment was 18.1 percent in Andalusia, it was 9.4 percent in on the Balearic islands and while unemployment was on average quite high in Germany in 2003, unemployment in Trier was only 4.8 percent while in Mecklenburg-Vorpommern it was 20 percent and also in excess of 15% in other formerly East German regions.

2 Social capital

What do we mean by social capital? Robert Putnam (2000) described it as the acknowledgement that social networks have some intrinsic value. As with others forms of capital, for example physical- or human capital, social contact may increase the productivity of individuals and groups. Social networks increase the effect of the civic virtue as described by Putnam "... civic virtue is most powerful when embedded in a dense network of reciprocal social relations. A society of many virtuous but isolated individuals is not necessarily rich in social capital" (Robert Putnam 2000, p. 19). An early contribution to this field was that of Banfield (1958) who showed how lack of social capital could be detrimental to economic development. He studied a poor village in southern Italy and traced the causes of poverty to a set of values that were detrimental to economic performance. In particular, people tended to trust other family members but put less trust into other members of the community. These differences across the regions of Italy may help explain the vast difference in labor market performance within that country as we will see.

Coleman (1988, 1990) explained how social capital comes into existence. Members of society control certain limited resources and these resources vary across individuals. Thus one might find it in one's self-interest to establish cooperation with others in order to enjoy together the benefits of combined resources. Through such cooperation between individuals their relationship is transformed, generating social capital just as physical capital is forged by changes in materials or human capital is the result of a change in person's abilities (Coleman 1988, p. 100). Coleman attributes the value of the concept of social capital to the fact that it identifies certain aspects of social structure by their functions, just as the concept 'chair' identifies certain physical objects by their function. The function identified by the concept of 'social capital' is the value of these aspects of social structure that individuals can use to achieve their goals.³

One of the structures Coleman (1988) mentions is trustworthiness. If members of society can expect others to hold their obligations towards them it may be seen as social capital. Trust facilitates communications and therefore leads to increased productivity. Economists have been aware of this aspect for some time. Knack and Keefer (1997)

³ See Coleman (1988), p. 101.

stress the importance of trust in incomplete contracts because it decreases the level of uncertainty. Tabellini (2010) discusses the economic importance of trust from the angle of the prisoner's dilemma. He came to the conclusion that trust increases the efficiency of anonymous markets exchange and reduces the need for external enforcement of contracts.

From a philosophical point of view trust can be regarded as the act of inviting someone to be in control of discretionary powers while relying on their goodwill. According to Annette Baier (1986) "Trust then, on the first approximation, is accepted vulnerability to another's possible but not expected ill (or lack of good will) toward one" (Baier, A. 1986, p. 235). However Zak and Knack (2001) offer other examples of trust relationships that partly contradict Baier's suggestion. One is that of Thomas Hobbes who claimed that trust between strangers was derived from the government alone, and thus had nothing to do with goodwill, while John Stuart Mill stated that the fear of being exposed motivated members of society to hold to their obligations because otherwise they would harm their reputation, which doesn't really rely on goodwill either.⁴

Norms and effective sanctions can also be considered to be a form of social capital. Norms can inhibit criminal activity; encourage solidarity and so on. According to Coleman (1988) norms arise as attempts to reduce negative external effects or encourage positive ones.⁵ In order for norms to take effect there has to be room for effective sanction and effective sanction will not be enforced unless the social structure allows it. The members of the society, which provide the demand for a norm, have to be able to combine forces and constrain others members actions and that requires repeated communications, which take place in a closed network. Those findings are consistent with the analysis of the economic performance of various regions of Italy carried out by Putnam et al. (1993) who argued that the northern regions of Italy were performing relatively better than those in the South because the northerners lived richer association life.

Delhey and Newton (2003) tested six main theories on the origins of social trust using survey data from the *Euromodule*. Their result was that social trust is higher amongst people where public safety is high and few social conflicts. Informal social networks also

⁴ See Zak and Knack 2001, p. 298.

⁵ See p. 105.

happen to be associated with trust and those who are successful in life tend to be more trusting than the unsuccessful. Based on these outcomes they tried to predict cross-national levels of social trust (Delhey and Newton 2005). It turned out that ethnic homogeneity and Protestant traditions influenced social trust directly.

Multiple studies have documented a statistical relationship between trust towards fellow citizens, as reported in surveys, and national output and income per capita.^{6,7} The one closest to ours is that of Tabellini (2010) who used cultural variables to explain the variation in output per capita and the growth of output in European regions. He used three questions from the World Values Survey to describe the positive aspects of culture – one measured trust towards other people; another tolerance and respect for other people and the third the degree to which people feel they have control for their own lives – and the extent to which parents try to teach their children to be obedient as a negative cultural trait. After controlling for education he found that the principal component of these values variables could help explain differences in output and growth across regions when literacy at the end of the 19th century and indicators of political institutions between 1600 and 1850 are used as instruments. We differ from Tabellini in focusing on labor market performance at the regional level as well as in the choice of empirical methods, to which we now turn. To facilitate comparison we report our results for the Tabellini sample of eight European countries in addition to our larger sample of 28 countries and a sample of Western European countries that has several countries not included in the Tabellini study.⁸

3 Social capital and the labor market

We model aspect of social capital that may affect workers' performance on the job. These are trust towards fellow citizens; the importance of work; if people value job security, being able to take the initiative and having the opportunity to achieve on the

⁶ See Knack and Keefer (1997), Zak and Knack (2001), Algan and Cahuc (2013) and Bjornskov (2012).

⁷ A recent study by Brueckner (2015) finds that the causality is the other way around – a fall in income per capita (caused by higher oil prices) makes trust fall.

⁸ These are Austria, Denmark, Finland, Greece, Iceland, Ireland, Luxembourg, Malta, Switzerland and Sweden.

job; and the attitudes parents would like to instill in children – obedience, independence, hard work, imagination, tolerance and respect of others, determination and responsibility. In all these are twelve numbers for each of Europe’s NUTS2 regions. The effect of these values on labor market outcomes, in particular, the rate of unemployment, the male participation rate and average hours worked, will then be estimated using statistical procedures.

