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Social Capital and Self-Rated Health

An IV Analysis

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Master's Thesis

August 2013

Abstract

This paper studies the contextual effects of social capital on individual self-rated health in a cross sectional analysis using individual level data from 44 European Countries. The question is addressed with an Ordinary Least Squares regression as well as an Instrumental Variable analysis. A contextual effect of social capital on individual self-rated health is found and the findings imply that higher country-level social capital has a detrimental effect on individual self-rated health. It is also found that it is crucial to account for the interaction effect between individual- and country-level social capital in order to fully understand the influences of social capital on health. Trusting individuals' self-rated health benefit from higher country-level social capital, as opposed to distrustful individuals'. Based on these findings it is therefore suggested that, in order to improve health, policy actions should not be targeted solely at increasing country-level social capital but also individual-level social capital.

Keywords: social capital, instrumental variables, contextual effects, interaction variable, self-rated health

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1 Introduction

Health can be argued to be one of the main components of overall welfare, and the determinants of health are therefore of large interest to be explored. Several determinants of health have been studied and during recent years, interest in the association between social capital and health has emerged. Social capital is defined as "those features of social structures- such as levels of interpersonal trust and norms of reciprocity and mutual aid- which act as resources for individuals and facilitate collective action" (Kawachi & Berkman, 2000, p. 175). A number of beneficial properties of social capital have been found, for instance decreased rates of homicide and economic development (Kawachi & Berkman, 2000).

Although it is agreed that the social environment has an impact on people's health, the exact relationship has not yet been defined. What is questioned is whether social capital can be considered a collective or individual characteristic. This is a relevant matter to clarify in order to identify where to efficiently target policies to benefit health outcomes. Recently, an additional component has been brought up to discussion and is suspected to have a considerable impact, namely the interaction between individual- and aggregate-level effects.

It has recently been hypothesized that results from several studies using conventional regression methods suffer from endogeneity with regard to the measure of country social capital. To overcome this bias, Kim et al. (2011) argue that an instrumental variable (IV) approach is the appropriate way to approach the question, and based on this notion they have conducted the study *The contextual effects of social capital on health: a cross-national instrumental variable approach.* However, although Kim et al. (2011) might have managed to find more consistent estimates in comparison to previous studies using ordinary least squares (OLS), they partially fail to infer any significant results regarding the interaction between individual- and country-level trust.

Due to the varying results regarding the contextual effects of social capital on health, the aim of this study is to further explore the causal relation of contextual effects with social capital on individual self-rated health (SRH). As many prior studies point to the conclusion that it is crucial to account for the cross-level interactions between individual- and country-level social capital, this relation will be further addressed in this study. A partial aim of the study is also to

confirm the results from Kim et al.'s (2011) analysis, in order to evaluate the appropriateness of applying IV methods on the topic. This study will use individual-level data from the European Values Study (EVS) in a cross-sectional study of 44 European countries. This will be conducted by firstly applying a conventional OLS regression, and thereafter the analysis will be extended by applying IV in which country-level trust is instrumented with a country's dependency ratio and social network density (SND).

The paper will be organized as followed. Section 2 will present the theoretical and empirical background. This will be followed by Section 3, which describes the empirical methodology applied for the study. Section 4 describes the variables included in the estimations. The empirical results are then presented in Section 5, where estimations will also be evaluated with an analytical discussion. Section 6 then assesses the implications of the empirical results with concluding remarks.

2 Theoretical and Empirical Background

Due to the relevance of the question of improving the state of health in a country, it is of large interest for researchers to analyse why, and which factors it is that causes differences in individual health. The social environments and more specifically, social capital's impact on individuals' health has been analysed in several papers. The following section will give an overlook of the prior findings in the research field. Some brief comments on some factors influencing individuals' state of health will be presented in a collective table. Thereafter, the mechanisms more specifically relating social capital to health will be described, followed by an account of empirical findings.

2.1 Social Capital and Health

2.1.1 Health

When analysing the relation between social capital and individual health, it is crucial to control for and consider other factors that could have a potential impact on health. The following table *(Table 1)* presents some individual- and country-level characteristics that have previously shown to be associated with better SRH.

Table 1 Determinants of Health

Variable	**Expected effect on Health**	**Outcome**
Age	Negative	As age increases, state of health declines (Karlsson et al., 2010; Olsen & Dahl, 2007; Helliwell and Putnam, 2004; Poortinga, 2006)
Male	Positive	Females tend to report lower levels of SRH in comparison to men (Olsen & Dahl, 2007; Poortinga 2006)
Relationship	Positive	A positive correlation between marriage and SRH have been found in several studies (Zheng & Thomas, 2013; Subramaniam et al., 2002)
Education	Positive	Additional years of schooling is found to benefit SRH (Lundborg, 2008; Olsen & Dahl, 2007; Helliwell & Putnam, 2004; Poortinga 2006)
Income	Positive	Higher income levels are associated with higher SRH (Karlsson et al., 2010; Helliwell & Putnam, 2004; Poortinga, 2006)
Employment	Positive	Unemployment on the individual level has a negative impact on SRH (Olsen & Dahl, 2007; Helliwell & Putnam, 2004)
GDP/capita	Positive	Increasing GDP/capita has a positive effect on SRH (Lynch and Kaplan, 2000)
Gini	Negative	As income inequalities increase, SRH is observed to decline (Kawachi et al., 1997a)

2.1.2 The Effect of Social Capital on Health

Studies analysing the relationship between the social environment and individual health go back to Durkheim in 1897. He hypothesized the potential effects of the social environment on suicide rates, and concluded that social integration decreased the risk of death and thereby indicated there were positive effects of social capital on health (Durkheim, 1897). However, it took until the 1990's until social capital was formally defined. Originating from the definitions of Putnam (1993) and Coleman (1990), Kawachi & Berkman (2000) define social capital as "[...] those features of social structures- such as levels of interpersonal trust and norms of reciprocity and mutual aid- which act as resources for individuals and facilitate collective action." (Kawachi & Berkman, 2000, p. 175). Putnam's definition emphasizes the fact that it is seen as a collective resource, i.e. a public good (Putnam, 1993) while others such as Portes (1998) define social capital more as an individual attribute, that enables individuals to *"*command scarce resources by virtue of their membership in networks or broader social structures*"*. In the literature, definitions differ but to a great extent follow the above cited by Kawachi & Berkman (2000). Those that incorporate social capital in their analysis include two components of social capital; a structural component, such as social participation, and a cognitive component, such as social trust (Subramanian et al., 2002; Rostila, 2007). Social capital is often seen as the "capital" derived from social participation and trust that acts as a resource that benefits cooperation in society, which has positive effects on individual well-being and efficiency (Kawachi & Berkman, 2000; Rostila, 2007; Putnam & Helliwell, 2004).

