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social cohesion:
a bottom-up approach

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L'European Values Study (EVS) est une enquête réalisée au Luxembourg en 2008 auprès d'un échantillon représentatif de la population résidante composé de 1610 individus âgés de 18 ans ou plus.

Au niveau national, cette enquête fait partie du projet de recherche VALCOS (Valeurs et Cohésion sociale), cofinancé par le FNR dans le cadre du programme VIVRE. Au niveau international, elle est partie intégrante d'une enquête réalisée dans 45 pays européens qui a pour objectif d'identifier et d'expliquer en Europe les dynamiques de changements de valeurs, et d'explorer les valeurs morales et sociales qui sous-tendent les institutions sociales et politiques européennes (www.europeanvaluesstudy.eu).

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Measuring and validating social cohesion: a bottom-up approach[1]

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Abstract

The aim of this paper is to provide a synthetic macro index of social cohesion based on the observation of several individual level variables. Based on the definition of social cohesion by Bernard (1999) and Chan *et al.* (2006) an index of social cohesion (henceforth VALCOS Index) was created. It covers the political and sociocultural domains of life in their formal and substantial relations. Results suggest that the VALCOS-Index of social cohesion is strongly and significantly correlated with other macro indicators largely used by the scientific community. The aggregation of EVS 2008 data on social cohesion together with many macro indicators of several dimensions of social life (including economic, socio-demographic, health and subjective well-being indicators) allowed us to rank social cohesion across 39 European countries and to explore differences across groups of countries. Subsequently, we validated our index by correlating it with many national level variables.

Keywords: social cohesion, methodology, macro index, micro index, EVS.

JEL classification codes: A1, D6, I3, Z13.

1.   Introduction

During last twenty years the topic of social cohesion almost disappeared from the political, economic and academic debate. Nonetheless, the fabric of more modern and richer societies, including European countries, are facing new challenges posed by the recent economic and social development.

Media recall our attention on episodes of violence, segregation and isolation. Such episodes spread in every domain of modern lives: from labour market to familiar relationships, from religion to cultural identity. Many European citizens perceive themselves less safe than in the past and more worried about their future. The violent episodes affecting the banlieues in Paris are still in everybody's mind; last European elections in Italy confirm that a growing part of Italian people fears the migration process and asks for more safety; the even more frequent events of racism and xenophobia happening in many European countries as well as the growing separatist pressures involving countries such as Italy, Spain and Belgium are all signals of an evident breaking of social ties.

The aim of present work is to provide a synthetic macro index of social cohesion based on the observation of several individual level variables.

Based on the definition of social cohesion by Bernard (1999) and Chan *et al.* (2006) an index of social cohesion (henceforth VALCOS[3] index) was created. It covers the political and socio-cultural domains of life in their formal and substantial relations. The VALCOS Index was elaborated for 33 European countries belonging to the 1999 EVS study from micro-socio-economic data using Multidimensional Scaling (MDS) and Confirmatory Factor Analysis (CFA) (Dickes *et al.* 2009). Assessment of the VALCOS Index on the 39 European countries belonging to the 2008 EVS survey was done by (Dickes, 2010).

Starting from the micro based index of social cohesion as proposed by Dickes *et al.* (2009, 2010) and using the European Values Study data-base, we first define a national level index of social cohesion and compare it across European countries. Secondly, we correlate our index with several national level variables concerning people's well-being, economic growth, education, health, demographic characteristic,

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job market and conditions. In so doing we show that it is possible to aggregate in a meaningful and reliable way an individual based index of social cohesion. At the same time, these correlations will serve construct validation's purposes.

Such a research can be relevant both from a policy point of view as well as from a theoretical one. In fact, the availability of a reliable micro-based synthetic index of social cohesion enables an in-depth analysis of its determinants and effects on many domains of social life starting from the individual level to the national level. This allows the design of a new set of policy interventions to promote and restore social cohesion at many different levels eventually extending the range of available policies. At the same time, it provides a way to easily monitor social cohesion across nations starting from individual surveys.

The paper is structured as follows. The first section provides a review of the main theoretical approach to social cohesion and set the theoretical framework on which the VALCOS Index of social cohesion is based. In the second section we present the data used. The third part presents the six dimensions of the VALCOS Index. The fourth is an application of our Index to European countries. In the fifth part we present the main findings assessing the VALCOS Index with a macro level approach using a selected set of macro indicators including social cohesion indicators (EUROSTAT and OECD). Finally, we discuss the results and the further developments of this approach.

2.   Social Cohesion

During the last years two main approaches to the study of social cohesion can be identified (Chan *et al.*, 2006). The first one is a sociological and psychological approach based on the study of integration and social stability (Berger, 1998; Gough and Olofsson, 1999). The second one is a policy oriented one as adopted by the Canadian government, by the European and other international institutions who consider social cohesion as a precondition for economic prosperity.

Based on the analysis of numerous researches on social cohesion available in the literature, Jenson (1998) elaborates a classification using five dimensions: 1. affiliation/isolation (share of common values, feeling of belonging to a same

community); 2. insertion/exclusion (a shared market capacity, particularly regarding the labour market; in other words, who has/does not have opportunities to participate in the economy); 3. participation/passivity (involvement in management of public affairs, third sector); 4. acceptance/rejection (pluralism in facts and also as a virtue, *i.e.* tolerance regarding differences); 5. legitimacy/illegitimacy (maintenance of public and privates institutions which act as mediators, *i.e.* how adequately the various institutions represent the people and their interests).

Bernard (1999) further develops Jenson's approach by broadening its dimensions and proposing a typology based on two facets. The first one describes the spheres or domains of human activity (economic, political and socio-cultural). The second one distinguishes social relations regarding their nature. Social relations pertain on one hand to social representations like values or attitudes, named as "formal relations" by Bernard (1999); on the other hand, they refer to observed behaviours or practices. Bernard (1999) refers to the last aspect as "substantial relations".

By considering the intersection between activity spheres and social relations, we get an integrated scheme summarizing Bernard's definition of social cohesion (table 1). This scheme contains six components: 1) insertion/exclusion; 2) legitimacy/illegitimacy; 3) recognition/ rejection; 4) equality/inequality; 5) participation/passivity and 6) affiliation/isolation.

Bernard considers social cohesion as a quasi-concept, *i.e.*, a hybrid mental construction proposed by the political game and – at the same time – based on a data analysis of the situation; such a construction must remain quite undetermined in order to be adaptable to the necessities of political action.

Chan *et al.* (2006) worked out Bernard' typology and defined social cohesion as follow:

"social cohesion is a state of affairs concerning both the vertical and the horizontal interactions among members of a society, as characterized by a set of attitudes and norms that include trust, a sense of belonging, and the willingness to participate and help, as well as their behavioural manifestations" (Chan *et al.* 2006: 290).

They keep the political and sociocultural spheres but exclude the economic one from their definition of social cohesion. Their main purpose is to leave out all characteristics which should be considered as explicative factors or determinants of social cohesion, such as equal opportunities, equality, and social inclusion. In their view, Bernard's economic dimension is

only one of many determinants for a cohesive society but never an "essential constituent" of the measure of social cohesion.

Table 1. Bernard's typology of social cohesion

Domains	Nature of relations	
	Formal/attitudinal	**Substantial/behavioural**
Economic	Insertion/exclusion: a shared market capacity, particularly regarding the labour market	Equality/inequality: equality in chances and equality in conditions
Political	Legitimacy/illegitimacy: maintenance of public and private institutions which act as mediators	Participation/passivity: involvement in management of public affairs, third sector (in opposition to political disenchantment)
Sociocultural	Acceptance/rejection: pluralism in facts and also as a virtue i.e. tolerance in differences	Affiliation/isolation: share of common values, feeling of belonging to a same community

Source: Bernard 1999

As it can be seen, Bernard (1999) and Chan *et al.* (2006) shared many components in their conception of social cohesion. They consider that social cohesion is an attribute of a group or society, not of individuals, (which implies that, even if measured using micro/individual-level data, the aim is to aggregate the individual information and describe the social cohesion of different groups/regions/communities). They regard social cohesion as defined by multiple facets, i.e. different spheres of human life and different types of social relations (such as relations among individuals, relations between individuals and groups and relations between individuals and society as a whole) as cornerstones of the construct. Finally, they assume that social cohesion is multidimensional and cannot be measured by any single composite indicator.

Dickes *et al.* (2009) show that the theoretical frameworks by Bernard (1999) and Chan *et al.* (2006) overlap largely. In the context of our research, we adopt the theoretical definition by Bernard (1999) (table 1), excluding the economic sphere.

This exclusion is due to the lack of available attitudinal and behavior data in the EVS survey to measure this sphere.

In a pilot project Dickes *et al.* (2008) tested the theoretical framework of Bernard's theory to Luxemburgish 1999 EVS data. Multidimensional scaling and confirmatory factor analysis reproduced very well Bernard's political and socio-cultural constructs.

The verification process involved two different data-set: the 1999 EVS data on 33 European countries (Dickes *et al.*, 2009) and the 2008 EVS data on 39 available countries (Dickes, 2010). In both cases, results are consistent: the two dimensional multi-dimensional scaling solutions fits very well and the facets of Bernard's theoretical framework give sense to the multi-dimensional space. With confirmatory factor analysis, a hierarchical structure could be assessed: trust in institutions and solidarity were dependent from a formal (attitudinal) second order factor and political and sociocultural participations formed a substantial (involvement) second order factor. The general cohesion factor found by Dickes *et al.* (2008) was not replicated.

