Master Thesis

Generalized trust and happiness – an instrumental variables analysis for 33 Eurasian countries

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Abstract

Happiness has always been the domain of philosophy and psychology, but since the 1970s happiness has become a topic of interest to economists as well. To traditional economists, utility refers to people's preferences over goods and services. The implicit assumption being that maximizing utility will make people happy. The economics of happiness considers utility in a perspective that observes happiness directly, often using data based on large-scale social surveys. In these surveys people are asked the following (or a similar) question: "Taking all things together, how happy would you say you are?". Several factors have been associated with happiness, such as income and health. In this research I investigate the association between generalized trust – the trust people have in strangers – and happiness. The rationale behind such association is that not trust frees you from the cost of having to deal with risk and uncertainty. For this research I used a dataset that was compiled on the basis of primarily the European Social Survey (2002-2011). The dataset contains data on generalized trust and self-reported happiness, as well as on several other socio-economic variables. The dataset covers 33 European countries, including Turkey and Russia. Using Ordinary Least Square (OLS) regressions I show that there is indeed a strong and statistically significant relationship between generalized trust and happiness. However, research on generalized trust and happiness is plagued by endogeneity. In order to increase the robustness of my findings, I perform additional regressions – 2-Stage Least Square (2SLS) regressions, also called Instrumental Variable (IV) regressions. The 2SLS regressions use so-called instrumental variables to estimate the independent variable of interest (in this case, generalized trust). This estimate is consequently used to estimate the dependent variable (in this case, happiness). Using 2SLS regressions the endogeneity problem is mitigated. The results of the 2SLS confirm the results obtained with OLS regressions, yet are dependent on the exact model specification.

Introduction

Happiness has historically not been the domain of economists. Instead, it has been the domain of philosophy and psychology. In contrast to philosophy, psychology has focused mainly on negative states of well-being, i.e. unhappiness. Many books and articles have been written about misery people experience, yet since the 1980's psychologists have increasingly researched positive states (Myers and Diener, 1995). Different scientific disciplines have their own names for happiness. Judging by the number of papers being published, since the early 1980s *happiness*, *well-being* and *quality of life* have received more and more attention, especially among epidemiologists and researchers in the field of medicine (Gill TM and Feinstein AR, 1994; Guillemin et al., 1993). Although not always the exact same thing is implied, in many ways the concepts of well-being and quality of life are similar to what economists refer to as happiness.

The economics of happiness is concerned with happiness in relation to socio-economic factors. Economists have traditionally based a country's prosperity on economic factors alone, such as Gross Domestic Product (GDP) and GDP per capita, yet such a simple, one-dimensional representation ignores the widely acknowledged belief that there is more to prosperity than just money. Besides money, our prosperity is reflected in our enjoyment of everyday life and cognitive evaluations of our lives. The scientific subfield of economics of happiness considers utility in a broader scope than traditional economics does, thereby touching on the domains of psychology and sociology. The economics of happiness is characterized by the predominance of quantitative research, primarily based on social surveys. Happiness data is thus usually self-reported.

The average self-reported happiness varies greatly per country (Diener et al., 2010; Inglehart et al., 2008). For instance, the Scandinavian countries score very high in every single survey (Delhey and Newton, 2005; Inglehart et al., 2008), while Mediterranean countries are infamous for consistently scoring low (Veenhoven, 1993). The European Social Survey (ESS) data used for the research described in this thesis covers most European countries. According to this dataset the Scandinavians are indeed happy folk, as the happiest countries are – in descending order: Iceland, Denmark, Switzerland, Finland, Norway, Sweden, Netherlands. Mediterranean countries do seem to score somewhat lower than countries in the north and west of Europe, yet at the bottom of the range we find the countries Bulgaria, Ukraine, Turkey, the Russian Federation and Romania.