Regarding theoretical explanations of the mechanisms relating social capital to health, they differ regarding compositional (the effect of individual social capital) and contextual effects (the effect of social capital on an aggregate level). Several studies have emphasized the importance of distinguishing between the two since it matters from a policy perspective (see for example Poortinga, 2006). Carlson (1998, 2004) argues that merely participating in civic activities can have a positive effect on health. Rostila's (2007) argumentation follows the same reasoning, arguing that by being a trusting individual, a positive impact on individual health could be observed. Kawachi et al. (1999) stated that individuals who to a larger extent are isolated, i.e. don't participate in civic activities, are more prone to reporting poor health due to the increased risk of restricted resources (such as more limited opportunities to consult other individuals for advice and emotional support).

However, as social capitals nature of being a collective resource is more often emphasized, many have argued that there are reasons to believe that communities, states or countries social capital has an impact on individuals' health, i.e. a contextual effect (Veenstra, 2000; Rostila, 2007; Islam et al., 2006; Rocco & Suhrcke, 2012; Kawachi et al., 1997a; Kawachi et al., 1999; Kawachi & Berkman, 2000). Rostila (2007), Putnam (2003), and Rocco & Suhrcke (2012) all argue that social capital can influence the political environment in a society, and in this way indirectly have an impact on health. As social capital can have a positive impact on the performance of political institutions, societies with greater social capital have more effective institutions (Putnam, 1993), which can lead to more socially efficient outcomes of e.g. the provision of health care. However, the mechanisms that link social capital to health are hypothesized and several different explanations have been put forward. It has also been argued (by for example Kawachi & Berkman, 2000) that the mechanisms to some extent differ when considering effects on for example neighbourhood level or state level. In order for the mechanisms to be present, trust must be reciprocal, i.e. individuals must trust one another and believe that the person they help will help them the next time they need it. This makes it a contextual effect; the mechanism will not be present if solely individual trust is present, trust must be reciprocal amongst individuals of society in order for the mechanisms to act (Rocco & Suhrcke, 2012).

It has been hypothesized that societies with large social capital, or high levels of social trust, have better health due to more egalitarian patterns of political participation (Kawachi & Kennedy, 1997; Kawachi et al., 1997b). In these societies, it is more likely that policies aimed at investing in social safety-nets which ensure the security and health of *all* members of society are adopted, in comparison to societies with low levels of social capital. As a consequence, in societies with lower levels of social capital, state of health is more dependent on individual's own ability to provide what he or she is in need of. Vulnerable individuals are therefore more likely to find themselves in a less hospitable environment than individuals provided with assistance via a social safety net in more trustful societies. This is argued to have an impact on the individual's health (Kawachi et al., 1997; Kawachi and Berkman, 2000).

Lobbying and the uniting of groups of people are often hypothesized to be more organized and effective in societies with high levels of social trust. The power to obtain public goods that can have a positive effect on health such as health clinics, sport facilities and green areas,

is increased. Given that the level of trust is high in these societies, the probability of having a large tax base and thus being able to finance these goods is most probably higher in comparison to the tax base in societies with lower levels of trust (Islam et al., 2006). Health-promoting public-goods are thought to affect not only individuals whom are active in the lobbying process but all individuals in society, since a public good is characterised by non-excludability in consumption (Kawachi & Berkman, 2000). It has however been pointed out that the "level of aggregation" in the measure of social capital can not be too high, since as the defined area is enlarged, it is more difficult to unite people and to take all individuals' different views into consideration (Rocco & Suhrcke, 2012).

The positive contextual effects of social capital on health due to increased access to information have been pointed out by both Kawachi et al. (1999) and Rocco & Suhrcke (2012). As social capital in most cases implies that individuals are more socially integrated, it is hypothesized that this increases the spread of information. Concerning the matter of health, this implies that health information could be more rapidly distributed, and as Kawachi et al. (1999) have argued, increases the probability that "healthy norms of behaviour are adopted and exerting social control over deviant health-related behaviour" (Kawachi et al., 1999). If this theoretical explanation is hypothesized to have an effect on health it could imply that, as information asymmetries exist between the provider and consumer in the healthcare system, higher social capital increases access to information and the information asymmetry decreases. As individuals in a society are socially integrated to a greater extent, information can be exchanged and questions such as "Who is the best physician?" can be answered. The costs for gathering information on for example how to cure or prevent diseases can decrease, which in turn can increase the state of health. An additional contextual effect of social capital on health could be the supply of informal health care in cases of short-term illness. These services may be hard to provide by a formal organization and if that is the case, individuals in society can help one another and act as risk-sharing devices in case of illness.

2.2 Empirical Findings

Regarding previous research on social capital and its potential effect on health, results and conclusions differ. Even though most recent research has focused on whether the effect of social capital should be ascribed to the individual or collective, a few ecological and individual-level studies have been carried out (Kawachi et al., 1997a; Venstra, 2000; Lynch,

2001). A large part of the remaining research has applied multilevel methods to investigate characteristics at aggregate- and individual-level simultaneously, as well as the cross-level interaction between the two. However, only the most recent papers account for *social capital* on both individual- and aggregate-level, and are thus enabled to distinguish between compositional and contextual effects. Two recent papers (Kim et al., 2011; Rocco & Suhrcke, 2012) have approached the topic with an instrumental variable method.

Early studies have found positive contextual effects of social capital on health (Kawachi et al., 1999; Putnam, 2000; Subramanian et al., 2001). Although these studies used multilevel methods they did not control for individual social capital, meaning they have not attempted to separate the contextual effects from the compositional effects. In order to examine if the effect of social capital on health can be ascribed as an individual or collective characteristic, measures of social capital on both levels need to be incorporated. Additionally, it is first when both contextual and compositional measures are included in a model that cross-level interactions can be addressed. Inclusion of an interaction variable enables researchers to observe whether trusting, as opposed to distrustful individuals, are differently affected by contextual variations (Poortinga, 2006; Duncan, Jones & Moon, 1998).

Subramanian et al. (2002) were with their paper *Social Trust and Self-Rated Health in US Communities: a Multilevel Analysis* one of the first to include measures of social capital on two levels; individual- and community-level. By using data from the 2000 Social Capital Community Benchmark Survey for 40 US communities and including individual measures of trust they failed to identify positive contextual effects of social capital on SRH. They rather found that the positive effect on health was due to social trust on the individual-level, i.e. they found compositional effects (Subramanian et al., 2002). Helliwell and Putnam (2004) combined EVS and World Values Survey (WVS) data for a total of 49 countries and found that social capital on both the individual- and country-level was positively and significantly related to better individual SRH.