Measurement equivalence was assessed by INDSCAL (*Individual Difference Scaling*) for the 1999 (Dickes *et al,.* 2009) so as the 2008 data sets (Dickes, 2010).

3.   Data

Empirical analyses are based on the 2008 European Values Study (EVS) conducted in 39 countries. EVS is a large-scale, cross-national, cross-sectional and repeated research program on basic human values. The first wave of the survey was launched in 1981 in ten European countries. About twenty years later (1999/2000), the third EVS wave was conducted in almost all European countries. The fourth wave was launched in 2008. (http://www.europeanvalues.nl/). This data-base contains a great number of subjective and objective items that measure attitudes towards and behavior regarding social relations, participation, and trust, at many levels of social reality, as well as in many domains of everyday life, corresponding more or less to the dimensions of social cohesion covered by the literature. Table A2 in the annex give an overview of these items.

Furthermore, EVS provides also two variables which are commonly used to proxy subjective well-being of the respondent. The two questions concern happiness and life satisfaction. The first one is measured on a scale ranging from 1 to 4 and is based on answers to the following question: "all considered you would say that you are: 1. very happy; 2. pretty happy; 3. not too happy; 4. not at all happy?" Life satisfaction is a variable ranging from 1 = "dissatisfied" to 10 = "satisfied" depending on the answers to the following question: "all things considered, how satisfied are you with your life as a whole these days?"

Recent academic as well as public and political debate paid increasing attention to subjective well-being measures as a way to complement more traditional measurements of well-being. Assuming that a cohesive society reports higher levels of well-being, we included the two proxies of subjective well-being in our study. Furthermore, we included a composite indicator of well-being based on the sum the two previous variables. In this way we check the correlation between our macro index of social cohesion and subjective well-being.

In the present study, we work on representative samples of the adult population (aged 18 or more) of only 39 European countries[4]. The available pooled sample consists of 39,919 individuals. The number of observations in each country has been equated to 1,000 to ensure equal weighting across countries in the analyses. In fact, weights for correcting social characteristics for each country are not available for the data at hand. Therefore, the final number of observation in the study is 39,000 (see table A1 in annex).

Following the method proposed by Dickes *et al.* (2009), we used available micro-data to build the VALCOS Index of social cohesion for each of the 39 countries.

Successively, we merged our micro-based data-set with a macro data-set including the most common indicators used by international institutions (OECD, Eurostat) to measure social, economic and demographic characteristics for 2008. Hence, our unit of analysis become single countries. The macro data-base contains 66 indicators (Acket, 2010) suited for 1999 and 2008 EVS surveys. For a complete list of the

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[4] Data on seven countries are not available in the EVS version of August 2010. These countries are: Croatia, Great Britain, Iceland, Italy, Macedonia, Norway, Sweden and Turkey.

observed variables and relative sources please refer to the first three columns of table A4 in the Annex.

4. Results

4.1 Bottom-up approach for assessing VALCOS-Index

The first step in transforming micro-data to macro social cohesion variables begins by summing up the standardized raw intermediate individual variables, divided by the number of variables belonging to the construct (table 2). Justification of this process was found in INDSCAL analysis (Dickes, 2010) and the congruence of internal consistencies has been assessed for each country (see table A3 in annex).

Table 2. Sum of standardized raw intermediate variables and internal consistency for individual social cohesion scores (N=39000)

Individual social cohesion scores	formula	alpha
Trust(Z)	(ZVAI01+ ZVAI02+ ZVAI03+ ZVAI04)/4	0.823
Solidarity(Z)	(ZVAI05 +ZVAI06)/2	0.673
Political Participation(Z)	(ZVAI07+ ZVAI08+ ZVAI09)/3	0.529
Sociocultural Participation(Z)	(ZVAI10 +ZVAI11+ ZVAI12+ ZVAI13)/4	0.684
Formal(Z)	(ZVA01+ZVA02+ZVA03+ ZVAI04 +ZVAI05 +ZVAI06)/6	0.713
Substantial(Z)	(ZVAI07+ ZVAI08+ ZVAI09+ ZVAI10 +ZVAI11+ ZVAI12+ ZVAI13)/7	0.635

Source : Dickes, 2010

Z=standardized

In a second step the individual social cohesion scores are linearly standardized. This individual standardized cohesion scores provides comparable norms for all the 39000 respondents. Statistical characteristics of the scores are reproduced in table 3.

Table 3. Statistical characteristics of the individual standardized social cohesion scores (N=39000)

		Z-Trust in institution	Z-Solidarity	Z-Political Participation	Z-Sociocultural Participation	Z-Formal	Z-Substantial
Mean		0.000	0.000	0.000	0.000	0.000	0.000
sd		1.000	1.000	1.000	1.000	1.000	1.000
Minimum		-2.804	-2.955	-1.462	-0.464	-3.690	-1.142
Maximum		3.005	2.275	3.878	10.260	3.552	9.232
Quartiles	25	-0.672	-0.609	-0.723	-0.464	-0.663	-0.656
	50	0.006	0.003	-0.144	-0.464	-0.004	-0.251
	75	0.675	0.690	0.629	0.078	0.656	0.399

Source : Dickes 2010

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Finally we created the VALCOS Index for each country by aggregating the standardized social cohesion mean scores and merging them with the 66 indicators of the macro data-base.

4.2   VALCOS Index and five European countries groups

In order to facilitate the reading of the statistical figures countries have been grouped into 5 categories following the organization of the Atlas of European Values (Halman *et al.*, 2005). Variance analysis (table 4) confirms the reliability of the five categories grouping.

Table 4. Variance analysis between VALCOS Index and EVS groups[5]

Dependent Variables		sum of squares	df	Mean squares	F	p	eta	eta²
VALCOS-Index: Trust in Institutions	Inter-groups	1.429	4	.357	2.546	.057	0.480	0.231
	Intra-class	4.772	34	.140				
	Total	6.201	38					
VALCOS-Index: Solidarity	Inter-groups	.575	4	.144	1.114	.366	0.340	0.116
	Intra-class	4.389	34	.129				
	Total	4.964	38					
VALCOS-Index: Political Participation	Inter-groups	2.144	4	.536	8.102	**.000**	0.699	0.488
	Intra-class	2.249	34	.066				
	Total	4.393	38					
VALCOS-Index: Socio-cultural Participation	Inter-groups	2.341	4	.585	10.002	**.000**	0.735	0.541
	Intra-class	1.989	34	.059				
	Total	4.330	38					
VALCOS-Index: Formal relations	Inter-groups	1.202	4	.300	2.202	.090	0.454	0.206
	Intra-class	4.640	34	.136				
	Total	5.842	38					
VALCOS-Index: Substantial relations	Inter-groups	3.590	4	.898	15.536	**.000**	0.804	0.646
	Intra-class	1.964	34	.058				
	Total	5.555	38					

Source: Dickes 2010

In bold: significant at p<0.001

Only the means of the substantial dimensions of the VALCOS Index are significantly different among groups. North and Western countries are more involved in social cohesion behaviors, i.e. political and sociocultural participations, than South, East and former Soviet Union's countries (figure 1).

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[5] North, West, South, East and former Soviet Union

Figure 1. EVS groups and the substantial dimension of the VALCOS Index
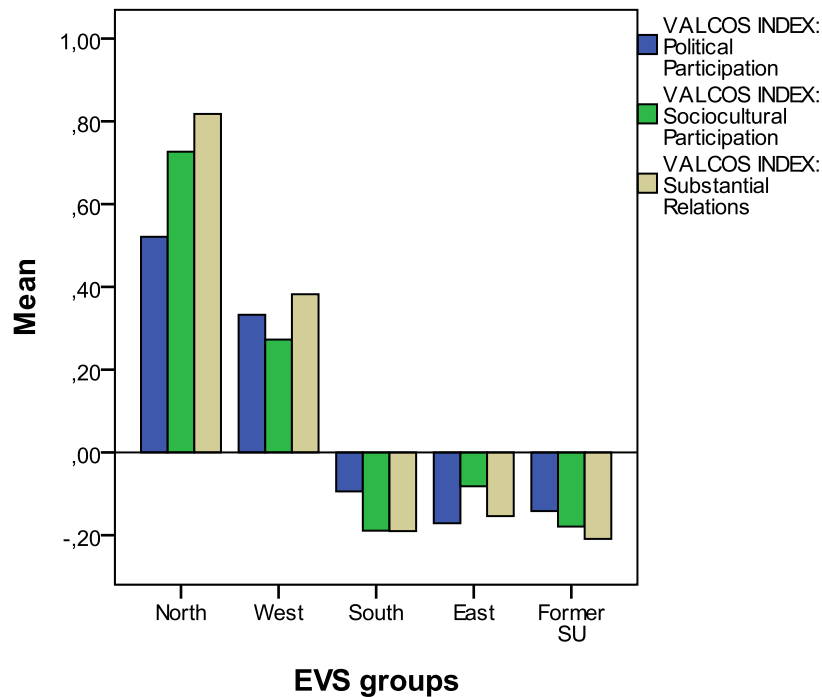
Joint relationship of EVS groups and formal and substantial relations (figure 2) provide information about the ranking of these VALCOS Indexes. North and West countries reflect high involvement scores, the North scoring better than the West. South, East and Former Soviet Union countries report weak participation in political and socio-cultural associations.