There is evidence that differences in values affect the behavior of workers on the job. Ichino and Maggi (1999) found that there are significant differences in the level of shirking – measured by absenteeism and misconduct – among employees of a large Italian bank so that shirking is more prevalent in the bank branches located in southern Italy. They find that individuals born in the south shirk more than those born in the north. In addition workers shirk significantly more when they work in the south than when they work in the north. Interestingly, the level of shirking of a given individual depends on the level among his co-workers. Thus moving from a branch in the south to a branch in the north would make a worker decide to shirk less. Magnifying the distinction between the north and the south is the observation that workers who decide to leave the southern branches tend to shirk less than those who decide to stay. Of these factors the most important one is the background of the individual. These results are consistent with the predictions of Putnam et al. (1993) that social interactions in the north and the south differ due to differences in their medieval history, which results in dissimilar traditions in civic involvement.⁹

The link between values and labor market outcomes can be described using commonly used economic models since employer-employee relations are of the principal-agent kind. Thus in the model of Shapiro and Stiglitz (1984) the relationship between an employer and an employee is described by a principal agent problem. The employer would like a worker to work hard but the latter has an incentive to shirk his duties but is restrained from doing so by a combination of monitoring and unemployment that serves as a disciplinary device. Clearly, a worker’s background – his values and attitudes towards achieving on the job, taking the initiative – and the values instilled in him by parents as a child will affect his utility he gets from shirking his duties, as found

⁹ See Putnam (1993) pp. 183-184.

in the study of Ichino and Maggi (1999). When workers enjoy shirking their duties the equilibrium wage and unemployment is increased.¹⁰

4 Methodology

Following Coleman we would like to identify aspects of social capital by their functions. The social capital that we are interested in should affect labor market performance and help explain differences in unemployment, labor force participation of men and average hours worked. To identify which factors belong to social capital we use a method proposed by Harold Hotelling (1936) called canonical correlation analysis.

Canonical correlation analysis is a method that makes sense of the cross-covariance matrices of two multidimensional variables. In our context social capital is one such multidimensional latent variable, each dimension representing aspects of social capital. Labor market performance is another multidimensional latent variable, the dimensions being the rate of unemployment, the rate of male labor market participation and average hours worked. We expect a significant association between two multivariate latent variables – the one measuring social capital and the other labor market outcomes – and the CCA is simply the bivariate correlation between them.

To perform the canonical correlation we gather together some observed measures into two different variable sets, X and Y , which represent the two multi-dimensional components of the latent variables, henceforth known as the canonical variables X and Y . The variable X is our measure of social capital and the variable Y is our measure of labor market outcomes. Next we assign weights to the variables within X and Y in order to create two linear combinations X^* and Y^* ; one for each variable set, which maximize the bivariate correlation between the canonical variables. The set of linear combinations, called canonical functions, are chosen to maximize the canonical correlation between the two latent canonical variables X^* and Y^* . Several uncorrelated components or functions can be determined, as in principal components analysis. The first function creates the linear combination so the two latent variables are as strongly correlated as possible.

¹⁰ In the model, the so-called non-shirking constraint is shifted upwards and to the left in the real wage – employment space.

However there probably will be some residual variance left over, which cannot be explained by the first canonical function. That means we can find another linear combination, which maximizes the correlation between X^* and Y^* given the residual variance subject to the constraint that the new function has to be perfectly uncorrelated with the previous one. This gives us another set of X^* and Y^* . This process can be repeated, as many times as there are variables in the smaller variable set or until there is no residual variance left. When all the canonical functions have been retrieved the researcher may begin to interpret the results.¹¹ An appendix has the definitions of important concepts for the interpretation of the results following an example described by Sherry & Henson (2005).

Having derived a measure of social capital we then perform regression analysis where we regress regional unemployment on country dummies and the canonical variable X^* , which is our measure of social capital. We use three data sets. The first contains regions belonging to 28 European countries¹²; the second has the sample of countries used by Tabellini (2010)¹³; and the third only includes regions in countries in Western Europe.¹⁴

5 Empirical results

We proceed first to perform the canonical correlation analysis and then to use our derived measure of social capital in an unemployment regression.

5.1 Social capital calculated

The variables used fall into groups. The first has the variables that may affect labor market performance. There are the level of trust; the importance of work; how much people value job security, being able to take the initiative on the job and being able to

¹¹ For a more thorough discussion of CCA see Tacq & Tacq, J. (1997) and Sherry & Henson (2005).

¹² Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

¹³ These are Belgium, France, Germany, Italy, Netherlands, Portugal, Spain and the U.K.

¹⁴ Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Spain, Sweden, Switzerland and the United Kingdom

achieve on the job; the importance parents attach to making their children obedient, independent, hard-working, imaginative, tolerant, determined and, finally responsible. The second group of variables has the three output variables that reflect labor market performance. They are the rate of unemployment; the male labor market participation rate, and average hours worked.

In Table 1 we report the results of the canonical correlation analysis for a set of 28 countries. The results consist of three functions, each of them generating a canonical correlation. The first function is the most important, the second has another linear combination that maximizes the correlation between X^* and Y^* given the residual variance subject to the constraint that the new function has to be perfectly uncorrelated with the previous one and so on.

The first column in each function has standardised coefficient, which is the weight attached to the variables to generate the linear combination X^* or Y^* so as to maximise the correlation between the two.¹⁵ The second column has the structure coefficient, which is the bivariate correlation between each observed variable and the latent variable, X^* or Y^* . The higher the value of the structure coefficient, the more correlated the variable is with the relevant latent variable. The sign of the correlation matters is also important. Usually the sign of the standardised and the structure coefficients are the same. In the few cases that they are not the same we find that the sign of the structure coefficient is more informative.¹⁶ The third column lists the squared value of the structure coefficient, which shows the proportion of the variance an observed variable shares linearly with a latent variable. Finally, the last column is the communality coefficient, which sums up the squared value of the structure coefficients and hence gives an assessment of the importance of each observed variable for all the significant functions.

¹⁵ They are standardised because of the constraint that the variance of the pair of canonical variables in a canonical function are equal; $\text{var}(X^*) = \text{var}(Y^*)$.

¹⁶ It might for example be the case that the effect of the standardized coefficient for certain variable is picked up by another variable. Theoretical insight is thus needed for explanation.

Table 1. Regions, work ethics & economic outcomes, sample of 28 countries

Variable	Function 1			Function 2			Function 3			Com. Coef
	Std. Coef	Str. Coef	Str. Coef ²	Std. Coef	Str. Coef	Str. Coef ²	Std. Coef	Str. Coef	Str. Coef ²	
Input – values conducive or detrimental to labor market performance										
Trust	0,331	0,783	61,31%	0,105	0,050	0,25%	-0,006	0,039	0,15%	61,71%
Importance of work	-0,228	-0,425	18,04%	-0,105	-0,018	0,03%	0,430	0,474	22,51%	40,57%
Job security	-0,088	-0,242	5,83%	-0,256	-0,308	9,50%	0,407	0,046	0,21%	15,55%
Job initiative	0,229	0,231	5,35%	0,634	0,297	8,84%	0,454	0,034	0,11%	14,31%
Job achieve	-0,067	-0,026	0,07%	-0,474	0,017	0,03%	-0,562	-0,245	5,99%	6,09%
Children obedience	-0,100	-0,270	7,31%	0,422	0,315	9,92%	-0,462	-0,579	33,47%	50,70%
Children independence	0,058	0,368	13,56%	0,064	-0,089	0,78%	-0,625	-0,151	2,28%	16,63%
Children hard work	-0,493	-0,801	64,18%	0,749	0,318	10,09%	-0,131	-0,255	6,51%	80,78%
Children imagination	0,082	0,368	13,55%	0,125	0,095	0,91%	0,265	0,063	0,40%	14,85%
Children tolerance	0,192	0,478	22,81%	0,575	0,515	26,50%	0,140	0,136	1,85%	51,16%
Children determination	-0,167	-0,073	0,54%	0,097	0,072	0,51%	0,189	0,333	11,08%	12,13%
Children responsibility	-0,121	0,074	0,55%	0,395	0,136	1,84%	0,210	0,624	38,99%	41,38%
Output – consequences – benefits										
Unemployment	-0,085	-0,649	42,11%	0,479	-0,088	0,77%	1,195	0,756	57,12%	100,00%
Male participation	0,513	0,829	68,74%	1,160	-0,537	28,80%	0,305	-0,156	2,44%	99,99%
Worked hours	-0,603	-0,863	74,55%	0,755	-0,444	19,73%	-0,605	-0,239	5,72%	100,00%