In contrast to Helliwell & Putnam (2004), Poortinga (2006) found no significant association between country-level trust and individual SRH when using data from the European Social Survey (ESS) for 22 countries. Poortinga (2006) found that individual social capital measures, such as personal social support networks and trust, were positively and significantly related to SRH. In line with Poortinga (2006), Mansyur et al. (2008) did not find a significant

relationship between country-level trust and SRH when using combined WVS data for 44 countries.

Subramanian et al. (2002), Poortinga (2006) and Mansyur et al. (2008) all identified cross-level interactions between social capital at the individual- and country-level. Subramanian et al. (2002) and Poortinga (2006) reached similar results; trusting individuals benefited more from high trust on the aggregate level than low-trusting individuals. The results imply that trusting individuals are more likely to report good health in countries with high social trust but less likely to do so in countries with low social trust. In other words, social capital at the aggregate level benefits trusting individuals. Mansyur et al. (2008) found similar results but the effect was not significant.

In the paper *The contextual effects of social capital on health: a cross-national instrumental variable approach* Kim et al. (2011) state that an IV approach is the appropriate method to use when studying the contextual effects of social capital on health. They argue that an IV approach can overcome common statistical complications like reverse causation and residual confounding. By not addressing these complications, results from previous studies might have obtained compromising results. They choose to conduct their study for women and men separately. When using two different joint instruments for social capital (corruption index together with population density and religious fractionalisation together with population density) they found large and significant contextual effects of social capital on health in a sample of 64 countries where EVS and WVS data was combined. Their coefficient estimates from their IV model were almost double in size in comparison to conventional regression methods and they argue that the latter underestimates the true effect of country-level social capital. The results for their cross-level interaction variable were insignificant for both women and men in their instrumental variable analysis. Regarding the outcomes of their ordinary least squares analysis, the cross-level interaction between individual- and country-level trust was found to be positive and significant for women but not for men.

The World Health Organization (Rocco & Suhrcke, 2012) used ESS data for 14 European countries and conducted a second IV analysis on the subject. They used seven instruments to instrument individual social capital, community social capital, the interaction between these two and squared community social capital. Their results did not indicate that there is a contextual effect of community-level social capital on health. However, the results still

indicated that community-level social capital had an effect, which was dependent on individual social capital. The effect of individual-level social capital was significant only if individuals lived in societies with sufficiently high community-level social capital. Further, their results indicated that trust had to be reciprocal in order to affect health. In other words, community-level social capital did not solely have an effect on health and neither did individual-level social capital in one sense; it was dependent on the presence of reciprocal trust (Rocco & Suhrcke, 2012).

To summarise, most studies conducted with multilevel methods found measures of social capital on the individual-level to be significantly related to better SRH. Results regarding the contextual effect of social capital on the country-level vary and are to a great extent not significant. An IV approach by Kim et al. (2011) found that previous estimates from conventional regression methods underestimated the contextual impact. The IV approach conducted by Rocco & Suhrcke (2012) also found larger estimates than conventional regression methods. However, they did not find that community social capital solely, on its own, had an effect on health after controlling for individual-level social capital. The various conflicting and often non-significant results call for more research.

Due to the varying results regarding the contextual effects of social capital on health, the aim of this study is to estimate the contextual effects of social capital on individual SRH. This will be done by elaborating on the most previous method used, IV, and by introducing new instruments. Further, this study will try to clarify if any cross-level interaction between individual- and country-level trust can be found.

3 Empirical Methodology

The following section will describe the empirical strategy. The choice of methodology and variables for this study have been selected based upon prior theoretical and empirical findings. Previously used methods have been evaluated in order to find an appropriate approach to evaluate the contextual effects of social capital on SRH.

3.1 OLS

As mentioned in Section 2, the question of whether the effect of social capital lies at the individual- or aggregate-level has been a conflicting discussion (Poortinga, 2006). Studies conducted so far have found support for both contextual and compositional effects. It is therefore of importance to include both measures in order to identify if any beneficial effect on health should be attributed to either the individual or aggregate constructions in society.

To begin with, a conventional regression model was applied by using OLS to estimate the effects of social capital on individual SRH. In order to identify if there was a contextual effect, *Model 1* was initially specified including only country-level trust as a measure of social capital. *Model 1* was then altered by introducing individual-level trust to the model in order to identify the separate effects of individual- and country-level trust. *Model 2* thus enables us to reveal to which extent the effects are really compositional or contextual.

3.1.1 Interaction Variable

It is not only a distinction between the effects attributed by individual- and country-level trust that is of interest, but also the cross-level interactions between them. Previous research on the subject has most often approached the issue by using multilevel methods in order to identify cross-level interactions. These studies have had their main focus on exploring the association between individual- and country-level trust with individual health (Kim et al., 2008). Kim et al. (2011) included an interaction variable in the OLS and IV analyses. One partial aim of this study is not only to confirm the results from Kim et al.'s (2011) IV analysis, but also to clarify the cross-level interaction between individual- and country-level trust.

In this study, a conventional regression model will firstly be applied, which addresses the cross-level effect with an interaction variable. The analysis will then be extended by

instrumenting the interaction variable in an IV estimation. However, before approaching the IV methodology, *Model 2* is extended by introducing an interaction variable. *Model 3* then takes into consideration compositional and contextual effects, as well as the interaction between the two (Poortinga, 2006; Duncan, et.al. 1998). The interaction variable is simply generated as the multiple of individual- and country-level trust.

As mentioned in Section 2, concerns have been raised regarding if it is defensible to apply the most frequently used OLS method due to the impending risk of endogeneity. In order to refine the analysis on the topic and to obtain meaningful results, methods which can circumvent this problem needs to be applied. One of these methods is the quasi-experimental method of IV analysis (Wooldridge, 2012).

3.2 Instrumental Variables

Endogeneity arises when a variable in a regression is determined by other components in the regression, meaning that there is a correlation between the covariate and other variables or the error term. One of the most common sources of endogeneity is reverse causality (Kennedy, 2008). For this specific study, country-level trust is measured, but this measure might fail to control for unobserved country characteristics that co-vary with social capital, which would induce a spurious relationship. Due to this, there is an impending risk that endogeneity is present in the OLS models. Country-level trust will in this case be measuring more effects than can be observed. The dependent variable, SRH, can potentially be the source of some of the variation in country-level trust, which in that case means the model suffers from reverse causation. The consequence of this is that the effect of social capital does not vary completely randomly.

Before proceeding to the IV model specification, it was examined whether endogeneity could be detected in the suspected variable country-level trust. This was tested and exogeneity cannot be rejected in the problematic regressor and thus it cannot be concluded that the model actually suffers from endogeneity (test outputs found in Appendix A, *Table 4*). However, the outcome of the test could be a result of faulty appropriateness of the tests characteristics with regard to the used data. Henceforth, we argue that endogeneity in fact is a problem for the analysis, with the regard to the above stated argumentation.