South, East and former Soviet Union countries are characterized by low *substantial relations*. North and West countries are middle ranked as far as *formal relations* are concerned. Nonetheless, they perform much better when *substantial relations* are concerned.

Figure 2. Formal and substantial dimensions of the VALCOS Index, 39 countries and 5 EVS groups
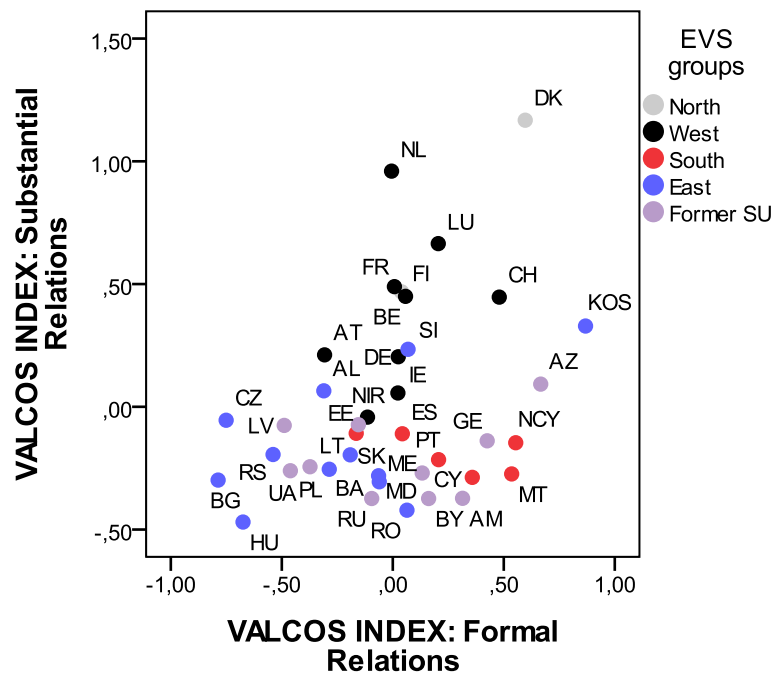
rho=0.207

4.2.1 Relationships between VALCOS Index and social indicators

A description of the main findings between the relations of indicators of the macro data base and the six dimensions of the VALCOS Index will be provided. The complete figures can be found in table A4 of the annex. We will extract for each dimension of the VALCOS Index the significant coefficients and summarize the main trend of the relationships. We will give special emphasis if the social indicator is utilized as an external social cohesion indicator in the EUROSTAT and/or OECD collections. For each dimension of our Index a few graphical representations will illustrate interesting relationships.

Dimension 1: trust in institutions

Trust in political institutions is one of the indicators of social cohesion proposed by OECD as well as life satisfaction and happiness.

Table 5. Social Indicators and the dimension of trust in institutions of the VALCOS Index
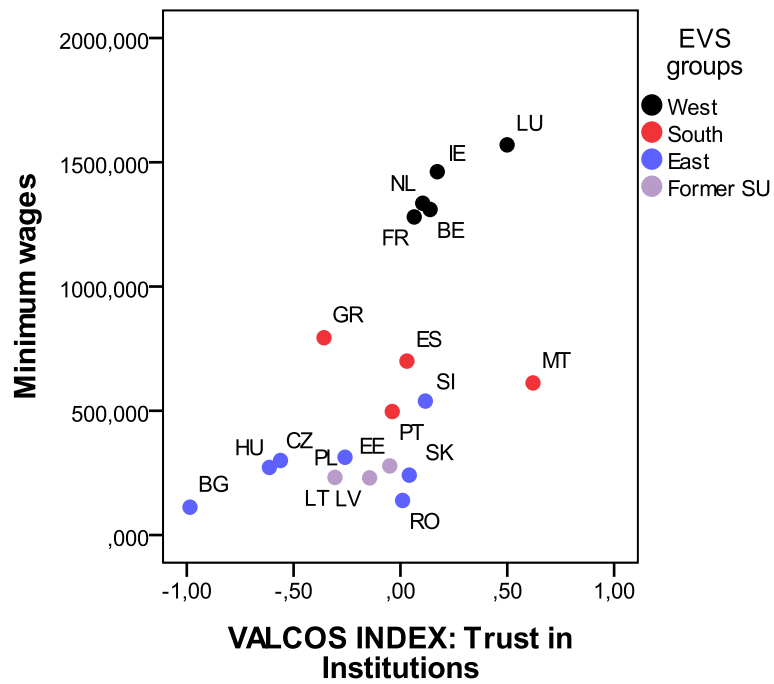
negative relation			positive relation		
variable	rho	CS	variable	rho	CS
var027 People killed in road accidents	-.60**		var048 Level of Internet access	.76**	
var017 HICP	-,50*		var050 Income per capita	.69**	
var036 Country superficy	-.46*		var019 Minimum wages	.68**	
			var008 Part-time employment	.61**	
			var012 GDP per inhabitant	.60**	
			var052 Immigration rate	.59**	
			var049 Cinema attendance	.58**	
			var051 Emigration rate	.58**	
			var011 Unionization rate	.57*	
			var057 Vote in European elections	.55**	
			var032 Lifelong learning	.54**	
			happy_mean1	.52**	oecd
			var046 Air pollution	.50*	
			var053 Type of state	.48*	
			var038 Crude birth rate	.46*	
			var042 Life expectancy at age 65	.45*	
			var063 Employment rate of young people	.45*	
			SWB2_mean	.44**	
			var039 Fertility rate	.44*	
			var041 Life expectancy at birth	.44*	
			var047 Motorization rate	.43*	
			lifesat_mean	.40*	oecd

Rho: Spearman rank coefficient; CS: external social cohesion indicator

The three main clusters of relationships between the dimension of trust in institution of the VALCOS Index and the set of macro variables are:

1. GDP or GDP related measures (like income per capita, immigration and emigration rates, minimum wages) which are highly correlated;

2. Employment variables like **employment of young people**, life-long learning, **part-time employment** and level of internet assessment which are moderately correlated;

3. Life satisfaction and happiness which are moderately correlated.

Figure 3. Institutional trust and minimum wage

Rho=0.68

Figure 4. Institutional trust and part-time employment
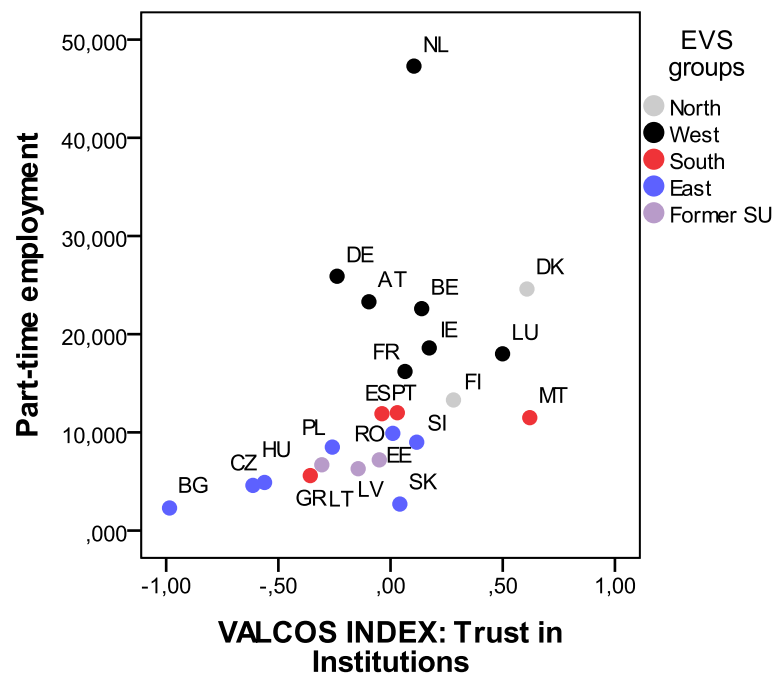
Rho=0,61

Dimension 2: solidarity

Table 6. Macro-variables and the solidarity dimension of the VALCOS Index

negative relationship			positive relationship		
variable	rho	CS	variable	rho	CS
var025 Suicides	-.61**	oecd	var024 Health expenditure	.55*	
			var004 Long-term unemployment rate	.45*	
			var033 Number of inhabitants	.45*	
			var029 Early leavers from education	.43*	Eurostat

Suicide-rate is used as an OECD social cohesion indicator and early leavers from education belongs to the list of Eurostat social cohesion indicators. The only relevant association with the solidarity dimension of the VALCOS Index is the suicide indicator.