What are the factors causing these cross-national differences in happiness? In the context of economics of happiness, many factors have been associated with happiness. The first to be associated with happiness, is income. In conventional economics, maximizing utility is equivalent to maximizing economic performance. The underlying implicit assumption is that increases in income make people happy. Intuitively, it makes sense. When Easterlin (1974) put this assumption to the test, the economics of happiness emerged as a subfield in the scientific domain of economics. Easterlin found that within a given country, money makes people happy – which was to be expected – but more interestingly he found that relative income level within countries is more strongly correlated with happiness than absolute income levels. This phenomenon has been dubbed Easterlin's Paradox (Clark et al., 2008; Dixon et al., 1997; Easterlin, 1995). Subsequent research in the field of economics of happiness has taught us that income does indeed not tell the whole story (Oswald, 1997). Although at an individual level happiness increases with income level, at an aggregate country level the effect of income on happiness levels off when the income passes a fairly moderate level (Bjørnskov, 2008). That happiness and economic performance are not necessarily synonymous, is nicely illustrated by the fact that since World War II per capita real income has risen quite dramatically, yet happiness has remained at more or less the same level (Frey and Stutzer, 2002). This suggests that besides economic factors, happiness may be explained by non-economic factors as well. Other factors that have been associated with happiness are employment status, social relationships and (Dolan et al., 2008).

In the current research I focus on the relationship between happiness, and the trust people have in strangers, so-called generalized trust. Generalized trust is *"The belief that others will not deliberately or knowingly do us harm, if they can avoid it, and will look after our interests, if this is possible"* (Delhey and Newton, 2005). The rationale behind a possible association is that people who in general trust that others will look after our interests, have fewer concerns about the risk and uncertainty of the kind that those people who are less trusting have to deal with (Helliwell, 2001). According to the ESS dataset, the countries with the highest levels of generalized trust are Denmark, Norway, Finland, Iceland, Sweden, the Netherlands and Switzerland. These countries evidently are the same countries as those that score highest on happiness. According to the data the least trusting countries are Turkey, Bulgaria, Greece, Romania, Portugal and Poland. Although the overlap is not as evident as it

is in the case of the happiest and most trusting countries, Turkey and Bulgaria are among the lowest scoring countries with respect to both trust and happiness.

How are trust and happiness related? People do not live in a vacuum. Trust is a requirement for social interaction between people, and social interaction is required to make societies work. Greater generalized trust is associated with better functioning societies, societies that have good institutions (Helliwell and Putnam, 1995; Knack and Keefer, 1997). Such societies are characterized by low levels of corruption (Mauro, 1995; Rothstein, 2010), high economic growth and productivity (Knack and Keefer, 1997; Mauro, 1995) and low unemployment (Rodrik, 2000). Well-functioning societies in turn are associated with greater happiness (Bjørnskov, 2008; Veenhoven, 1993). The relationship between interpersonal trust and happiness has not been studied very extensively, but the literature thus far suggests that there is a positive relationship between the two (Bjørnskov, 2008; Dolan et al., 2008; Helliwell, 2003; Putnam, 1995). It remains unclear if there is a direct relationship between the two, or that the associations that are found are the result of confounding variables, i.e. variables that are related to how well societies function and to the quality of their institutions, thus possibly affecting both happiness and trust. Another possible confounder is that trust may bring with it externalities. Living among trusting people may have a positive effect on one's own happiness (Bjørnskov, 2008). In the current study I treat trust in a similar fashion, considering it as a public good.

These possible confounders are reasons why research on the association between happiness and generalized trust is often plagued by endogeneity. Endogeneity is a problem that arises when variables in the model are correlated with the error term. An important contribution of this research resides in the fact that I use instrumental variable regressions in order to tackle the problem of endogeneity. Another unique contribution of the current research is that the relationship between happiness and generalized trust has not been researched on the basis of the specific dataset that is used for this research.