The quasi-experimental method of IV uses an instrument to provide an experimental input to the regression. It replaces the problematic variable, which effect is to be estimated, with the instrument. The purpose of this is for the instrument to reflect the estimated effect of the endogenous variable without the actual problematic part (Martens et al., 2006). In this specific study it separates the problematic variable, country-level trust, into two parts. The first part is the component correlated with the other covariates/ error term in the regression and the second part is the uncorrelated component that contains the randomized variation. The randomized effect of social capital is then filtered. The instrument then isolates the essential effect to be measured in order to obtain consistent estimates (Angrist & Pischke, 2009).

An IV estimation consists of two equations, *first stage* and the *reduced form*. The first stage displays the relation between the problematic variable and its instrument, and the reduced form estimates the relation between the instrument and the dependent variable. For an instrumental analysis to provide consistent estimates there must exist a strong first stage (Verbeek, 2012). For the instrument applied, this implies that the dependency ratio and population density must have a strong effect on the endogenous variable, country-level trust. The only relation allowed between the dependent variable, SRH, and the instrument is the first stage. The instrument must thus exclusively affect SRH through its effect on country-level trust. We refrain from putting considerable weight on specific tests of the instruments since these are conducted with the assumption of i.i.d. errors (test outputs found in Appendix A, *Table 4)*. Conclusions on instrumental validity are thus primarily confided in intuitive outcomes and a similar argumentation as commented above on endogeneity.

The validity of the results from an IV estimation is to a large extent dependent on the accuracy of the instruments that are selected for the analysis. Choosing appropriate instruments for the analysis is thus one of the most essential elements of the analysis and also one of the main potential sources for improvements (Verbeek, 2012). The process of identifying a good instrument was therefore a crucial part of the work process for this study. Part of the analysis was therefore also to assess the robustness of the instruments used in Kim et al. (2011) in order to identify any potential improvements.

The first IV estimation (*Model* 4) is applied to test one of the instruments specified by Kim et al. (2011). They use a combined instrument constructed of The Corruption Perception Index

(CPI) and population density. By applying this instrument with a slightly modified specification and an updated data set, the robustness of their results can be evaluated.

3.2.1. Selecting an Instrument

The specific instrument for this study is a joint instrument constructed by the dependency ratio and SND in a country. SND is one of the most commonly used measures to represent social capital in the literature today. Civic participation is often seen as an indicator of social capital and SND can thus be considered to reflect the structural component of social capital (Islam et al., 2006). The dependency ratio in a country somewhat reflects the demographic composition in a country; it represents to what extent a country is dependent on its labour force. A high dependency ratio often implies that there is a high number of elderly in a country. As elderly have reported to be more trusting than younger individuals, it can be argued that the dependency ratio captures the effect of aggregate social trust. To confirm this relation, the correlations between each instrument and country trust have been evaluated. Plots of these relationships confirm that the dependency ratio and SND are relevant to proceed with (plots are presented as *Plot 1* and *Plot 2* in Appendix B).

The two selected instruments have been selected with the thought that they are exogenously related to SRH. If the instruments can be considered to have any impact on health, this effect is argued to not be autonomous. In that case it would be through any of the other control variables, and would therefore not affect their capabilities of fulfilling their effects as instruments.

With the specific character of an IV approach, one of the most apparent sources of improvement lies in the selection of instruments. The final extension to the analysis is *Model 5*, which applies the new instrument; SND and the dependency ratio in a country.

A variety of variable specifications were tested in different subsets before the final models were selected. Apart from the transformed variables that are included in the above mentioned models, the following variable modifications were also tested for GDP/capita^2, Age^3, log(GDP/capita), total population, log(pop_den) and Gini^2. The variables modifications used for the final estimations were selected upon consistency and correlation with theoretical and empirical hypotheses on their effects. All models have been taken through a number of

robustness checks. *Model 1, 2* and *3* were tested for both linear and non-linear heteroscedasticity with Breusch-Pagan and White's test for heteroscedasticity (test outputs found in Appendix A, *Table 3*). Heteroscedasticity was detected for all models and White's robust standard errors was therefore applied to all above mentioned model specifications. Thereafter, it was tested whether the IV estimation had eliminated heteroscedasticity. Since this was not the case, White's robust standard errors were applied to all models.

4 Data

The complete cross-sectional data set includes 44 European countries for 2008. Individual-level data from the 2008 EVS Wave 4 is used together with aggregate country-level data from Transparency International, the World Bank and Eurostat. The data sources used in this study are widely used and recognized and have to a large extent been used in previous research. From the data set provided by EVS, Northern Cyprus, Kosovo and Northern Ireland have been excluded due to missing values and the unconventional classification of country regions. A list of the countries included can be found in Appendix B.

4.1 Dependent Variable- SRH

Individual SRH (*SRH*) is collected from EVS and is used to measure overall health perception. Health is a highly subjective notion and a variety of both subjective and objective methods have been established in attempts to measure health status as accurately as possible. SRH has for several years been widely used in health economic literature to measure overall health perception and in prospective studies it has shown to be a good predictor of mortality (Kim et al., 2011). It has been applied in a broad range of countries and is therefore considered to be representative for cross-national studies. Due to its subjective properties for an individual-level measure, it has been selected as the outcome variable in this study. By answering the following question "*All in all, how would you describe your state of health these days?*" respondents are asked to value their health on a five-point ordinal scale. The alternatives range between 1 ("*very good*") to 5 ("*very poor*"). This five point ordinal scale has been applied as continuous in this analysis.

4.2 Independent Variables

4.2.1 Individual- level variables

All data required for the individual-level variables is collected from EVS. In the questionnaire, respondents are asked to report their gender and the information from this dichotomous response variable is coded as a dummy variable *(Male),* where 1 corresponds to male and 0 to female. Respondents were also asked to include their year of birth and this information has been used to account for age. This is calculated as the differential between

year 2008 (the year that the survey was conducted) and the respondent's year of birth, and is applied as a continuous variable (*Age*). Further, an additional age variable (*Age^2)* is included in the models, defined as age squared.

The respondents answers to the question "*What is your current legal marital status?"* with the following alternatives: "*married", "registered partnership", "widowed", "divorced", "separated*" or "*never married and never registered partnership"* have been used to generate a variable accounting for the respondents legal marital status in the model. The variable is coded as a dummy variable (*Relationship*), indicating whether the respondent is engaged in any kind of partnership or not. The respondents who have answered either of the two alternatives "*married"* or "*registered partnership"* have been coded as 1 (in a relationship) and remaining alternatives to 0. From the dichotomous alternative question "*Are you yourself employed or not?"* with the answering alternatives "*yes"* or "*no"*, a dummy variable *(Employment)* has been generated with the purpose of accounting for individuals' employment; 1 representing an employed and 0 an unemployed individual.