Figure 5. Solidarity and suicide rates
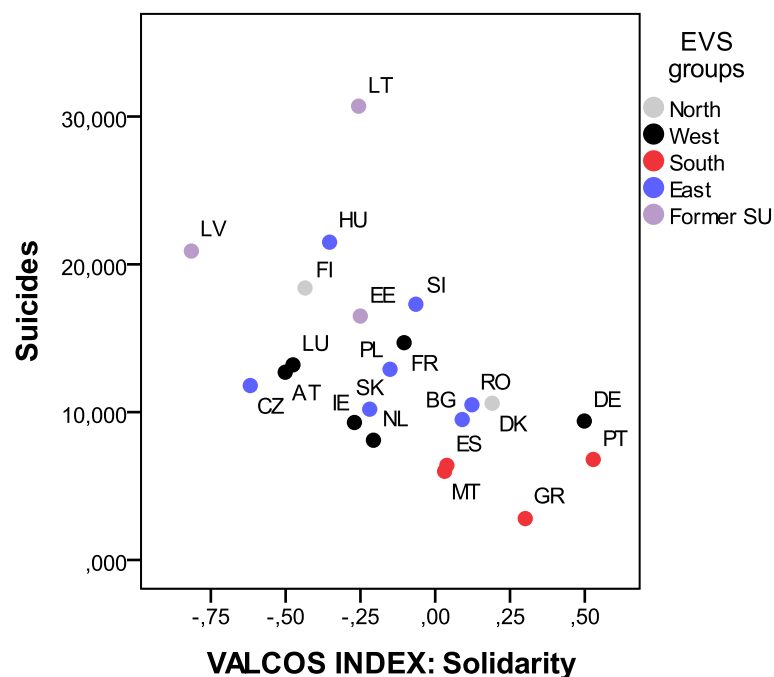
Rho=-0.64

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Dimension 3: political participation

Table 7. Macro-variables and the dimension of political participation of the VALCOS Index

negative relation			positive relation		
variable	rho	SC-indicator	variable	rho	SC-indicator
var059 Legal abortions	-.71**		var050 Income per capita	.85**	
var017 HICP	-.69**		var019 Minimum wages	.84**	
var043 Infant mortality	-.59**		var042 Life expectancy at age 65	.83**	
var018 Recreational and cultural services HICP	-.58**		var012 GDP per inhabitant	.80**	
var027 People killed in road accidents	-.54**		var008 Part-time employment	.78**	
var002 Jobless households	-.40*	eurostat	var041 Life expectancy at birth	.78**	
			var014 Social protection expenditure	.77**	
			var048 Level of Internet access	.76**	
			var032 Lifelong learning	.69**	
			var049 Cinema attendance	.68**	
			var047 Motorization rate	.65**	
			var051 Emigration rate	.61**	
			var024 Health expenditure	.60*	
			var035 Urbanization rate	.58**	
			var057 Vote in European elections	.58**	oecd
			var039 Fertility rate	.56**	
			var052 Immigration rate	.56**	
			var061 Women in Parliament	.56**	
			happy_mean1	.53**	oecd
			var001 Employment rate	.51*	
			SWB2_mean	.50**	
			var063 Employment rate of young people	.48	
			var046 Air pollution	.46*	
			var053 Type of state	.46*	
			lifesat_mean	.45**	oecd
			var062 Employment rate of women	.43*	

Political participation is correlated with only one Eurostat social cohesion indicator: jobless households and three OECD social cohesion-indicators: voting participation, happiness and life satisfaction.

When considering the political participation dimension of the VALCOS Index, we identified four main areas of relationships. These are:

1. A strong and significant correlation with GDP or GDP related measures (income per capita, minimum wages, so as immigration and emigration rates);

2. High and significant correlations with health related variables such as: life expectancies, social protection and health expenditure, legal abortions, infant mortality, people killed in road accidents;

3. Strong correlation with part-time employment and lifelong learning;

4. Life satisfaction and happiness with moderate significant correlations.

Figure 6. Political participation and Income per capita
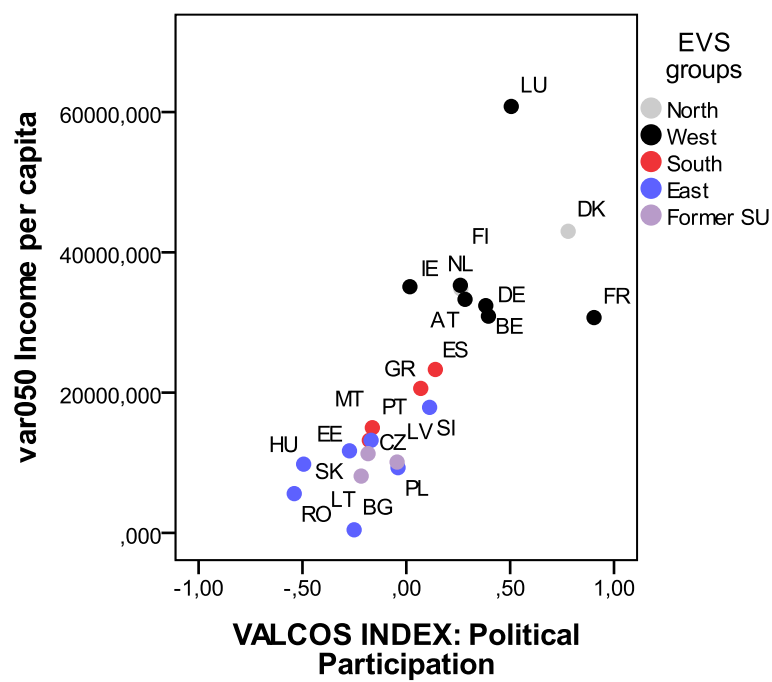
Rho=0.85

Figure 7. Political participation and life expectancy at age 65
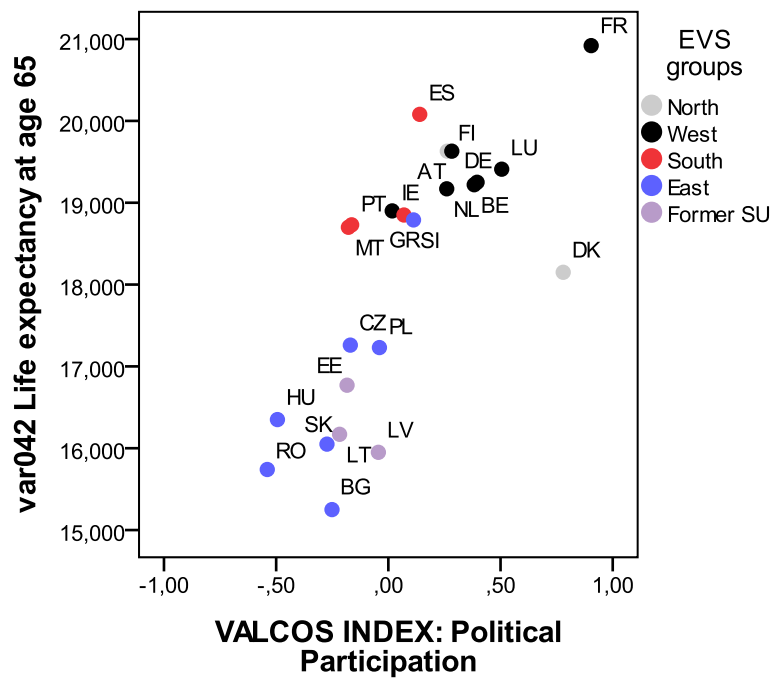
Rho=0.83

Figure 8. Political participation and life-long learning

Rho=69

<u>Dimension 4: sociocultural participation</u>

Table 8. Macro-variables and the socio-cultural participation dimension of the VALCOS Index

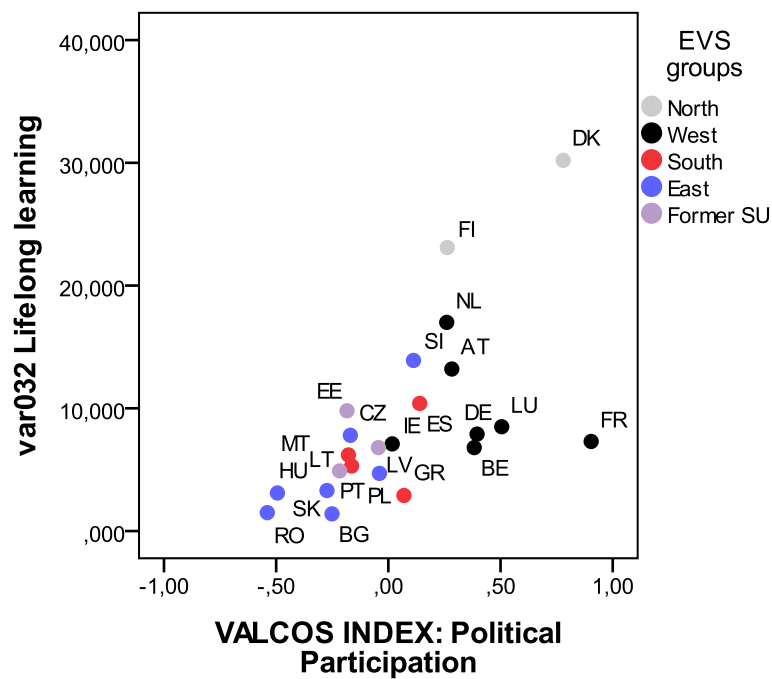| negative relation			positive relation		
variable	**rho**	**SC-indicator**	**variable**	**rho**	**SC-indicator**
var003 Unemployment rate	-.65**		var048 Level of Internet access	.89**	
var006 Unemployment rate of women	-.62**		var050 Income per capita	.74**	
var004 Long-term unemployment rate	-.61**	eurostat	var032 Lifelong learning	.74**	
var043 Infant mortality	-.54**		var012 GDP per inhabitant	.71**	
var005 Unemployment rate of young people	-.52		var062 Employment rate of women	.70**	
var023 At-risk-of-poverty rate	-.46*	eurostat	var001 Employment rate	.69**	
var002 Jobless households	-.42*	eurostat	var039 Fertility rate	.64**	
var036 Country superficy	-.42*		var008 Part-time employment	.64**	oecd
			var011 Unionization rate	.58*	
			lifesat_mean	.57**	oecd
			SWB2_mean	.54**	
			var063 Employment rate of young people	.51*	
			var061 Women in Parliament	.50*	
			happy_mean_1	.47**	oecd
			var019 Minimum wages	.47*	
			var014 Social protection expenditure	.45*	
			var053 Type of State	.44*	
			var051 Emigration rate	.43*	
			var042 Life expectancy at age 65	.42*	

Sociocultural participation is correlated with three Eurostat social cohesion indi-
cators measuring social equity: long-term unemployment rate, risk of poverty rate
and jobless households. Positive correlations are observed with three OECD social
indicators: life satisfaction, happiness and part-time employment.