Canonical correlation coefficients		
1	2	3
0,796***	0,441***	0,256*

Squared canonical correlation coefficients		
1	2	3
0,633	0,194	0,065

*** 99% significance. ** 95% significance. * 90% significance

From the second column of Table 1 in Function 1 we can see that the most important component of social capital is trust – with a structure coefficient of 0.783 – followed by teaching children to be tolerant – structure correlation of 0.478 – imaginative – structure coefficient of 0.37 and independent – structure coefficient of 0.386 – followed by valuing initiative on the job – structure coefficient of 0.231. There are two variables having a negative correlation; teaching children to work hard – structure correlation of -0.801 – and finding work important – structure coefficient of -0.425. The negative correlation for the last two variables could possibly be explained by high unemployment making people value having a job and working hard. Remember that the statistical analysis does not prove correlation. These variables together generate the latent variable X^* , which is our measure of social capital. The labor market outcome variable Y^* is a function of unemployment, male participation and the number of average hours worked. Of the three, participation is positively correlated with Y^* – with a structure coefficient of 0.829 – and unemployment and average hours are strongly and negatively correlated with Y^* -- having structure coefficients of -0.649 and -0.863 respectively. Thus a higher value of Y^* indicates better labor market performance if we assume that employed workers enjoy their time away from work. It follows that greater social capital X^* is positively correlated with labor market outcome Y^* , which is positively correlated with participation and negatively correlated with unemployment and hours worked. The canonical correlation is 0.796 between the two latent variables, X^* and Y^* . The canonical correlations for the other two significant functions are much lower, 0.441 and 0.256 respectively.

Looking at the difference in social capital, reported in Table 2, between the regions with the highest and lowest value of social capital, which is derived from the result in Table 1, we find that Zahodna in Slovenia is lowest with a value of social capital equal to -62.43 and Copenhagen in Denmark has the highest values of 25.94. The next four top regions are also found in Denmark and Sweden. At the bottom we find regions in Poland, Bulgaria and Romania.

Table 2. Social capital: The top five and bottom five regions

Highest social capital			Lowest social capital		
Region	X^*	U	Region	X^*	U
Copenhagen (Denmark)	25.9	4	Zahodna Slovenija (Slovenia)	-62.4	4.6
Mellersta Norrland (Sweden)	25.4	6.8	Opolskie (Poland)	-60.4	15.7
Nordjylland (Denmark)	25	4	Swverozapaden (Bulgaria)	-60.1	15.4
Midtjylland (Denmark)	24.3	5	Nord-Est (Romania)	-59.8	5.6
Smaland med öarna (Sweden)	24.2	5	Yuzhen tsentralen (Bulgaria)	-58.7	10.9

Table A1 repeats the analysis of Table 1 but only for countries that were included in the study of Tabellini (2010) on social capital and productivity and Table A2 omits several Western European economies from the sample of 28 countries. The results are broadly identical except for the variable measuring parent's emphasis on teaching children to be tolerant having a very low correlation with social capital in the Tabellini sample and the variable measuring the extent to which parents teach them to be determined having a larger positive correlation.

Figure 1 has scatterplots that show the relationship for the sample of 28 countries between social capital X^* and labor market performance Y^* . The top graph has the regional data while the bottom graph uses simple averages of regions for each country. Remember that a higher level of Y^* implies lower unemployment and higher participation and hence better performance. A clear upward-sloping relationship emerges so that a higher level of social capital and better performance go together. The best performing countries are Denmark and the Netherlands, both have a very high level of social capital and good performance. Other countries with high levels of social capital are Sweden, Switzerland, Finland, Iceland, Austria and Germany. The countries of Eastern Europe, Portugal, Greece and Italy have lower levels of social capital and labor market performance.

There is a wide variation within countries when it comes to levels of social capital and labor market performance. The differences are especially profound in Italy where regions further in the north (Lombardia, Piedmont, Abruzzo, Liguria and Valle d'Aosta) have much higher levels of social capital and better economic performance than the once in the south (Sardinia, Sicily, Basilicata, Apulia, Calabria, Molise and Campania). Similarly, there are regions in the eastern part of Germany that have lower levels of social capital. This is Berlin, Dresden and Mecklenburg-Vorpommern. The one formerly East German region that does not have lower level of social capital is Sachsen-Anhalt. In

the U.K. Inner London, Tees valley and Durham, South Western Scotland and East Wales have low levels of social capital and bad labor market performance whereas Berkshire, Buckinghamshire and Oxfordshire, Surrey, Sussex, Dorset and Somerset and East Anglia have high social capital and good performance.