Using a dataset that covers 33 European countries, including Turkey and Russia, Ordinary Least Square (OLS) regressions are performed to show that there is indeed a strong and statistically significant relationship between generalized trust and happiness. However, research on generalized trust and happiness is plagued by endogeneity. In order to increase the robustness of my findings, I perform additional regressions – 2-Stage Least Square (2SLS)

regressions, also called Instrumental Variable (IV) regressions. The 2SLS regressions use so-called instrumental variables to estimate the independent variable of interest (in this case, generalized trust). This estimate is consequently used to estimate the dependent variable (in this case, happiness). Using 2SLS regressions the endogeneity problem is mitigated and the robustness of the association is increased.

Theoretical framework

In this section I will first discuss the theoretical background of happiness, followed by a discussion of trust. Then I will discuss the association between generalized trust and happiness.

Happiness

Happiness is – and has always been – one of the main subjects discussed by philosophers. Nevertheless, there is no clear-cut answer to the question what happiness actually is. In ancient Greece happiness was studied by Socrates, who regarded Eudemonia – often translated as happiness – as the greatest gift the gods might give to men (Vlastos, 1985). Similarly, Aristotle assessed happiness by reflecting on life. Philosophers in ancient Greece generally argued for people to live a 'good life', pursuing one's own happiness while also behaving morally in relation with other people. There were also those who put more emphasis on personal enjoyment. One example are the epicureans, who had a more hedonistic outlook on life. They advocated the importance of pleasures, but also emphasized the avoidance of pain of body and soul (Helliwell, 2003).

In post-enlightenment Western Europe – in the year 1789 – Jeremy Bentham coined the now famous phrase "the greatest happiness for the greatest number" (Burns, 2005; Jeremy Bentham, 1879). The phrase refers to what Bentham called utility, the concept that stood at the basis of the utilitarian philosophy. Bentham's notion of utility refers to 'pleasure' and 'pain', as the things that determine what we should do, and the things that determine what we will actually do (Kahneman et al., 1997). Many economists of Benthams time and thereafter can be considered to be utilitarians, such as Edgeworth, Jevons and Wicksteed (Dixon et al., 1997). To them, utility was a particular state of mind that might someday be measured. Bentham thought that it should be possible to somehow define utility quantitatively. However, Bentham's notions of utilitarianism have never really caught on with economics, one reason being that in actuality utility has always been very difficult to measure. Therefore, utilitarianism has since gone out of fashion somewhat among economists (Holländer, 2001).

From the perspective of modern day economists, utility refers to decisions people make to best suit their own needs – utility is inferred from the choices people make, and in turn utility is used to explain people's choices (Kahneman et al., 1997). Utility is the thing people will try to maximize, and thus by observing what decisions they take, it can be inferred what their

utility is. Utility and happiness may not be the exact same thing per se, but they are clearly very similar and related (Clark et al., 2008). Although Benthamian utility has always been a very elusive concept, that could not be measured directly, quantifying it is now within our grasp.

Subjective Well-Being (SWB) is usually measured by means of questionnaires, and thus it is self-reported. SWB is used more and more by economists as a measure of happiness. As researchers have now found a way to proxy utility by asking them questions, Benthams concept of utility has come to the fore again (Dixon et al., 1997; Loewenstein and Ubel, 2008). Since Easterlin, the economics of happiness has become a 'hot' topic, as evidenced by the progressively increasing size and depth of the field (Kahneman and Krueger, 2006). Through the years datasets have increased in quality and number, with data being gathered in many countries around the world by universities and governmental organizations.

In their systematic review of evidence relating how a range of personal, economic and social factors are associated with happiness, Dolan et al. (2008) discuss the most researched variables. They have included in their review only those studies that rely on analysis of large datasets. Weighing of papers was done on the basis of their quality. Dolan et al. focus mainly on papers published in economics journals, but some key research articles and reviews in psychology journals were also included, as well as some unpublished work. According to their review poor health, separation from a partner, unemployment and lack of social contact have a strong negative effect on happiness. Other variables that are often linked to happiness are income, age, gender, ethnicity, personality, education, the type of work, hours worked, commuting, exercise, religious activity, attitude to circumstances, political persuasion. According to Dolan et al.'s review the results for these variables were less consistent or strong. In some cases the evidence is contradictory, in others the relationship found is likely to be attributable to unobserved confounding variables.