In particular, the dimension of sociocultural participation of the VALCOS
Index is positively correlated with:

1. employment or unemployed related variables;

2. GDP and GDP-related variables;

3. Happiness and life satisfaction measures.

Figure 9. Sociocultural participation and income per capita
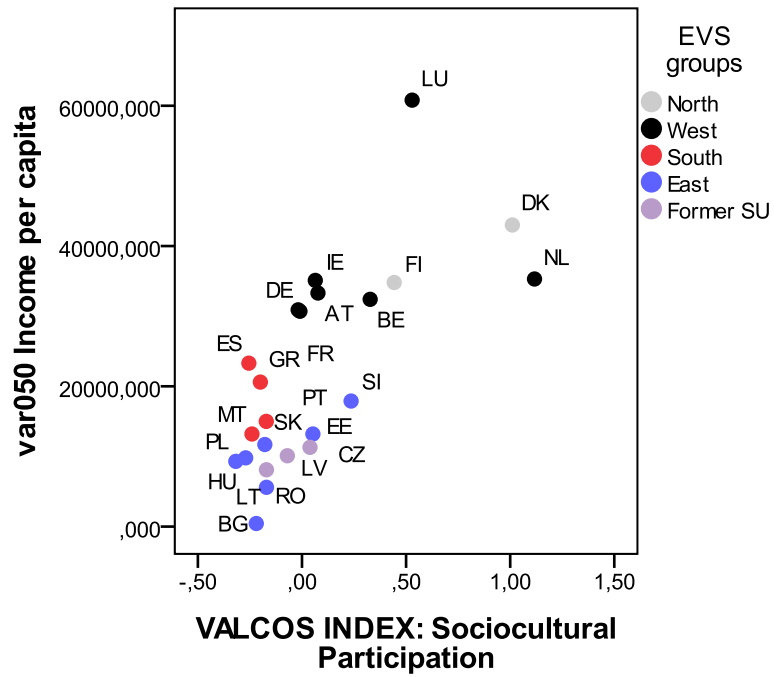
Rho=0.74

Figure 10. Sociocultural participation and employment rate
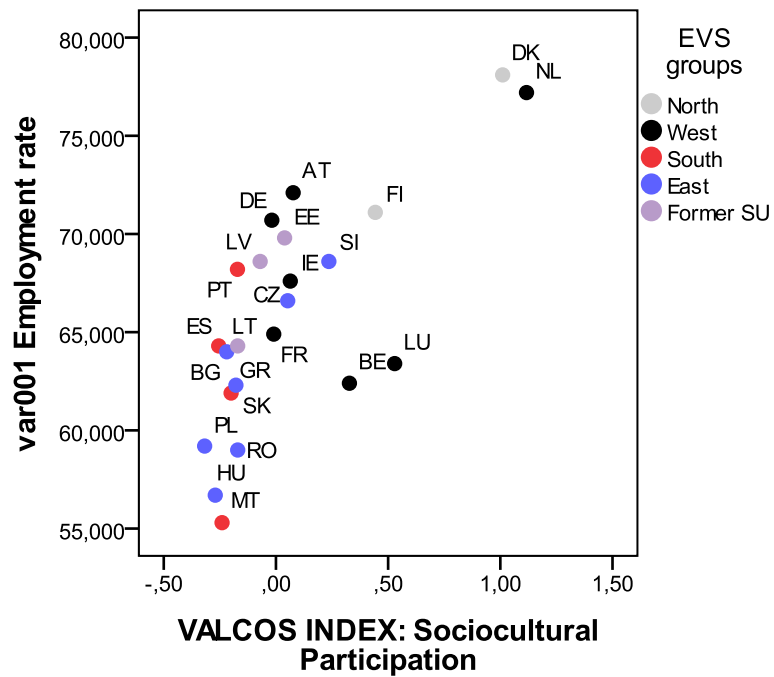
Rho=0.69

Dimension 5: formal relations

Table 9. Macro-variables and formal relations dimension of the VALCOS Index

negative relation			positive relation		
variable	rho	SC-indicator	variable	rho	SC-indicator
var030 Education attainment level	-.59**		var008 Part-time employment	.58**	
var027 People killed in road accidents	-.50*		var048 Level of Internet access	.56*	
var017 HICP	-.45*		var046 Air pollution	.55**	
			var019 Minimum wages	.53*	
			var049 Cinema attendance	.50*	
			var050 Income per capita	.50*	
			var051 Emigration rate	.50*	
			var052 Immigration rate	.50*	
			var053 Type of state	.43*	
			var012 GDP per inhabitant	.42*	
			happy_mean_1	.34*	oecd

The formal relations dimension of the VALCOS Index correlates with the OECD happiness indicator. In this case, our data suggest only a weak, but significant correlation of our Index with proxies of educational attainment.

Figure 11. Sociocultural participation and employment rate
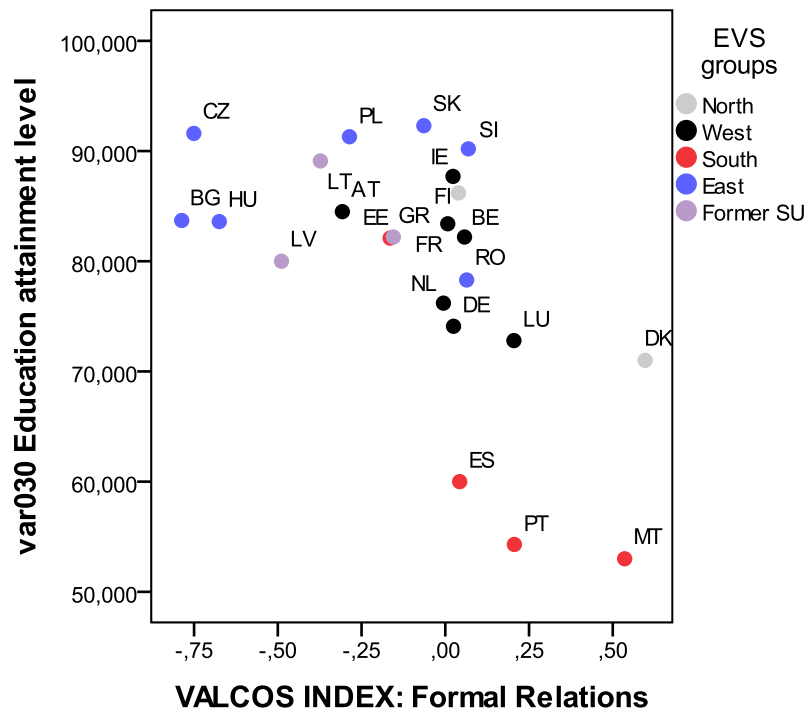
Rho=-0.59

Dimension 6: substantial relations

Table 10. Macro-variables and substantial dimension of the VALCOS Index

negative relation			positive relation		
variable	rho	SC-indicator	variable	rho	SC-indicator
var043 Infant mortality	-.63**		var048 Level of Internet access	.92**	
var059 Legal abortions	-.60*		var050 Income per capita	.86**	
var004 Long-term unemployment rate	-.53**	eurostat	var032 Lifelong learning	.83**	
var002 Jobless households	-.54**	eurostat	var012 GDP per inhabitant	.82**	
var027 People killed in road accidents	.47*		var039 Fertility rate	.77**	
var023 At-risk-of-poverty rate	-.45*	eurostat	var019 Minimum wages	.75**	
var003 Unemployment rate	-.44*		var008 Part-time employment	.74**	
			var001 Employment rate	.70**	
			var042 Life expectancy at age 65	.68**	
			var014 Social protection expenditure	.66**	
			var062 Employment rate of women	.65**	
			var041 Life expectancy at birth	.61**	
			var047 Motorization rate	.58**	
			var049 Cinema attendance	.58*	
			var051 Emigration rate	.57**	
			var063 Employment rate of young people	.57**	oecd
			SWB2_mean	.57**	
			var035 Urbanization rate	.56**	
			var061 Women in Parliament	.56**	
			lifesat_mean	.56**	oecd
			happy_mean_1	.55**	oecd
			var038 Crude birth rate	.53**	
			var052 Immigration rate	.53*	
			var053 Type of state	.52*	
			var028 Expenditure on education	.49*	
			var057 Vote in European elections	.49*	oecd
			var040 Live births outside marriage	.47*	

The substantial relations dimension of the VALCOS Index brings together all the items of participation in social and civic associations. From this perspective present dimension appears related to the social capital dimension proposed in the list of OECD social indicators.