Figure 1. Social capital and labor market performance

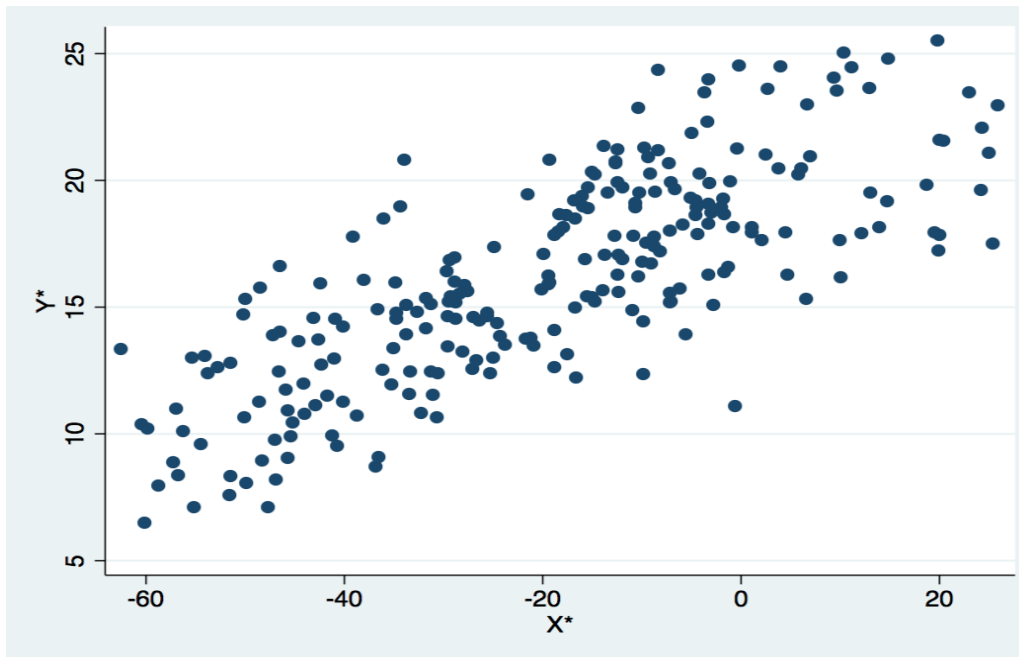


Figure 1. continued

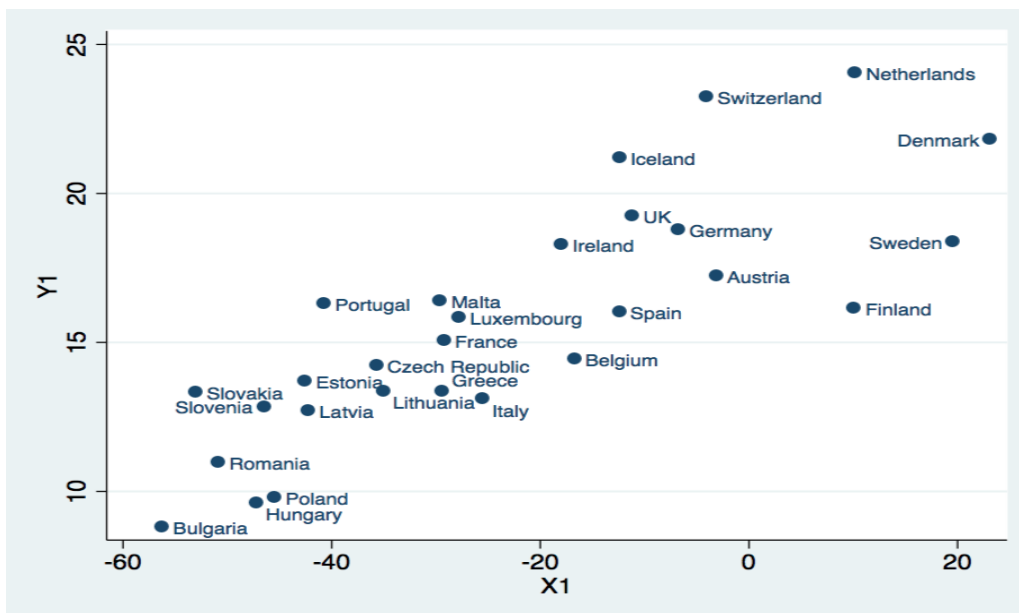
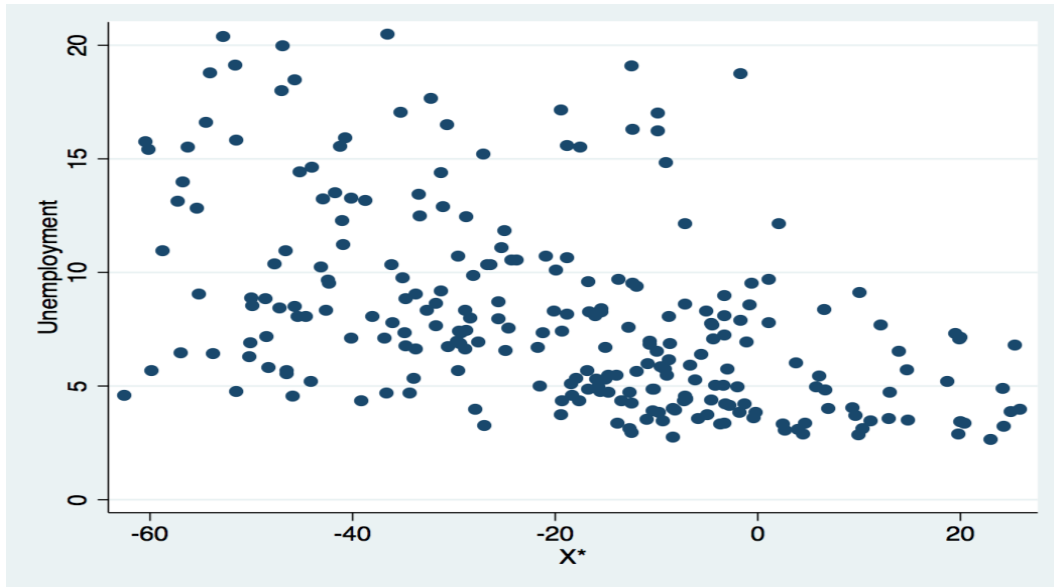


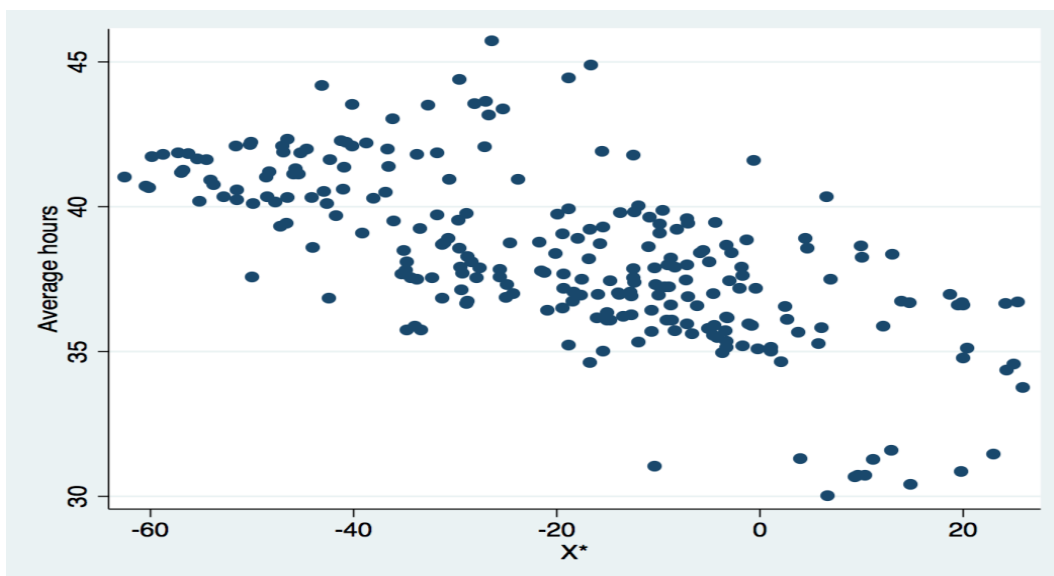
Figure 2 below show the scatter plot of unemployment against the social capital variable.