In the EVS-questionnaire, respondents are presented with different educational levels to select from. With this information, EVS has created three different education levels, referred to as low, middle and high. These are included in the models as dummy variables (*Edu_mdl* and *Edu_up*) where the reference group is low education. EVS has created three categorical variables for weekly household income. These are included in the models as two dummy variables (*Inc_med* and *Inc_hi*) where the reference group is low income.

4.2.2 Country- level variables

In order to measure income inequality, the Gini coefficient *(Gini)* is collected from Eurostat. They define the Gini coefficient as the relationship of cumulative shares of the population, arranged according to the level of equivalised disposable income to the cumulative share of the equivalised total disposable income received by them (Eurostat, 2012). The coefficient ranges from 0-100 where a value of 0 represents perfect equality and a value of 100 perfect inequality. The commonly used measure of GDP/capita *(GDP/Cap)* is included in the model to account for overall living standards and degree of economic development. It is collected from the World Databank and is measured in constant 2005 US dollars.

4.2.3 Social Trust

Both measures of social trust are constructed of data from EVS. For the individual-level trust variable *(Ind_trust)*, the information from 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?"* is used. The answering alternatives to this question are "*most people can be trusted"* and "*you can't be too careful in dealing with people"*. This variable is coded as a dichotomous dummy variable, indicating either that you are a trusting individual, if your answer to the question is "*most people can be trusted",* or a non-trusting individual if your answer is "*you can't be too careful in dealing with people"*. Trustful individuals are in this study represented by the value of 1 and non-trusting by 0. Using this variable, the aggregate measure of country-level trust (*Country_trust*) is created. The measure of country-level trust is defined as the number of respondents who answer "*most people can be trusted"* to the question stated above, divided by total number of respondents in corresponding country. The variable is measured as a quota between 0 and 1, where higher values represent higher levels of trust on the country-level.

4.3 Instrumental Variables

As stated in Section 3, social capital will be instrumented using two combined instruments. One of the instruments applied by Kim et al. (2011) will be assessed. Thereafter, the specific instrument for this study will be applied.

To generate the selected instrument applied by Kim et al. (2011), data on two variables are needed. They use an instrument where data on population density and CPI is combined to instrument social capital. Data on population density is collected from the World Databank, where it is defined as the total population in a country divided by the land area measured in square kilometres. The variable *(Pop_den)* is introduced in the model as a continuous variable. Data on CPI is collected from Transparency International. CPI measures the level of public-sector corruption from a scale from 0 to 1, where 1 represents "*highly clean*" and 0 a "*highly corrupted*" sector. The variable *(CPI)* is applied as a continuous quota.

The instrument specific for this paper is also a combined instrument, comprised by a country's social network density and dependency ratio. The SND variable *(SND)* is generated by firstly calculating degree of social participation. The EVS-questionnaire includes a question stating 15 different categories of voluntary organizations, where respondents are

asked to report if they are involved in any of the listed. The number of respondents who answer yes to being involved in any of the stated organisations, i.e. yes to at least one of the 15 stated alternatives, is divided by the total number of respondents in each respective country. The variable is a quota ranging from 0 to 1; numbers closer to 1 indicating larger social capital. The second part of this instrument is the variable dependency ratio *(Dep_ratio)*. Data is collected from the World Databank, where it is defined as the ratio of people younger than 15 or older than 64, to the number of people between 15 and 64 years of age. This variable also has the character of a quota ranging from 0 to 1; higher numbers reflecting a larger dependency on the country's work force.

5 Empirical Results

The following section will present the main results from the estimations. All estimates are presented in *table 2*. Results for each respective regression will then be addressed in chronological order. Firstly, the OLS models (*model 1, 2* and *3*) will be presented, followed by the results from the IV models (*model 4* and *5*). Interpretations will be applied with a significance level of 5%. To conclude, outcomes of robustness tests concerning the IV models described will be commented; with appurtenant tables with outputs found in Appendix A. Appendix A also includes descriptive statistics for all the variables included. All estimations are conducted in the statistical software package Stata, version 10.

Table 2

Variable	Model 1 *Contextual Effects*	Model 2 *Compositional and Contextual Effects*	Model 3 *Cross-level Interaction*	Model 4 *Instruments CPI and Population density*	Model 5 *Instruments SND and Dependency ratio*
Constant	1.6308***	1.6151***	1.5907***	1.5851***	1.5880***
	(0.0546)	(0.0544)	(0.0549)	(0.0577)	(0.0565)
Individual level					
Male	-0.0477***	-0.0491***	-0.0493***	-0.0494***	-0.0494***
	(0.0091)	(0.0090)	(0.0090)	(0.0090)	(0.0090)
Age	0.0345***	0.0345***	0.0345***	0.0345***	0.0346***
	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)
Age^2	-0.0002***	-0.0002***	-0.0002***	-0.0002***	-0.0002***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Relationship	-0.0900***	-0.0902***	-0.0885***	-0.0886***	-0.0882***
	(0.0102)	(0.0102)	(0.0102)	(0.0102)	(0.0102)
Employment	-0.1866***	-0.1829***	-0.1821***	-0.1827***	-0.1818***
	(0.0116)	(0.012)	(0.0116)	(0.0116)	(0.0116)
Edu_mdl	-0.0838***	-0.0763***	-0.0762***	-0.0763***	-0.0762***
	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0114)
Edu_up	-0.1589***	-0.1335***	-0.1314***	-0.1324***	-0.1308***
	(0.0134)	(0.0134)	(0.0134)	(0.0135)	(0.0135)
Inc_med	-0.1864***	-0.1822***	-0.1822***	-0.1820***	-0.1823***
	(0.0118)	(0.0118)	(0.0118)	(0.0118)	(0.0117)
Inc_hi	-0.2991***	-0.2862***	-0.2867***	-0.2860***	-0.2869***
	(0.0129)	(0.0129)	(0.0129)	(0.0130)	(0.0130)
Country level					
Gini	0.0035**	0.0035***	0.0031**	0.0033***	0.0029**
	(0.0012)	(0.0012	(0.0012)	(0.0013)	(0.0012)
GDP/cap	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Social Trust					
Country_trust	-0.1181**	0.0333	0.1576***	0.1727**	0.1753**
	(0.0371)	(0.0382)	(0.0500)	(0.0817)	(0.0722)
Ind_trust		-0.1596***	-0.0761***	-0.0850***	-0.0587**
		(0.0101)	(0.0225)	(0.0267)	(0.0256)
Interaction			-0.2355***	-0.2153***	-0.2831***
			(0.0580)	(0.07283)	(0.0696)
R^2	0.2524		0.2581	0.2581	0.2851

Significance level: *** p-value<0.01, ** p-value<0.05, * p-value<0.1. Robust standard errors in parentheses. Uncentered R^2 presented for IV-models.