It is important to note that Dolan et al. considered research that covered diverse units of observation. Some of the research included in the review are on the individual level, some of it is at a regional level. Inglehart et al. (2008) researched happiness at the country level. They used large time-series datasets derived from the World Values Survey and the European Values Survey, covering the period from 1981 to 2007. According to their research, the level

of economic development was strongly associated with happiness. Other associated variables were religion, tolerance of out-groups, and a society's level of democracy.

Generalized trust

Social capital refers to norms and networks that enable collective action and cooperation (Woolcock and Narayan, 2000). Social capital encompasses communication, social interaction, the forming of relationships, social norms and customs. In order for people to cooperate with each other, it is required that they trust each other. Trust is therefore an absolute requirement in order to build social capital and in order for people to cooperate. Knack and Zak (2001) show that interpersonal trust indeed has an impact on economic growth and that sufficient trust is necessary for economic development.

Social scientist often distinguish between many kinds of so-called particularized trust, such as thick trust, interpersonal trust and institutional trust. Thick trust is the trust we have in the people that are close to us, such as family and friends. Interpersonal trust is the trust we have in people with whom we interact spontaneously or in those non-kin people we meet occasionally. Institutional trust refers to the trust we have in institutions such as government, politicians, police and other public services. Besides particularized trust, social scientists also distinguish generalized trust.

Generalized trust is the trust we have in strangers in general. We tend to trust people who are very much like ourselves, yet generalized trust requires a leap of faith, especially so because there are those quite unlike ourselves among those strangers. Generalized trust is important because it makes people more tolerant of minorities and those with different views and beliefs. People who are of the opinion that most strangers can be trusted tend to give more to charity and show more civic engagement. Countries in which generalized trust is high have better governments, less corruption and usually have a more equal wealth distribution (Rothstein and Uslaner, 2005; Uslaner and Brown, 2005).

But why should we trust strangers? If I were a completely rational actor, I would trust only to increase my own utility. I would trust another actor only if I believed that the other actor would have an incentive to act according to my expectations in a particular exchange. If the particular circumstances of the exchange were to change, the other actor may no longer have

the right incentives to act in accordance with my expectations, and it might no longer be warranted for me to trust him. This kind of trust is a form of particularized trust, pertaining only to particular actors under quite specific circumstances, on the basis of specific knowledge one has about the incentives of the other actor.

Trust is a requirement for cooperation and the forming of social capital, yet if each actor were to only pursue his own interests, can we really trust the other actor? Information about the other actor's incentives is always lacking or incomplete. Having to acquire this information for each exchange would significantly increase transaction costs, thus inhibiting cooperation (Rothstein, 2000). However, it can be argued that even in the case of uncertainty, it can be beneficial to trust others. For example, actors who play the *trust game* usually have an incentive to misuse trust, as in most forms of the game misusing trust would maximize their own utility. Yet in order to maximize their collective utility, the actors usually would have to work together. If the *trust game* were to be played only once, misusing trust would be the dominant strategy, because that would lead to the highest utility. However, if the game is to played multiple times, the best strategy usually is to trust the other actor in the first instance the game is played and to reward or punish the other actor's trust in each consecutive game. It can thus be argued for a rational actor to put trust in a stranger. This kind of trust is sometimes called strategic trust, or calculating trust (Delhey and Newton, 2005).

Rothstein (2000) takes this line of thinking a bit further, as he argues that a 'theory of collective memory' may fill the gap between the game theoretical explanation of cooperation and the theory of social capital. In his now famous work, Putnam (1995) argues that a decline in social capital – and trust in particular – may be a threat to democracy, the quality of schooling the quality of public institutions and to the quality of life as a whole. Putnam's work has spurred increased attention for trust among social researchers and economists. In contrast, these ideas about strategic trust and the fact that trust is a requirement for social capital to arise, combined with the theory of collective memory, led Rothstein to argue that the causal relation may well point in the other direction: better government might cause people to become more trusting. This view is supported by Sobel (2002), among others.