Three measures of social cohesion in the list of Eurostat have high correlations with our dimension of social cohesion. These are: long-term employment rate, jobless households and risk of poverty rate. Present dimension of social cohesion is

also correlated with four OECD social cohesion indicators: employment rate of young people, life satisfaction and happiness, as well as voting participation.

These correlations suggest that the substantial relations dimension is related to many social indicators. In particular, we found:

1. significant correlations with GDP and other GDP related variables;

2. highly significant correlations with variables belonging to the employment domain, such as part-time employment, employment rate and long term unemployed;

3. positive and significant correlations with demographic variables such as life expectancies, fertility rates and infant mortality;

4. happiness and life satisfaction are moderately correlated with substantial relations.

Figure 12. Substantial relations and income per capita
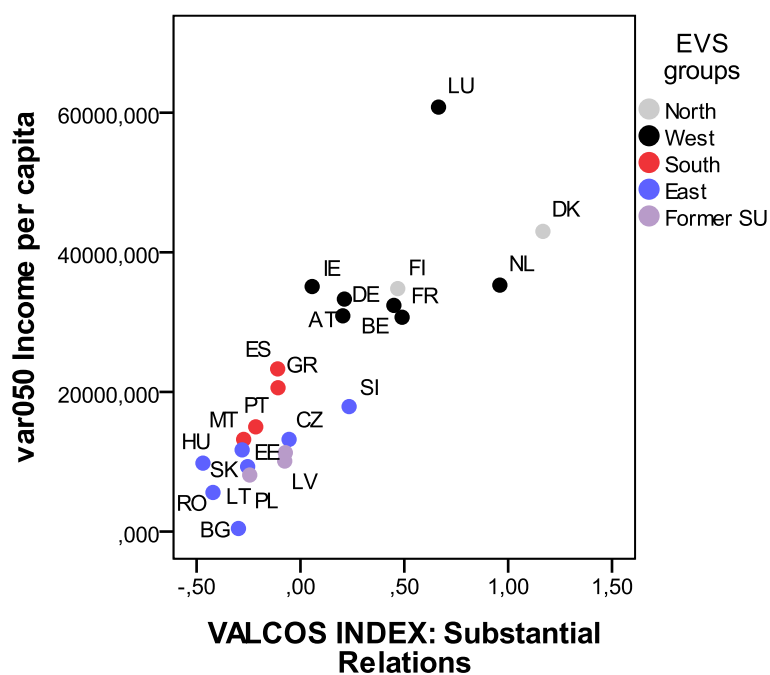
Rho= 0.86

Figure 13. Substantial relations and employment rate
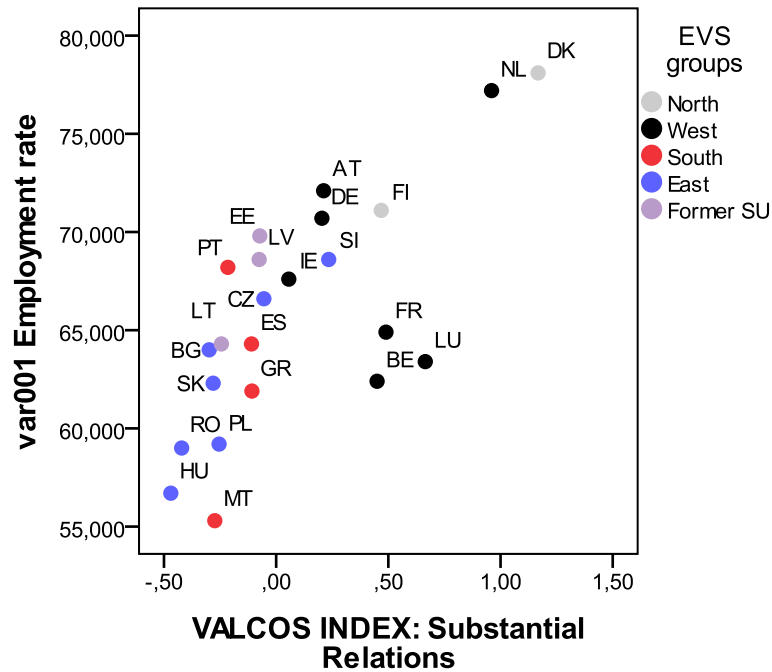
Rho=0.70

Figure 14. Substantial relations and fertility rate
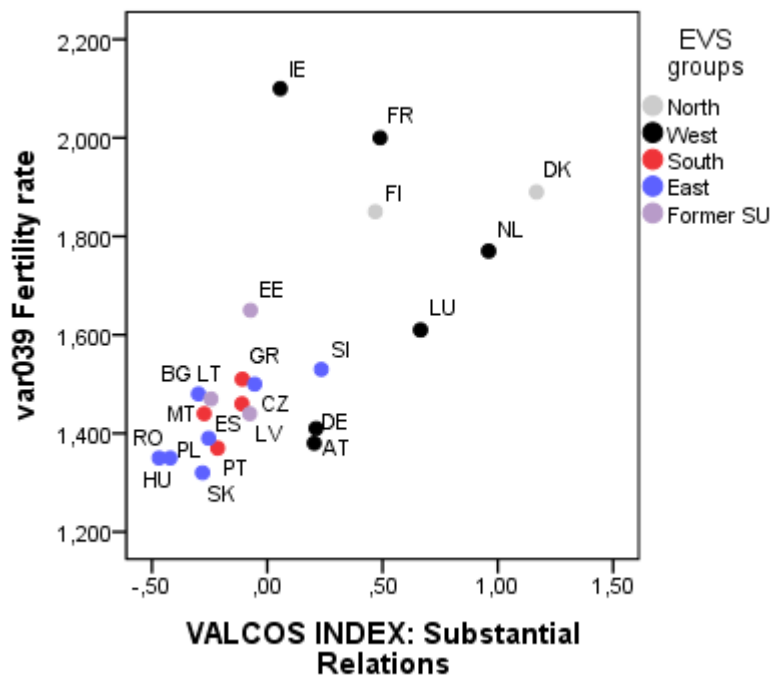
Rho=0.77

Figure 15. Substantial relations and happiness
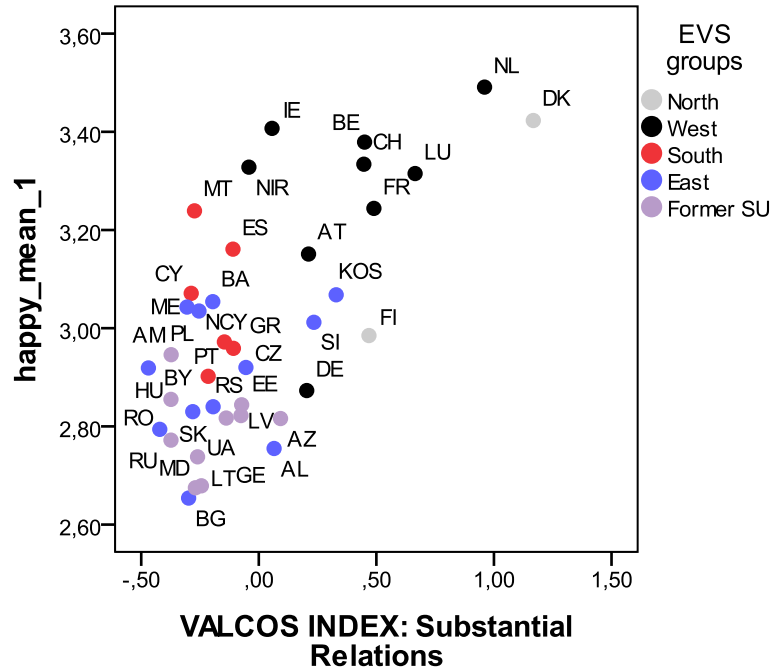
Rho=0.55

5.   Conlusions

The aggregation of EVS 2008 data on social cohesion together with many macro indicators of several dimensions of social life (including economic, socio-demographic, health and subjective well-being indicators) allowed us to rank social cohesion across 39 European countries and to explore differences across groups of countries. Subsequently, we validated our index by correlating it with many national level variables.

Results suggest that the VALCOS-Index of social cohesion is strongly and significantly correlated with other macro indicators largely used by the scientific community. This is the case of the following variables: suicides, life satisfaction and happiness, jobless households, voting participation, long-term unemployment rate, risk of poverty rate, part-time employment, long-term employment, and employment rate of young people.

Social variables of the macro data base presenting the most significant (at p<0.01) correlations with the six dimensions of the VALCOS Index are the following: Part-time employment (5), GDP per inhabitant (4), lifelong learning (4), level of Internet access (4), income per capita (4), happiness (4), minimum wages (3), fertility rate (3), cinema attendance (3), emigration rate (3), life satisfaction (3) and infant mortality (3).

The main domains linked to the VALCOS Index are: Income, employment, subjective well-being, suicide, health, education and demography.