Figure 2. Social capital and unemployment



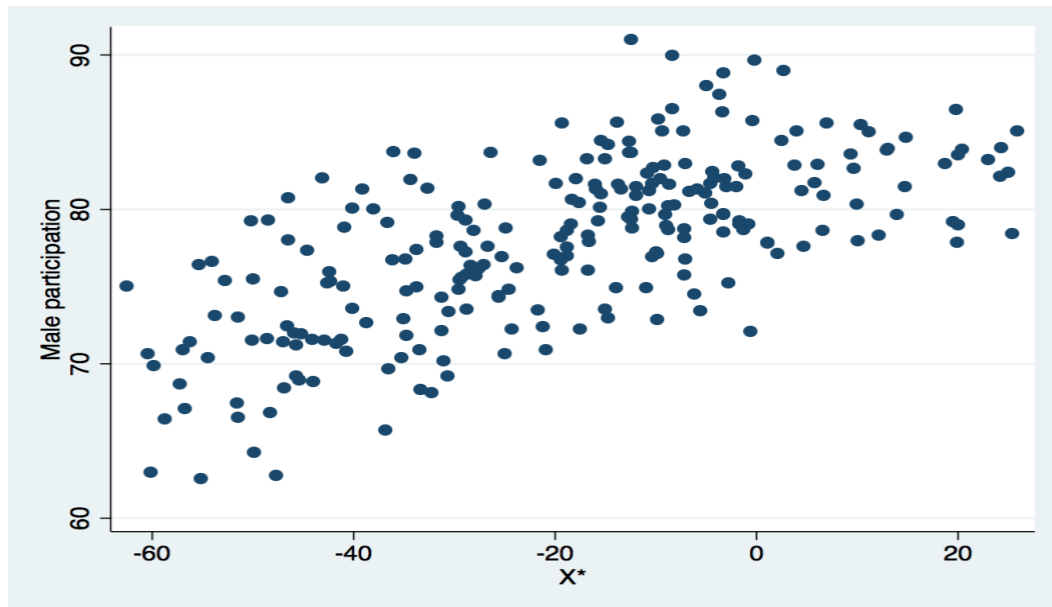
There is a clear downward sloping relationship between the two variables. The countries in the lower right-hand corner include Denmark, the Netherlands. Figure 3 has the relationship between social capital and average hours worked where the relationship is even stronger. Again, the countries in the lower left-hand corner include the Netherlands.

Figure 3. Social capital and average hours worked



Finally, Figure 4 has the male labor force participation rate against the social capital variable. There is a clear positive relationship between the two variables.

Figure 4. Social capital and the male labor force participation rate



5.2 Unemployment equations

The literature on unemployment in the OECD mainly attempts to explain differences in mean unemployment across countries and changes in unemployment within countries. In so doing it attempts to answer questions such as why unemployment in Spain is higher than in most other European countries and why it rose in the 1970s and 1980s; why unemployment in Europe was lower than in the United States until about 1970 and higher afterwards; why unemployment in Denmark and the Netherlands fell in the 1990s and so on. This approach stands in contrast with our treatment of social capital at the regional level, which allows for variation in labor market performance and social capital within countries. In this section we give a summary of the mainstream explanations for unemployment and then estimate equations where social capital is used as a regressor alongside country dummy variables that capture omitted country level variables used in the unemployment literature.

The macroeconomic studies of unemployment fall into two groups: There are models of flows into and out of unemployment and there are models of the level of employment and unemployment. The causal factors also fall into two groups. In group of studies there

are macroeconomic variables that cause changes in the mean level of unemployment. In the other group of studies high unemployment is explained by a set of labor market institutions. Phelps (1994) belongs to the first group by showing how the (world) real rates of interest may affect unemployment through their effect on hiring, price setting and investing. In related work higher stock prices – as in Phelps and Zoega (2001) – bring unemployment down by raising investing in training and physical capital. There is also the effect of changes in the rate of productivity growth that can be shown to affect unemployment – as in Pissarides (2001), Ball and Moffit (2001) and Hoon and Phelps (1997). There is also the effect of higher oil prices in reducing labor demand and causing higher unemployment, see Carruth et al. (1998). Other studies of unemployment emphasise the role of labor market institutions. Nickell et al. (2005) find that differences in labor market institutions across countries and changes in these institutions over time can account for the variation of unemployment over time and across countries. The institutions include the system of unemployment compensation, the organisation of labor unions and rules and regulations regarding redundancies. Blanchard and Wolfers (2000) combine the two approaches and emphasize both macroeconomic shocks and labor market institutions by including interaction terms between shocks and institutions in their unemployment equations, following Phelps (1994) and Layard Nickell and Jackman (1991).

In Table 3 we report results of the estimation of an unemployment equation where unemployment depends on country dummy variables – controlling for omitted macroeconomic and institutional variables – and our estimate of social capital X^* . The data are regional and, as before, the unemployment rate is measured as the average level from 2001 to 2008 and social capital is calculated in the previous section of this paper based on 2008 survey data. For the least squares estimates in Table 3 we find that the coefficient of social capital is negative and significant at the 1% for all three samples. We conclude that the relationship between unemployment and social capital is not spuriously capturing the effect of macroeconomic factors and institutions on unemployment. The next four columns have the IV estimates. The hypothesis that social capital is endogenous is examined in the regressions. We explore several instruments that all have references to earlier writings surveyed in Section 2.¹⁷ Potential instruments suggested by

¹⁷ See Knack and Keefer 1997, Zak and Knack 2001, Delhey and Newton 2003, Delhey and Newton 2005 and Tabellini 2010 for further details.

this literature such as population density, the protestant religion, the size of towns and the level of trust in public institutions did not have sufficient association with the dependent variable. Participation in voluntary organizations, on the other hand, as measured by the average percentage of respondents in the *European Values Study* who participated in voluntary organizations, looks promising. The outcomes of Durbin and Wu-Hausman tests for exogeneity, using voluntary organizations as an instrument, all rejected the null hypothesis that X^* should be treated as an exogenous estimate and thus participation in voluntary organizations has the desired impact as an instrument. The hypothesis that participation in voluntary organizations is a weak instrument can be rejected at 1% level in all three samples. The IV estimates in Table 3 show that social capital is negatively related to unemployment at the 1% level in all three samples.¹⁸ The numerical estimates are larger than from the least-squares regressions.¹⁹

¹⁸ The Tabellini sample (F=15,13); Western Europe (F=11,26); and 28 countries (F=17,44).

¹⁹ In Table A3 in the appendix, we replace our measure X^* of social capital by trust. The first three columns of Table A3 have the OLS estimates for the three samples (28 countries, the Tabellini sample and Western Europe). The next three columns have IV estimates where trust is treated as an endogenous variable. Here the OLS estimates find a strong negative relationship between trust and unemployment but we fail to find instruments for trust using the tests applied to the social capital regression.