Economists have traditionally measured trust by means of experiments, such as the *trust game* or the *investment game*. The weak point of experiments is that external validity is limited (Bjørnskov, 2007; Nannestad, 2008). In order to acquire data with better external validity,

generalized trust is therefore often measured by means of questionnaires – as is the case with happiness. Surveys such as the European Social Survey (ESS), the General Social Survey (GSS) and the World Values Survey (WVS) measure generalized trust by asking 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?*". The validity of this measure of generalized trust has been questioned by some researchers, who argue that the question is open to personal interpretation, which – they argue – leads to noise (Nannestad, 2008). However, trust as measured by surveys does appear to correlate well with some factors that are logically related to trust. For instance, generalized trust as measured by means of surveys correlates with the outcomes of common economic experiments, such as the *trust game* (Glaeser et al., 2000). Also, in an experiment done in several cities around the world self-reported generalized trust appears to be a good predictor of the number of deliberately 'lost' wallets returned with their contents intact (Glaeser et al., 2000; Knack and Keefer, 1997). In quantitative research based on large datasets, generalized trust has been found to correlate with the prevalence of corruption (Uslaner, 2009), economic inequality (Knack and Keefer, 1997; Rothstein and Uslaner, 2005; Uslaner and Brown, 2005) and violent crime (Lederman et al., 2002).

According to Bjørnskov (2007) only few variables can be reliably linked to generalized trust. He too finds income inequality to correlate with generalized trust, as well as ethnic diversity, having previously been a communist country, Protestantism and having a monarchy. He also stresses that endogeneity can be of great significance in this kind of research. Nannestad (2008) actually takes it one step further, questioning if we have learned anything at all from research on generalized trust yet. He states that there is a great deal of ambiguity involved, as different research articles report contradictory results. Although there clearly is a relation between generalized trust and factors relating to income and income distribution, it remains difficult to tell in which direction the arrows of causality point. He too stresses that endogeneity has a very large role to play in this kind of research: generalized trust is high in certain countries in which there is a complex of concurrent social, political and economic conditions – appealingly dubbed "The Nordic Syndrome" by Delhey and Newton (2005), as these conditions particularly pertain to the Nordic countries. Therefore Nannestad strongly suggests more rigorous robustness analysis in the case of survey-based research, as well as systematic replication of research in order to assess the validity of the associations found.

In an expert review article Helliwell (2006) shows that social trust is positively associated with happiness and life satisfaction. Similarly, Bjørnskov (2003) concludes that social capital may be an important factor explaining why some countries are happier than others. In his (2007a) article Bjørnskov purports that social capital – comprised of measures of generalized trust, civic participation and perceptions of corruption – is robustly and positively associated with life satisfaction. In contrast, tests with several different samples, model specifications and variable proxies have led Ram (2010) to conclude that the association between generalized trust and happiness is extremely fragile. However, according to a systematic review by Dolan et al. (2008) the association between social capital and happiness is very strong: a 10% increase in the score for social capital has the same effect on happiness as a halving of inflation or an increase in per capita income of 25%. However, Dolan et al. stress that the risk that the association between generalized trust and happiness as often found is due to endogeneity, is real. The association between the two does not pass every test of robustness, let alone that it is possible to find a causal relationship between the two (Helliwell, 2003).

The endogeneity problem

Understanding the causal nature relationships, can be beneficial to policy makers. Yet when it comes to generalized trust, scientists struggle to reliably identify them. In his book, Putnam (2000) famously remarked that "the causal arrows among civic involvement, reciprocity, honesty, and social trust are as tangled as well-tossed spaghetti", referring to the fact that "all-round good citizens", who are trustworthy and involved in community life generally are more trusting than those who are not. Relationships involving trust in general are plagued by endogeneity problems. Nannestad (2008) mentions several examples of variables that are associated with trust, but where the direction of a causality is unclear: corruption, the well-fare state and a nation's wealth may all both explain trust, as well as be explained by trust.