Summarizing, present results point out the following patterns:

1. countries with higher social cohesion show lower levels of unemployment and higher levels of other forms of employment such as part-time job. Similarly, these countries are characterized by higher levels of people investing in education over the life course;

2. more cohesive societies are also reporting better economic performances in terms of higher GDP, higher employment and social expenditures, lower levels of inflation, less unequal societies and lower risk of poverty;

3. those societies are not only richer, but also safer: countries with higher levels of social cohesion correlate with lower levels of mortality due to car accidents and lower rates of suicides and of infant mortality. On the contrary, these countries are characterized by higher fertility rates and life expectancy when 65;

4. higher social cohesion is positively correlated with a higher participation of women and young people to the political and working life of their countries, more intense social participation and confidence in new technologies.

This framework suggests that more cohesive societies are also characterized by higher quality of life. This is further confirmed by correlation with aggregated indexes of subjective well-being as proxied by happiness, life satisfaction and a joined index of well-being.

Nonetheless, it is worth mentioning that these results are subject to some constraints. First of all, we must recall the impossibility of taking into account the economic sphere of the social cohesion architecture proposed by Bernard. This is mainly due to lack of appropriate items in the dataset about insertion/exclusion and equality of chance. Furthermore, present work was limited by the unavailability of information concerning some major European countries at the time of writing this paper and by the lack of weights to account for sampling errors.

Taking into account all the above mentioned constraints, we consider present results encouraging showing that it is possible to build a reliable index of social cohesion starting from individual level variables. The relevant advantage of this approach is that it is based on micro-observed data which are easy to collect and widely available for many countries.

The availability of a reliable micro-based synthetic index of social cohesion enables an in-depth analysis of its determinants and effects on many domains of social life starting from the individual level to the national level. Present results are a former step forward toward the definition of new tools allowing the design of a new set of policy interventions to promote or restore social cohesion at many different levels eventually extending the range of available policies. At the same time, our index provides a way to easily monitor social cohesion across nations starting from individual surveys.

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Annexes

Table A1. Countries and sample size

country	abrev	source num	EVS groups	sample size	equal size
Albania	AL	1	4 East	1534	1000
Armenia	AM	2	5 Former SU	1500	1000
Austria	AT	3	2 West	1510	1000
Azerbaijan	AZ	4	5 Former SU	1487	1000
Belarus	BY	5	5 Former SU	1500	1000
Belgium	BE	6	2 West	1509	1000
Bosnia-Herzegovina	BA	7	4 East	1512	1000
Bulgaria	BG	8	4 East	1500	1000
Cyprus	CY	9	3 South	1000	1000
Cyprus (North)	NCY	10	3 South	500	1000
Czech Republic	CZ	11	4 East	1821	1000
Denmark	DK	12	1 North	1507	1000
Estonia	EE	13	5 Former SU	1518	1000
Finland	FI	14	1 North	1134	1000
France	FR	15	2 West	1499	1000
Georgia	GE	16	5 Former SU	1500	1000
Germany	DE	17	2 West	2075	1000
Greece	GR	18	3 South	1498	1000
Hungary	HU	19	4 East	1513	1000
Ireland	IE	20	2 West	1013	1000
Kosovo	KOS	21	4 East	1601	1000
Latvia	LV	22	5 Former SU	1506	1000
Lithuania	LT	23	5 Former SU	1500	1000
Luxembourg	LU	24	2 West	1610	1000
Malta	MT	25	3 South	1500	1000
Moldavia Republik	MD	26	5 Former SU	1551	1000
Montenegro	ME	27	4 East	1516	1000
The Netherlands	NL	28	2 West	1554	1000
Northern Ireland	NIR	29	2 West	500	1000
Poland	PL	30	4 East	1510	1000
Portugal	PT	31	3 South	1553	1000
Romania	RO	32	4 East	1489	1000
Russia	RU	33	5 Former SU	1504	1000
Serbia	RS	34	4 East	1512	1000
Slovakia	SK	35	4 East	1509	1000
Slovenia	SI	36	4 East	1366	1000
Spain	ES	37	3 South	1500	1000
Switzerland	CH	38	2 West	1272	1000
Ukraine	UA	39	5 Former SU	1507	1000
Total				56190	39000

Source: Dickes 2010

Countries not available in august 2010: Croatia, Great Britain, Iceland, Italy, Macedonia, Norway, Sweden, Turkey.

Table A2. Intermediate social cohesion variables (VAI): composition, internal consistency and statistical characteristics (N=39000)

Intermediates variables	items	α	M sd	Skew Kurt
Political sphere – Formal relations Dimension: **Legitimacy/Illegitimacy**				
VAI01 Confidence in national distributive systems	v207r Confidence in: education system v213r Confidence in: social security system v217r Confidence in: health care system v218r Confidence in: justice system	.77	10.26 2.54	-.097 -.147
VAI02 Confidence in national organiza-tions	v208r Confidence in: the press v209r Confidence in: trade unions v211r Confidence in: parliament v212r Confidence in: civil service	.74	9.15 2.42	.193 .199
VAI03 Confidence in authority institutions	v205r Confidence in: church v206r Confidence in: armed forces v210r Confidence in: the police	.57	7.99 1.97	-.112 -.248
VAI04 Satisfaction and approval of democracy and government	v221r Confidence in: political parties v222r Confidence in: government v223r Are you satisfied with democracy v224r View government: very bad-very good (4 categories)	.76	9.15 2.64	.086 -.543
Sociocultural sphere – Formal relation Dimension: **Acceptance/Reject**				
VAI05 Proximal solidarity	v285r Concerned with people in the neighbourhood v286r Concerned with people in the region v287r Concerned with fellow countrymen	.87	9.03 2.82	-.062 -.229
VAI06 Distal solidar-ity	v290r Concerned with elderly people v291r Concerned with unemployed people v292r Concerned with immigrants v293r Concerned with sick and disabled people v294r Concerned with poor children	.85	17.41 4.15	-.330 .047

| | Political sphere –substantial relation | | | |
	Dimension: **Participation/Passivity**			
VAI07 *Participation in legal political activities*	v187r Signing a petition	.75	4,98	.478
	v188r Joining in boycotts		1.80	-.822
	v189r Attending lawful demonstrations			
VAI08 *Participation in illegal political activities*	v190r Joining unofficial strikes	.63	2.41	2.040
	v191r Occupying buildings/factories		0.80	3.781
VAI09 *Political concern*	v7r How often discuss politics with friends	.50	3.93	-.071
	v281r How often do you follow politics in media (3 categories)		1.26	-1.076
	Sociocultural sphere - substantial relation			
	Dimension: **Belonging/Isolation**			
VAI10 *Participation in social associations*	v10r Do you belong to: welfare organisation	.68	4.12	4,84
	v28r Do you work unpaid for: welfare organisation		0.49	26,53
	v15r Do you belong to: local community action			
	v33r Do you work unpaid for: local community action			
VAI11 *Participation in political associations*	v13r Do you belong to: trade unions	.64	6.24	4.04
	v31r Do you work unpaid for: trade unions		0.70	21.10
	v14r Do you belong to: political parties/groups			
	v32r Do you work unpaid for: political parties/groups			
	v18r Do you belong to: professional associations			
	v36r Do you work unpaid for: professional associations			
VAI12 *Participation in cultural associations*	v11r Do you belong to: religious organisation	.65	6.29	3.37
	v29r Do you work unpaid for: religious organisation		0.77	13.96
	v12r Do you belong to: cultural activitiesa			
	v30r Do you work unpaid for: cultural activities			
	v21r Do you belong to: womens groups			
	v39r Do you work unpaid for: womens groups			
VAI13 *Participation in youth & leisure associations*	v19r Do you belong to: youth work	.66	4.23	3.27
	v37r Do you work unpaid for: youth work		0.64	11.68
	v20r Do you belong to: sports/recreation			
	v38r Do you work unpaid for: sports/recreation			

Source: Dickes 2010

α= alpha coefficient of Cronbach; sd=standard deviation; skew=skewness; kurt=kurtosis.
Standard-error for skeweness = 0,012 and standard-error for kurtosis = 0,25.