Table 3. Unemployment explained by social capital X^*

<i>Variable</i>	Least Squares			IV		
	1 <i>Coef</i>	2 <i>Coef</i>	3 <i>Coef</i>	1 <i>Coef</i>	2 <i>Coef</i>	3 <i>Coef</i>
X^*	-0,08	-0,09	-0,08	-0,25	-0,25	-0,32
Std. dev	(0,02)***	(0,02)***	(0,02)***	(0,08)**	(0,08)***	(0,11)***
Austria	-0,73		-0,23	1,44		-2,87
Belgium	1,51	0,64	2,98	1,39	0,32	-0,12
Bulgaria	3,49			-3,29		
Czech Republic	-0,71			-4,02		
Denmark	0,74		1,90	7,34		7,22
Estonia	omitted			-4,47		
Finland	5,18		5,83	9,58		6,68
France	1,17	0,14	2,86	-1,05	-2,40	-2,55
Germany	3,34	2,49	4,49	4,90	3,71	2,80
Greece	2,85		3,17	0,60		-6,10
Hungary	-1,64			-6,90		
Iceland	-2,86		omitted	-2,26		1,78
Ireland	-1,56		0,21	-1,89		-2,36
Italy	3,66	3,23	5,27	2,05	1,67	0,49
Latvia	1,22			-3,20		
Lithuania	2,07			-1,14		
Luxembourg	-3,13		-0,50	-5,11		-2,95
Malta	-0,29		1,69	-2,58		-3,01
Netherlands	-0,40	omitted	1,37	4,02	6,11	5,35
Poland	7,54			2,57		
Portugal	-1,60	-1,57	1,33	-5,76	-3,92	-3,31
Romania	-2,00			-7,87		
Slovakia	5,35			-0,90		
Slovenia	-3,01			-8,15		
Spain	4,00	2,07	4,36	4,60	0,49	-0,82
Sweden	3,20		4,48	9,20		9,33
Switzerland	-1,39		-0,07	0,62		-0,63
UK	-0,82	7,75	0,96	omitted	omitted	omitted
Observations	249	146	195	249	146	195
Adjusted R-squared	0,58	0,38	0,43			

*** 99% significance, ** 95% significance, * 90% significance

1 *Sample with 28 European countries*

2 *Tabellini sample*

3 *Western Europe*

□

Table 4 shows the five regions with the lowest and highest average rates of unemployment between 2001 and 2008 and their level of social capital. Clearly, the high-unemployment regions have much lower levels of social capital than the low-

unemployment regions and this difference can help account for the difference in unemployment rates.

Table 4. High- and low-unemployment regions

Lowest average unemployment			Highest average unemployment			Unemployment difference	Difference explained by X^*	
Region	X^*	U	Region	X^*	U		ΔU	OLS (-0.08)
Zeeland (Netherlands)	23.1	2.6	Dolnoslaskie (Poland)	-36.4	20.5	17.9	4.8	14.9
Zentralschweiz (Switzerland)	-8.3	2.7	Wýchodné Slovensko (Slovakia)	-52.7	20.4	17.7	3.6	11.1
Tirol (Austria)	10.0	2.8	Zachodniopomorskie (Poland)	-46.8	20.0	17.2	4.5	14.2
Salzburg (Austria)	4.5	2.9	Warmińsko-Mazurskie (Poland)	-51.5	19.1	16.2	4.5	14.0
Utrecht (Netherlands)	19.8	2.9	Mecklenburg-Vorpommern (Germany)	-12.4	19.1	16.2	2.6	8.1

The unemployment differences between the top regions on each list and each of the four regions below that on the list vary between 16.2% and 17.9%. To account for this difference one can take the difference in social capital and multiply by the estimated coefficient of social capital in Table 3. In the next-to-last column we use the least-squares estimate from column (1) and in the last column we use the IV estimate from column (4). Using the former differences in social capital can account for between 2.6% and 4.8% of the unemployment difference while using the IV estimates can account for between 8.1% and 14.9% of the difference. Based on the IV estimates most of the unemployment differences are accounted for by differences in social capital, leaving only a small part of the difference to the country dummy variables that capture institutions and macroeconomic developments at the country level.

6 Conclusions

We have defined social capital as a set of values that affect workers' behavior on the job. Using canonical correlation analysis we found that teaching children to be independent, imaginative and tolerant contributes positively to social capital as does a higher level of

trust towards fellow citizens. In contrast, teaching children to be obedient and hard-working, valuing job security and finding work to be important in life all contribute negatively to social capital. One explanation could be that societies where people have to learn to obey and work hard are societies where people cannot be trusted to do so when left alone, which indicates a lack of social capital.

Differences in social capital can account for a substantial proportion of the variation in regional unemployment even when country dummy variables are included. Thus there is very considerable heterogeneity in terms of social capital within countries and this heterogeneity can help explain differences in the rate of unemployment across regions. These differences are very stark within some of the large European countries such as Germany and Italy – the eastern regions of Germany and the southern regions of Italy having both lower levels of social capital as well as worse labor market performance.

We conclude that studying the macroeconomics of unemployment at the country level and omitting social capital from the analysis may generate misleading results. Countries may not always be the right unit of analysis and social capital affects workers' behavior on the job and labor market outcomes. The effect of macroeconomic policies on social capital may be limited.

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Appendix

Canonical correlation – main concepts

- *Canonical correlation coefficient*: the correlation between the two latent variables X^* and Y^* in a given canonical function.
- *Squared canonical correlation*: represents the proportion of variance shared by the two latent variables. It indicates the amount of shared variance between the variable sets.
- *Canonical function*: Set of standardized coefficients from the observed variable sets.
- *Standardized coefficient*: the 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. They are standardized due to the constraint that the variance of the pair of canonical variables in a canonical function are equal, $var(X_i^*) = var(Y_i^*) = 1 \forall i$ where i represents the number of canonical functions. This is vital in order to obtain unique values for the coefficients.
- *Structure coefficient*: the bivariate correlation between an observed variable and a latent variable, X or Y . They help to define the structure of the latent variable by estimating which observed variables contribute to the creation of the latent variable.
- *Squared structure coefficient*: the proportion of variance an observed variable linearly shares with a latent variable.
- *Communality coefficient*: the proportion of variance in 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.

Table A 1. Tabellini sample

Variable	Function 1			Function 2			Function 3			Com. Coef
	Std. Coef	Str. Coef	Str. Coef ²	Std. Coef	Str. Coef	Str. Coef ²	Std. Coef	Str. Coef	Str. Coef ²	
Input – values conducive or detrimental to labor market performance										
Trust	0,450	0,653	42,61%	-0,042	-0,025	0,06%	-0,315	-0,060	0,36%	43,03%
Importance of work	-0,421	-0,549	30,17%	-0,195	0,385	14,81%	0,412	0,322	10,34%	55,32%
Job security	-0,242	0,195	3,79%	-0,833	-0,640	41,00%	0,071	0,304	9,26%	54,05%
Job initiative	0,505	0,614	37,65%	0,501	0,331	10,96%	0,116	-0,039	0,15%	48,76%
Job achieve	-0,040	0,309	9,52%	0,008	-0,013	0,02%	-0,036	-0,292	8,53%	18,07%
Children obedience	-0,047	-0,124	1,54%	0,336	0,038	0,14%	-0,223	-0,711	50,54%	52,22%
Children independence	0,232	0,494	24,37%	0,123	-0,268	7,17%	0,192	0,521	27,14%	58,68%
Children hard work	-0,098	-0,441	19,45%	0,184	0,138	1,91%	-0,497	-0,630	39,63%	60,99%
Children imagination	0,177	0,520	27,02%	-0,094	-0,319	10,18%	0,058	0,132	1,75%	38,94%
Children tolerance	0,049	0,040	0,16%	-0,259	0,236	5,58%	-0,298	-0,191	3,63%	9,37%
Children determination	-0,149	0,217	4,69%	0,515	0,281	7,92%	0,000	0,237	5,62%	18,22%
Children responsibility	0,066	-0,007	0,00%	0,462	0,229	5,26%	0,251	0,738	54,49%	59,76%
Output – consequences – benefits										
Unemployment	-0,139	-0,643	41,29%	0,374	0,042	0,18%	1,211	0,765	58,52%	100,00%
Male participation	0,493	0,770	59,27%	1,066	-0,629	39,60%	0,473	-0,106	1,13%	100,00%
Worked hours	-0,0638	-0,832	69,26%	0,697	-0,496	24,56%	-0,497	-0,249	6,19%	100,00%