5.1 OLS

5.1.1 Model 1 and 2

The initial model (*Model 1)*, including only country-level trust, estimates a negative and significant relation between country-level trust and SRH; a result that implies that individual health improves with increasing country trust. However, the effect of country-level trust differs when individual-level trust is added to the specification in *Model 2*. Country-level trust is no longer significant and changes from having a negative effect to now having a positive effect on SRH. In *Model 2*, individual-level trust displays a negative and significant relation with SRH. According to the results from *Model 2*, this implies that higher country-level trust dis-benefits health whereas individual-level trust (i.e. being a trustful individual) benefits health.

5.1.2 Model 3

Due to the differing results of *Model 1* and *2*, *Model 3* is extended by including an interaction variable. This makes it possible to observe interactions between the two levels of trust. Before the interaction variable is interpreted, the individual- and country-level variables will be commented upon.

The dummy variable *Gender* (simply indicating whether the respondent is a male (=1) or a female (=0)) displays a negative correlation with SRH, implying that male respondents have a higher probability of reporting better health than women. More specifically, they on average report a 0.0493 lower value on the SRH-scale than female respondents. In the same sense, the dichotomous variables *Relationship* (in registered relationship=1, or not=0) and *Employment* (employed=1, or not=0) display negative relationships with SRH. These results point to the conclusion that individuals who are in a relationship or are employed increase their probability of perceiving better SRH. Individuals who are in a registered partnership or who are employed on average report -0.0885 and -0.1821 lower values respectively on the five-point scale of SRH than those who are not in either a registered partnership or employed.

Concerning respondents' age, the results for *Model 3* show a positive relation with SRH; the probability of reporting poorer health increases with age. One additional year of age leads to a response 0.0345 higher on the five-point scale of SRH. The covariate of Age^2 measures to a

value of -0.00 (-0.0001748), which would indicate that up to a certain threshold, hence a certain age limit, additional years of age has a negative correlation of -0.0345 with one's health but after this certain threshold, the effect is declining. This means that, at older years of age, an individual's SRH is not affected to an equally large extent by additional years. Ergo, five years of additional age has a more notable effect on individuals' health when they are younger as opposed to when they have passed the age of for example 80.

Since low education is used as a reference group in the model, it is dropped from the regression. A negative relation between both middle education (-0.0762) and high education (-0.1314) is found with SRH. As individuals' educational level increase, the likelihood of reporting lower values on the five-point SRH scale increases, meaning that individuals with higher levels of education perceive better health than individuals with lower levels of education. As for low education, low income is also dropped since it is the reference group for middle and high income. The coefficient estimates for these variables measure to -0.1822 and -0.2867 respectively. These results imply that increasing income levels benefit the likelihood of reporting lower values on the SRH-scale. Henceforth, higher income levels benefit the individual SRH. Furthermore, the effect reveals to be increasing from medium to high levels of income, indicating that individuals with a high income have the largest probability of reporting very good health.

The estimate on the relation between the Gini-coefficient and SRH is positive and this signifies that if a country has more equal income distribution, individuals' SRH benefit from this. GDP/capita has a negative relation with individual SRH. This means that as GDP/capita increases in a country, individuals tend to report lower values on the SRH scale, indicating that they increase their self-perceived health status.

Concerning the estimates of social trust in *Model 3*, country-level trust shows a positive relation with SRH, estimating to 0.1577. In other words, higher aggregate levels of trust dis-benefit individual health. On the contrary, individual-level trust displays a negative relation to SRH. Individuals who are trustful on average report -0.0761 lower values on the SRH scale. However, in order to assess the net effect, the interaction variable needs to be taken into consideration.

The results imply that health is benefited for individuals who are trusting, and it is further benefited if the individual lives in a country with high levels of trust. However, for a distrustful individual, higher country trust instead shows to have a detrimental effect on health. Hence, if two individuals live in the same country with high country trust, where one is trusting as opposed to a second distrustful individual, the trusting individual will report even better health than the distrustful individual. If an individual instead lives in a country with low country trust, trusting individuals still report better health than dis-trustful individuals, although to a lesser extent than if in a country with high levels of country trust. Conclusively, being trusting still benefits your health in a country with low levels, although not to the same extent as in a country with a high level of trust.

As the results from this paper's OLS models now have been presented, the results found by Kim et al. (2011) should be recalled. What they suspected from their estimations after observing larger effects when applying instruments to instrument social capital, was that prior studies using conventional regression methods had in fact underestimated the effects of social capital on health. It was therefore of interest to investigate whether this effect would apply when using one of their instruments with new data or alternatively if this effect could be observed when applying a new instrument. The results from the two IV models will be presented below, including brief comments on tests of instrumental appropriateness and robustness checks.

5.2 IV

5.2.1 Model 4 and 5

The first model specified for the IV analysis replicates one of the two IV estimations Kim et al. (2011) present in their paper. *Model 4* is specified by applying CPI and the logarithm of population density to instrument aggregated social trust. Apart from the variables regarding social trust, the results for *Model 4* provided estimates vastly similar to those of the prior OLS estimation of *Model 3*. The signs of all covariates are in accordance with *Model 3* and there are only slight changes in the size of the measured effects. Concluding, this IV estimation shows that for the individual, being in a relationship and employed, having additional years of schooling, an increasing wage level and being trustful all benefit SRH. Regarding socioeconomic country-level specific factors, measured with GDP/capita and the Gini-

coefficient, they also have a beneficial effect on individuals' SRH, as they increase respectively decrease. Even here results indicate that increasing age dis-benefits health, although with a declining impact rate after a certain age limit. These effects thus seem to have a robust effect, further confirmed by the overall significance of the estimation.

The estimates for individual-level trust, country-level trust and the interaction variable do however differ in comparison to the previous models. The change that can be observed is that the effect of both country- and individual-level trust have increased, implying a stronger beneficial effect of individual trust on SRH, and a more pronounced dis-beneficial effect of country-level trust. These results are in accordance with the findings of Kim et al. (2011), which implies that a conventional OLS regression underestimates the effects of social capital on SRH. Regarding the interaction effect, it decreases from -0.2355 to -0.2153. The interaction between country- and individual-level trust has thus been estimated to somewhat decrease. This implies that higher country-level trust does not have as strong beneficial effect for trusting individuals in this specification.