Table A3. Internal consistency (alpha), social cohesion indicators and countries

country	abb	trust in institution (n=4)	solidarity (n=2)	political participation (n=3)	socio cultural participation (n=4)	formal (n=6)	substantial (n=7)
Albania	AL	0.750	0.681	0.472	0.941	0.713	0.781
Armenia	AM	0.860	0.682	0.622	0.659	0.735	0.624
Austria	AT	0.806	0.754	0.574	0.595	0.738	0.615
Azerbaijan	AZ	0.845	0.379	0.187	0.508	0.597	0.698
Belarus	BY	0.873	0.674	0.498	0.468	0.789	0.457
Belgium	BE	0.751	0.571	0.498	0.392	0.692	0.521
Bosnia-Herzegovina	BA	0.831	0.760	0.533	0.606	0.720	0.604
Bulgaria	BG	0.837	0.699	0.529	0.573	0.733	0.611
Cyprus	CY	0.785	0.561	0.422	0.589	0.711	0.563
Cyprus (North)	NCY	0.865	0.667	0.573	0.548	0.770	0.580
Czech Republic	CZ	0.823	0.677	0.557	0.654	0.657	0.591
Denmark	DK	0.710	0.651	0.483	0.350	0.610	0.508
Estonia	EE	0.759	0.683	0.463	0.584	0.673	0.564
Finland	FI	0.784	0.574	0.614	0.332	0.586	0.523
France	FR	0.691	0.612	0.587	0.406	0.649	0.547
Georgia	GE	0.853	0.727	0.617	0.246	0.749	0.406
Germany	DE	0.834	0.737	0.447	0.477	0.748	0.519
Greece	GR	0.824	0.575	0.871	0.399	0.675	0.546
Hungary	HU	0.803	0.699	0.479	0.393	0.755	0.496
Ireland	IE	0.802	0.755	0.560	0.605	0.677	0.611
Kosovo	KOS	0.911	0.243	0.562	0.974	0.736	0.771
Latvia	LV	0.808	0.707	0.466	0.469	0.728	0.474
Lithuania	LT	0.807	0.726	0.521	0.424	0.715	0.459
Luxembourg	LU	0.783	0.643	0.502	0.494	0.681	0.560
Malta	MT	0.843	0.537	0.542	0.471	0.769	0.500
Moldavia Republik	MD	0.824	0.696	0.509	0.410	0.739	0.438
Montenegro	ME	0.817	0.688	0.606	0.894	0.735	0.724
The Netherlands	NL	0.774	0.567	0.542	0.618	0.674	0.607
Northern Ireland	NIR	0.787	0.765	0.672	0.560	0.645	0.644
Poland	PL	0.723	0.765	0.569	0.262	0.679	0.430
Portugal	PT	0.699	0.723	0.520	0.864	0.626	0.688
Romania	RO	0.652	0.484	0.439	0.684	0.718	0.591
Russia	RU	0.640	0.470	0.516	0.513	0.717	0.484
Serbia	RS	0.647	0.478	0.558	0.752	0.667	0.616
Slovakia	SK	0.663	0.496	0.424	0.509	0.712	0.503
Slovenia	SI	0.701	0.540	0.384	0.543	0.703	0.548
Spain	ES	0.589	0.418	0.640	0.281	0.666	0.514
Switzerland	CH	0.721	0.564	0.511	0.472	0.661	0.560
Ukraine	UA	0.647	0.478	0.534	0.356	0.676	0.499
mean		0.772	0.618	0.528	0.535	0.698	0.564
sd		0.077	0.122	0.101	0.176	0.048	0.089

Source: Dickes, 2010.

Internal consistency (alpha) is measured starting from normalized scores.
Correlations among scores are significant at $p<0.01$ for each country.

Table A4. Spearman rank coefficients between social cohesion indicators and other social macro-variables

			N Coun-tries	Trust in institution	Solidarity	Political partici-pation	Sociocultu-ral parti-cipation	Formal	Substan-tial
EMPLOYMENT WORK AND ECONOMY	Employment and Unemployment	var001 Employment rate	23	.19	-.12	.51*	.69**	.08	.70**
		var002 Jobless households	23	-.30	-.071	-.40*	-.42*	-.37	-.54**
		var003 Unemployment rate	23	-.20	.20	-.15	-.65**	-.07	-.44*
		var004 Long-term unemploy-ment rate	23	-.34	.45*	-.31	-.61**	-.07	-.53**
	Vulnerable groups	var005 Unemployment rate of young people	23	-.11	.10	-.18	-.52	-.02	-.40
		var006 Unemployment rate of women	23	-.23	.22	-.04	-.62**	-.07	-.36
		var007 Employment rate of older workers	23	-.06	-.05	.07	.35	-.10	.27
	Working condi-tions	var008 Part-time employment	23	.61**	.14	.78**	.64**	.58**	.74**
		var009 Accidents at work	22	.22	-.32	-.17	.05	.07	-.02
		var010 Number of working days lost	16	.09	.45	.37	.08	.45	.21
		var011 Unionization rate	13	.57*	-.19	.15	.58*	.39	.30
	Economy	var012 GDP per inhabitant	23	.60**	-.12	.80**	.71**	.42*	.82**
		var013 government debt	23	-.01	.28	.35	-.15	.08	.10
		var014 Social protection expen-diture	23	.32	.24	.77**	.45*	.34	.66**
		var015 renewable sources	22	-.00	.04	-.03	-.01	.14	-.05
	Purchasing power	var016 Purchasing power parity	23	-.14	-.29	-.03	.17	-.18	.09
		var017 HICP	23	.50*	-.16	-.69**	-.38	-.45*	-.58**
		var018 Recreational and cultural services HICP	23	-.32	-.09	-.58**	-.12	-.25	-.40
	Power and life conditions	var019 Minimum wages	19	.68**	.00	.84**	.47*	.53*	.75**
		var020 Gender pay gap in unadjusted form	23	-.36	-.31	.03	.15	-.53**	.18
		var021 S80/S20 income quintile share ratio	23	-.35	.31	-.23	-.40	-.12	-.37
		var022 Gini coefficient	23	-.38	.27	-.25	-.38	-.17	-.36
		var023 At-risk-of-poverty rate	23	-.29	.29	-.31	-.46*	-.08	-.45*
HEALTH AND EDUCATION	Health	var024 Health expenditure	16	.17	.55*	.60*	.25	.35	.45
		var025 Suicide	22	-.15	-.61**	-.06	.20	-.34	.1
		var026 Hospital beds	21	-.38	-.28	-.16	-.32	-.39	-.29
		var027 People killed in road accidents	23	-.60**	-.16	-.54**	-.36	-.50*	-.47*
	Education	var028 Expenditure on educa-tion	20	.37	.10	.40	.44	.29	.49*
		var029 Early leavers from education	23	.06	.43*	-.10	-.29	.30	-.25
		var030 Education attainment level	23	-.33	-.49	-.27	-.02	-.59**	-.13
		var031 School expectancy	23	.04	-.09	.19	.31	-.027	.33
		var032 Lifelong learning	23	.54**	-.21	.69**	.74**	.36	.83**

	Population	var033 Number of inhabitants	23	-.33	.45*	.22	-.21	-.09	-.02
		var034 Population density	23	.28	.23	.29	.13	.38	.21
		var035 Urbanization rate	22	.20	-.08	.58**	.41	.06	.56**
		var036 Country superficy	23	-.46*	.24	.02	-.42*	-.28	-.24
		var037 Old-age dependency ratio	23	-.26	.23	.38	.10	-.13	.24
DEMOGRAPHY	Natality and fertility	var038 Crude birth rate	23	.46*	-.26	.35	.47*	.16	.53**
		var039 Fertility rate	22	.44*	-.15	.56**	.64**	.17	.77**
		var040 Live births outside marriage	23	.09	-.20	.25	.52*	-.10	.47*
	Mortality	var041 Life expectancy at birth	23	.44*	.12	.78**	.34	.40	.61**
		var042 Life expectancy at age 65	23	.45*	.01	.83**	.42*	.39	.68**
		var043 Infant mortality	23	-.28	.12	-.59**	-.54**	-.29	-.63**
	Nuptiality and divorciability	var044 Marriages	23	.10	-.04	-.21	-.08	.03	-.16
		var045 Divorces	22	-.08	-.33	.01	.14	-.15	.09
OTHERS		var046 Air pollution	23	.50*	.26	.46*	.12	.55**	.31
		var047 Motorization rate	23	.43*	-.06	.65**	.41	.37	.58**
		var048 Level of Internet access	15	.76**	-.11	.76**	.89**	.56*	.92**
		var049 Cinema attendance	23	.58**	.06	.68**	.35	.50*	.58*
		var050 Income per capita	23	.69**	-.05	.85**	.74**	.50*	.86**
		var051 Emigration rate	22	.58**	-.04	.61**	.43*	.50*	.57**
		var052 Immigration rate	22	.59**	-.08	.56**	.39	.50*	.53*
		var053 Type of state	23	.48*	.08	.52*	.44*	.43*	.52*
		var054 Population aged under 25 years	23	.39	-.31	-.07	.11	.05	.06
		var055 Population aged 26 – 64 years	23	-.19	.10	-.27	-.33	-.05	-.34
		var056 Population aged 65 and over	23	-.40	.34	.16	-.08	-.14	.03
		var057 Vote in European elections	22	.55**	-.04	.58**	.40	.41	.49*
		var058 Exit from the labour force	16	-.02	.07	.04	.26	.10	.23
		var059 Legal abortions	13	-.38	-.12	-.71**	-.35	-.28	-.60*
		var060 Cities over 100,000 inhabitants	23	-.40	.35	.16	-.25	-.22	-.06
		var061 Women in Parliament	23	.20	-.00	.56**	.50*	.13	.56**
		var062 Employment rate of women	23	.19	-.14	.43*	.70**	.06	.65**
		var063 Employment rate of young people	23	.45*	.01	.48	.51*	.30	.57**
SUBJECTIVE WELL-BEING		var064 SWB2_mean	39	.44**	-.21	.50**	.54**	.223	.57**
		var065 Lifesat_mean	39	.40*	-.27	.45**	.57**	.177	.56**
		var066 Happy_mean1	39	.52**	-.11	.53**	.47**	.338*	.55**

Source: Acket, 2010

Rho of Spearman: (** significant at p<0. 01; * significant at p<0.05)

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