Canonical correlation coefficients		
1	2	3
0,758***	0,575***	0,483***

Squared canonical correlation coefficients		
1	2	3
0,574	0,331	0,233

Table A 2. Regions, work ethics & economic outcomes, Western Europe

Variable	Function 1			Function 2			Function 3			Com. Coef
	Std. Coef	Str. Coef	Str. Coef ²	Std. Coef	Str. Coef	Str. Coef ²	Std. Coef	Str. Coef	Str. Coef ²	
Input – values conducive or detrimental to labor market performance										
Trust	0,481	0,757	57,27%	-0,107	-0,194	3,76%	-0,121	0,023	0,05%	61,09%
Importance of work	-0,314	-0,520	27,06%	-0,018	0,131	1,71%	0,280	0,295	8,67%	37,44%
Job security	-0,135	0,007	0,00%	-0,543	-0,658	43,30%	0,304	0,005	0,00%	43,30%
Job initiative	0,444	0,535	28,60%	0,521	0,182	3,32%	0,326	-0,179	3,20%	35,11%
Job achieve	-0,157	0,250	6,27%	-0,229	-0,067	0,44%	-0,694	-0,581	33,76%	40,46%
Children obedience	-0,025	-0,160	2,55%	0,444	0,422	17,77%	-0,147	-0,569	32,32%	52,64%
Children independence	0,279	0,524	27,46%	-0,077	-0,537	28,85%	-0,206	0,251	6,28%	62,58%
Children hard work	0,184	-0,300	8,97%	0,523	0,488	23,81%	0,127	-0,353	12,45%	45,23%
Children imagination	0,157	0,591	34,92%	0,056	-0,305	9,31%	0,419	0,215	4,63%	48,85%
Children tolerance	0,201	0,409	16,71%	0,203	0,363	13,16%	0,235	0,158	2,49%	32,35%
Children determination	-0,147	-0,032	0,10%	0,229	-0,010	0,01%	0,099	0,242	5,84%	5,95%
Children responsibility	0,027	0,030	0,09%	0,417	-0,058	0,34%	0,553	0,788	62,03%	62,46%
Output – consequences – benefits										
Unemployment	-0,278	-0,694	48,14%	0,579	0,015	0,02%	1,134	0,420	17,64%	65,80%
Male participation	0,267	0,611	37,36%	1,196	-0,755	57,06%	0,282	-0,236	5,57%	99,99%
Worked hours	-0,726	-0,888	78,84%	0,371	-0,284	8,04%	-0,692	-0,362	13,12%	100,00%

Canonical correlation coefficients		
1	2	3
0,744***	0,442***	0,335**

Squared canonical correlation coefficients		
1	2	3
0,553	0,195	0,112

Table A 3. Regression with average unemployment as dependent variable and trust as explanatory

Variable	Least Squares			IV		
	1 Coef	2 Coef	3 Coef	1 Coef	2 Coef	3 Coef
Trust	-0,43	-0,05	-0,43	-0,34	-0,32	-0,31
Std. dev	(0,13)***	(0,15)***	(0,14)***	(0,18)*	(0,16)**	(0,14)**
Austria	-6,05		-6,05	-2,04		-1,92
Belgium	-2,73	2,02	-2,73	0,85	0,93	1,02
Bulgaria	1,74			-0,18		
Czech Republic	-3,6			-1,6		
Denmark	-5,07		-5,07	10,6		9,58
Estonia	-2,17			0,8		
Finland	omitted		omitted	12,5		11,8
France	-2,44	2,25	-2,45	-1,73	-1,52	-1,28
Germany	-1,34	3,46	-1,34	4,34	4,32	4,3
Greece	-0,99		-1,003	-1,9		-1,3
Hungary	-3,99			-4,85		
Iceland	-6,79		-6,79	1,43		1,13
Ireland	-5,52		-5,52	-0,72		-0,68
Italy	0	5,13	0	2,55	3,14	2,82
Latvia	-1,3			-0,46		
Lithuania	-0,92			0,84		
Luxembourg	-6,64		-6,7	-4,4		-4,11
Malta	-4,04		-4,05	-4,46		-3,9
Netherlands	-5,7	-0,76	-5,7	6,07	5,77	5,43
Poland	5,34			6,48		
Portugal	-4,64	omitted	-4,65	-6,55	-6,22	-5,85
Romania	-3,18			-5,99		
Slovakia	3,22			0,57		
Slovenia	-5,22			-4,72		
Spain	-0,57	4,19	-0,57	3,28	3,35	3,42
Sweden	-2,75		-2,75	9,95		9,23
Switzerland	-5,9		-5,89	3,17		2,8
UK	-5,28	-0,48	-5,28	omitted	omitted	omitted
Observations	248	145	194	248	145	194
Adjusted R-squared	0,57	0,36	0,42			

*** 99% significance, ** 95% significance, * 90% significance

- 1 Sample with 28 European countries,
- 2 Tabellini sample
- 3 Western Europe

Table A 4. Variable descriptions

Variable	Description	Source	Name in database
Children determination	The percentage of people who mentioned determination, perseverance as a quality to teach children at home.	Q 52, EVS, (2011)	children_determination
Children hard work	The percentage of people who mentioned hard work as a quality to learn children at home	Q 52, EVS (2011)	children_hardwork
Children imagination	The percentage of people who mentioned imagination as a quality to learn children at home	Q 52, EVS, (2011)	children_imagination
Children independence	The percentage of people who mentioned independence as a quality to learn children at home	Q 52, EVS (2011)	children_independence
Children obedience	The percentage of people who mentioned obedience as a quality to learn children at home	Q 52, EVS (2011)	children_obedience
Children responsibility	The percentage of people who mentioned feeling of responsibility as a quality to teach children at home.	Q 52, EVS, (2011)	children_responsibility
Children tolerance	The percentage of people who mentioned tolerance and respect for other people as a quality to teach children at home.	Q 52, EVS, (2011)	children_tolerance
Importance of work	The percentage of people who mentioned that work was very important in their life	Q 1, EVS (2011)	implife_work
Job achieve	The percentage of people who mentioned the feeling you can achieve something as an important aspect of a job	Q 14, EVS (2011)	impjob_achieve
Job initiative	The percentage of people who mentioned the opportunity to use initiative as an important aspect of a job	Q 14, EVS (2011)	impjob_initiative
Job security	The percentage of people who mentioned job security as an important aspect of a job	Q 14, EVS (2011)	impjob_security
Male participation	The average labor force participation rate, % of total male population from age 15 to 65, from 2001 to 2008	Eurostat (2014)	male_l.p.
Trust	The percentage of people who answered the question "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?" with "most people can be trusted"	Q 7, EVS (2011)	trust
Unemployment	The average unemployment, total % of labor force from age 15 to 74, from 2001 to 2008	Eurostat (2014)	UNEM
Worked hours	Average number of usual weekly hours of work in main job by sex, age, from 2001 to 2008	Eurostat (2014)	whour
Group	The average total participation rate in voluntary organisations	Q 5, EVS (2011)	group