Concerning validity of the instruments, with the results from the Kleibergen-Paap rk LM Statistic the null hypothesis is rejected stating that *Model 4* is underidentified, which implies that the instruments are valid (Kleibergen & Paap, 2006). The result however also rejects the null hypothesis of the Hansen J Statistic, which states that the overidentification restrictions are valid (Baum et al., 2003). The rejection thus raises concerns regarding the appropriateness of the selected instruments. This test result implies that there are improvements to be made on the selection of instruments.

Model 5 is the second IV-estimation, using a country's dependency ratio and social network density as instruments to instrument social capital. To summarize, all signs appurtenant with the variable estimates are unchanged for both individual and aggregate measures, and sizes of the estimated effect are in accordance with prior estimations. The main implications are thus unchanged. The changes to be observed are again to be found in the variables in the category of social trust. The effect of country-level trust has increased, whereas the effect of individual-level trust has decreased. The interaction effect has however increased. This implies that the beneficial effect of higher country trust is even more pronounced for trusting individuals than found in previous specifications.

Regarding the appropriateness of this specification, the results of the estimates are robust and highly significant. Further, by looking at the corresponding test statistics as for *Model 4*, outputs from the Kleibergen-paap rk LM statistic and Hansen J statistic reject underidentification but fail to confirm the validity of the instruments for *Model 5* (test outputs found in Appendix A, *Table 4*).

Differences between the OLS and IV models are found for the estimates of social trust on the individual- and country-level. Apart from the measured effects on social capital, the effects of remaining regressors are thus concluded to be robust.

5.3 Discussion of Results

In this study, country-level trust is estimated to have a negative causal relation with individual SRH. This complies with the results found by Subramanian et al. (2002). Opposite effects have been found in studies by Rocco & Suhrcke (2012) and Kim et al. (2011). The results for the coefficient estimates of the control variables are all consistent with the theoretical framework presented in Section 2.

The coefficient estimates for country-level trust has increased in size when comparing the results between the IV and OLS estimations. This observed change in the estimates might be an indication that the instrument has filtered a more genuine effect of country-level trust. The fact that the size of the estimates increase is in accordance with the results found by Kim et al. (2011). These findings state that the estimates found when using conventional regressions methods are likely to be prone to endogeneity biases, which underestimate the coefficient estimates. Based on these results, the argumentation that an IV analysis is a more appropriate method of choice than OLS is strengthened.

In accordance with previous research (Poortinga, 2006; Subramanian et al., 2002; Kim et al., 2011; Rocco & Suhrcke, 2012), a cross-level interaction between individual- and country-level trust is found to have a significant effect on individual SRH. The change that is observed for country-level trust between the OLS and IV models is not consistent regarding the interaction variable. In the first IV model (*Model 4*), the effect of the interaction variable has decreased. The second IV model however displays an increase in the estimate of the effect of the interaction variable. Results for the estimate of individual-level trust has a similar

outcome. However, this estimate has increased in *Model 4* and decreased in *Model 5* in comparison to the OLS estimate. As the interaction variable is the multiple of individual- and country-level trust, the variable is only partially instrumented. These observed instabilities raises concern to whether individual-level trust suffers from endogeneity, and in that case also should be instrumented in order to refine the analysis. However, since findings of this study correlate with those of Kim et.al (2011) regarding the instrumented variable country-level trust, the extension of the IV analysis with a new instrument contributes to confirm appropriateness of the instrumental validity. Hence, further instabilities are reasoned to primarily stem from the model specification and variables rather than a risk of weak instruments.

In comparison to Kim et al.'s (2011) IV analysis, other differences can be observed which can be argued to originate from different sources. This study uses a new data set, different model specifications and different covariates. As a large number of the explanatory variables are included as dummy variables there might be a risk that this has decreased their informative value. However, the external validity can be concluded to be considerably high due to compliance with results from previous research.

Although the results from this study show that an IV analysis may be a more appropriate choice of method than OLS, there are concerns to be raised regarding IV as well. The coefficient estimates from an IV estimation reflects the LATE-effect, which means it only measures the effect of compliers. In other words, IV estimates only measure the average effect of units that have changed their status induced by the instrumental variable (Angrist & Pischke, 2009). It is questionable what actually can be regarded as a complier in this study, and if the measured effect actually is appropriately represented by these compliers. Are compliers separated expediently amongst countries with the used instruments? It has been argued in the literature that LATE not necessarily is a reflection of the parameter of interest and it can therefore be problematic to actually build a reasonable interpretation upon IV estimates (Deaton, 2009; Heckman & Urzúa, 2009). Heckman and Urzúa (2009) argue that due to the LATE-effect, even valid instruments are not assured to actually identify the "right" effect in an estimation. Consequences of this can in fact lead to IV estimates presenting signs of their estimates in opposite direction than the true causal effect. Conclusively, with this reasoning, neither OLS nor IV methods can be argued to be the optimal approach for this research question.

6. Conclusion

The aim of this study was to estimate the contextual effects of social capital on individual SRH in 44 European countries using EVS data. Social trust has been used as an indicator of social capital in the OLS and IV models and two separate combined instruments have been used. The cross-level interaction between individual- and country-level trust has also been assessed.

From this study it can be confirmed that depending on the level of analysis and variables included in the model specifications, different conclusions can be reached and henceforth policies targeted towards increasing individual SRH will differ. For this study, when individual-level trust was not included in the model specification, country-level trust had a beneficial effect on SRH. In the following models, where individual-level trust and the interaction between individual- and country-level trust was included, the effect of the country-level trust variable was estimated to have a detrimental effect on SRH. However, the overall effect and interpretation of country-level trust on SRH is complex.

Previous research has argued that it is crucial to take cross-level interactions into consideration when specifying the model and the results of this study confirm this notion. The main intuition from the results of the interaction variable is that country-level trust benefits trusting individuals' SRH. Trusting individuals more often report better SRH in countries with high country-level trust in comparison to distrustful individuals. Moreover, as country-level trust increases, the beneficial effect increases for trusting individuals. For distrustful individuals the effect of higher country-level trust can be the opposite, i.e. it can have a detrimental effect.

These findings imply that policy actions targeted at increasing country-level social capital can both have beneficial and detrimental effects on SRH. This is crucial to take into consideration when deciding which policies should be implemented. In order to benefit from country-level social capital, individuals have to be trusting. In other words, it cannot be presumed that increasing country-level trust will benefit SRH; the downsides of social capital must also be accounted for. Distrustful individuals living in areas with high aggregate levels of social capital can feel rejected or ignored by the rest of society (Putnam, 2000; Subramanian et al., 2002; Poortinga, 2006), which can cause a reduction in SRH. These findings coincide with

theory describing the contextual effects of social capital on health; trust must be reciprocal in order to have an actual effect. Trusting individuals therefore have an increasing benefit from country-level trust, whereas distrustful individuals do not experience the beneficial effects and can instead feel excluded and therefore country-level trust can have a detrimental effect.