Population density	The ratio between the annual average population and the land area of the region	Eurostat (2015)	pop_dens
Protestant	The percentage of people who listed Protestantism as their religious denomination	Q 23a, EVS (2011)	protestant
Size of towns	Size of town where respondent lives	Q 135, EVS (2011)	town:under_2000 town:2_5000 town:5_10000 town:10_20000 town:20_50000 town:50_100000 town:100_500000 town:500000_and_more
Trust in organizations	The percentage of people who mentioned they had 'a great deal' of confidence in the justice system, government or/and political parties	Q 63, EVS (2011)	confidence_justice confidence_gov confidence_politicalparties

Table A 5. List of regions

Austria	Estonia	Mecklenburg-Vorpommern
Burgenland	Eesti	Braunschweig
Niederösterreich	Finland	Hannover
Wien	Länsi-Suomi	Lüneburg
Kärnten	France	Weser-Ems
Steiermark	Ile de France	Düsseldorf
Oberösterreich	Champagne-Ardenne	Köln
Salzburg	Picardie	Münster
Tirol	Haute-Normandie	Detmold
Vorarlberg	Centre (FR)	Arnsberg
Belgium	Basse-Normandie	Koblenz
Bruxelles/Brussels	Bourgogne	Trier
Gewest	Nord - Pas-de-Calais	Rheinhessen-Pfalz
Antwerpen	Lorraine	Saarland
Limburg (BE)	Alsace	Dresden
Oost-Vlaanderen	Franche-Comté	Sachsen-Anhalt
Vlaams-Brabant	Pays de la Loire	Schleswig-Holstein
West-Vlaanderen	Bretagne	Thüringen
Brabant Wallon	Poitou-Charentes	Greece
Hainaut	Aquitaine	Anatoliki Makedonia, Thraki
Liège	Midi-Pyrénées	Kentriki Makedonia
Luxembourg (BE)	Limousin	Dytiki Makedonia
Namur	Rhône-Alpes	Thessalia
Bulgaria	Auvergne	Ipeiros
Severozapaden	Languedoc-Roussillon	Ionia Nisia
Severen tsentralen	Provence-Alpes-Côte d'Azur	Dytiki Ellada
Severoiztochen	Germany	Stereia Ellada
Yugoiztochen	Stuttgart	Peloponnisos
Yugozapaden	Karlsruhe	Attiki
Yuzhen tsentralen	Freiburg	Voreio Aigaio
Czech Republic	Tübingen	Notio Aigaio
Praha	Oberbayern	Kriti
Strední Cechy	Niederbayern	Hungary
Jihozápad	Oberpfalz	Közép-Magyarország
Severozápad	Oberfranken	Dunántúl – Közép-Dunántúl
Severovýchod	Mittelfranken	Dunántúl – Nyugat-Dunántúl
Jihovýchod	Unterfranken	Dunántúl – Dél-Dunántúl
Strední Morava	Schwaben	Alföld és Észak – Észak-Magyarország
Moravskoslezsko	Berlin	Alföld és Észak – Észak-Alföld
Denmark	Bremen	Alföld és Észak – Dél-Alföld
Hovedstaden	Hamburg	Iceland
Sjælland	Darmstadt	Island
Syddanmark	Gießen	Ireland
Midtjylland	Kassel	Border, Midland and Western
Nordjylland		

Southern and Eastern	Zachodniopomorskie	Illes Balears
Italy	Lubuskie	Andalucía
Piemonte	Dolnoslaskie	Región de Murcia
Valle d'Aosta/Vallée d'Aoste	Opolskie	ES Sur - Ciudad Autónoma de Ceuta
Liguria	Kujawsko-Pomorskie	Canarias (ES)
Lombardia	Warminsko-Mazurskie	Sweden
Abruzzo	Pomorskie	Stockholm
Molise	Portugal	Östra Mellansverige
Campania	Norte	Småland med öarna
Puglia	Algarve	Sydsverige
Basilicata	Centro (PT)	Västsverige
Calabria	Lisboa	Norra Mellansverige
Sicilia	Alentejo	Mellersta Norrland
Sardegna	Romania	Övre Norrland
Latvia	Nord-Vest	Switzerland
Latvija	Centru	Région lémanique
Lithuania	Nord-Est	Espace Mittelland
Lietuva	Sud-Est	Nordwestschweiz
Luxembourg	Sud - Muntenia	Zürich
Luxembourg	Bucuresti - Ilfov	Ostschweiz
Malta	Sud-Vest Oltenia	Zentralschweiz
Malta	Vest	Ticino
Netherlands	Slovakia	UK
Groningen	Bratislavský kraj	Tees Valley and Durham
Friesland (NL)	Západné Slovensko	Northumberland and Tyne and Wear
Drenthe	Stredné Slovensko	Cumbria
Overijssel	Východné Slovensko	Greater Manchester
Gelderland	Slovenia	Lancashire
Utrecht	Vzhodna Slovenija	East Yorkshire and Northern Lincolnshire
Noord-Holland	Zahodna Slovenija	North Yorkshire
Zuid-Holland	Spain	South Yorkshire
Zeeland	Galicia	West Yorkshire
Noord-Brabant	Principado de Asturias	Derbyshire and Nottinghamshire
Limburg (NL)	Cantabria	Leicestershire, Rutland and Northamptonshire
Poland	País Vasco	Lincolnshire
Lódzkie	Comunidad Foral de Navarra	Herefordshire, Worcestershire and Warwickshire
Mazowieckie	La Rioja	Shropshire and Staffordshire
Malopolskie	Aragón	West Midlands
Slaskie	Comunidad de Madrid	East Anglia
Lubelskie	Castilla y León	Bedfordshire and Hertfordshire
Podkarpackie	Castilla-la Mancha	Essex
Swietokrzyskie	Extremadura	
Podlaskie	Cataluña	
Wielkopolskie	Comunidad Valenciana	

Inner London
Outer London
Berkshire, Buckinghamshire and Oxfordshire
Surrey, East and West Sussex
Hampshire and Isle of Wight
Kent
Gloucestershire, Wiltshire and Bristol/Bath
area
Dorset and Somerset
Cornwall and Isles of Scilly
Devon
West Wales and The Valleys
East Wales
Eastern Scotland
South Western Scotland
Highlands and Islands
Northern Ireland (UK)