In future research, social capital should be analysed at different aggregate levels in order to further explore if the contextual effect of social capital on health differs depending on this. A more varied data set of countries is also suggested to be tested; different subsets of countries, for example developing and developed countries. Further, the findings of this study also give indications that social capital at the individual-level could be at risk of endogeneity. It is therefore suggested that individual-level trust also should be instrumented. Potential shortcomings with an IV approach, like the LATE-effect, have been brought to light and it is therefore also suggested that additional methods should be evaluated.

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Appendix A

Table 3 - Heteroscedasticity

Test	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Breusch Pagan		0.0000				
White's		0.0000				
Pagan-hall general					0.0000	

Table 4 – Instrumental Variables

Test	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Wu-hausman F test			0.3565			
Durbin-Wu-hausman			0.3563			
Kleibergen-paap rk				0.0000	0.0000	
Hansen J Statistic				0.0000	0.0000	

Table 5 – Descriptive Statistics

Variable	Frequency	Min	Max	Mean	Median	Std. Dev.
SRH	64993	1.0000	5.0000	2.3166	2.0000	0.958788
Male	65173	0.0000	1.0000	0.4432	0.0000	0.496771
Age	64904	14.0000	108.0000	46.6037	46.0000	17.78763
Age^2	64904	196.0000	11664.0000	2488.2960	2116.0000	1763.223
Relationship	64758	0.0000	1.0000	0.5628	1.0000	0.496044
Employment	64920	0.0000	1.0000	0.5110	1.0000	0.499883
GDP/Cap	65185	591.3235	54881.9800	13894.7500	8041.9750	13406.59
Gini	44660	23.4000	37.7000	29.5631	29.8000	4.004264
Inc_med	65185	0.0000	1.0000	0.2946	0.0000	0.45587
Inc_hi	65185	0.0000	1.0000	0.2396	0.0000	0.42684
Edu_mdl	65185	0.0000	1.0000	0.4610	0.0000	0.49848
Edu_up	65185	0.0000	1.0000	0.2361	0.0000	0.424686
Country_trust	65185	0.0890	0.7498	0.2968	0.2705	0.158857
Ind_trust	65185	0.0000	1.0000	0.2968	0.0000	0.456852
Interaction	65185	0.0000	0.7498	0.1133	0.0000	0.201353
CPI	65185	1.9000	9.3000	5.4526	5.0000	2.178355
Pop_ density	65185	3.1662	1287.3440	142.7560	100.3633	196.7174
Dep_ratio	65185	37.9094	53.5646	46.1410	47.1042	4.159439
SND	65185	0.0747	0.9244	0.3674	0.2842	0.212432

Table 6 – Correlation matrix (Dummy variables excluded)

	Age	Age^2	Ind_rust	Country_trust	GDP/Cap	Gini	Interaction
Age	1						
Age^2	0.9829	1					
Ind_trust	-0.0223	-0.0293	1				
Country_ trust	-0.0039	-0.0131	0.3548	1			
GDP/Cap	-0.0487	-0.0489	0.2348	0.6634	1		
Gini	0.0194	0.025	-0.1255	-0.3532	-0.33	1	
Interaction	-0.0098	-0.0208	0.8734	0.6282	0.3921	-0.2428	1

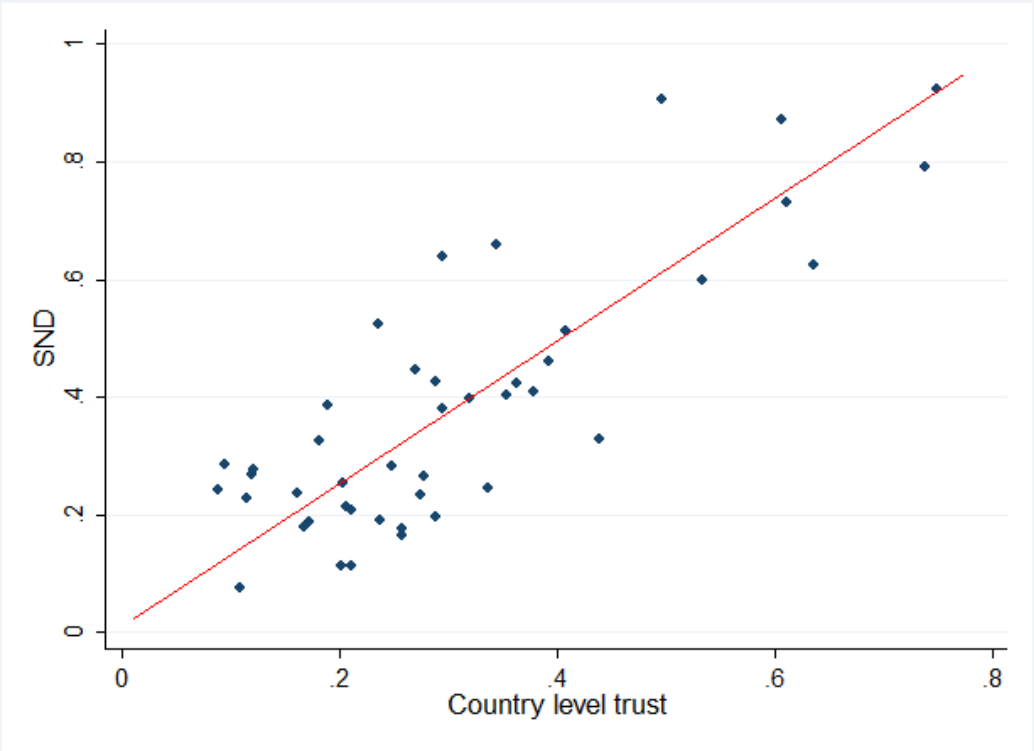
Appendix B

Countries included in the data set

1. Albania
2. Armenia
3. Austria
4. Azerbaijan
5. Belarus
6. Belgium
7. Bosnia-Herzegovina
8. Bulgaria
9. Croatia
10. Cyprus
11. Czech Republic
12. Denmark
13. Estonia
14. Finland
15. France
16. Georgia
17. Germany
18. Great Britain
19. Greece
20. Hungary
21. Iceland
22. Ireland
23. Italy
24. Latvia
25. Lithuania
26. Luxembourg
27. Republic of Macedonia
28. Malta
29. Republic of Moldova
30. Republic of Montenegro
31. Netherlands
32. Norway
33. Poland
34. Portugal
35. Romania
36. Russian Federation
37. Serbia
38. Slovak Republic
39. Slovenia
40. Spain
41. Sweden
42. Switzerland
43. Turkey
44. Ukraine

Appendix C

Scatter plot 1 - SND against Country_trust



Scatter plot 2 – Dep_ratio against Country_trust