But what is causality? If X and Y are not merely correlated, yet there is a causal relationship, then the following conditions must be met: X must precede Y in time, the relation may not be explained by other causes, the correlation is not due to chance and the relation remains constant in direction and over time (Granger, 1980). The most straight-forward way to find causal relationships is by employing randomized experiments. In experiments randomization guarantees that at the start of the experiment the treatment group and the control group are interchangeable. This allows us to see the counterfactual, i.e. what would have happened to the treatment group if they would not have received the treatment and – vice versa – what would have happened to the control group if they would have received the treatment. Randomization renders the occurrence of significant confounding highly unlikely. However, in the social sciences experiments randomization is often not feasible, forcing researchers to rely on survey-based data (Antonakis et al., 2010).

A disadvantage of survey-based research, is that the data on many different parameters are usually gathered at the same moment in time. It is therefore very difficult to guarantee that X precedes Y in time. In survey-based research on generalized trust, relatively simple statistical tests such as the ordinary least squares (OLS), probit and logit are most commonly used (Nannestad, 2008). When using such methods, endogeneity may lead to both overestimation, as well as underestimation: both the magnitude and the sign of the effect could be wrong, rendering a test in the face of endogeneity practically worthless (Antonakis et al., 2010).

In the discussion of their papers, social scientists often mention possible endogeneity as one of the limitations. What does this mean? In order for the statistical tests to yield reliable

results, the independent variables may not be correlated with the error term. If the independent variable is in actuality correlated with the error term, they are endogenous. Endogeneity is often caused by missing variables. Other possible causes are simultaneity, common-method variance and measurement errors. In the event of endogeneity, the results of statistical tests will be biased and the strength of the relations may be either overestimated or underestimated. In order to reliably test for endogeneity, datasets with long time-series data are required, yet these are not very common in the case of data regarding generalized trust. An examination of three leading studies with respect to trust has led Durlauf (2002) to argue that endogeneity and other estimation issues render quantitative research on trust too vague to enable the precision and clarity that matches the standards in the scientific field.

There are however tests that allow so-called quasi-experimentation; statistical tests that have some of the properties of an experiment (Antonakis et al., 2010). One such test is the two-stage least squares (2SLS) – or instrumental variable regression – which may actually give valid and consistent outcomes in the presence of endogeneity (Nannestad, 2008). The name of the 2SLS refers to the fact that the analysis incorporates two steps: a first step in which the instrument or instruments are used to estimate the independent variables; and a second step that uses the estimate of the independent variable to estimate the dependent variable (see figure 1). By using instruments to estimate the independent variable, correlation of the independent variable with the error term is mitigated. That is because proper instruments are exogenous, and thus not logically correlated with the dependent variable. Therefore, the effect a confounding variable may have on the independent variable, is circumvented: the estimation of the independent variable is done on the basis of the exogenous instruments exclusively. An instrumental variable may thus both help in the presence of endogeneity and possibly also be used to find the direction of causality.

The 2SLS estimator may be a reliable estimator in the presence of endogeneity due to simultaneity, omitted variables, common-method variance or measurement error. An instrumental variable is directly related to both the independent variable and the dependent variable, yet more strongly with respect to the former than the latter. In comparison to OLS estimator the 2SLS estimator sacrifices efficiency for consistency (Antonakis et al., 2010). Lower efficiency means that the 2SLS estimator requires a greater number of observations for the same statistical power. Greater consistency means that if the number of samples of the population increases, the 2SLS estimator is more likely to converge to the actual value of the

parameter that is being estimated. The 2SLS estimator uses an instrumental variable that only affects the dependent variable through the effect it has on the independent variable. In this specific case that would be a variable that affects happiness through generalized trust. The 2SLS estimator is therefore a quite conservative estimator. The instrument or instruments are used to estimate the independent variable (X), the estimate is subsequently used to estimate the dependent variable (Y).

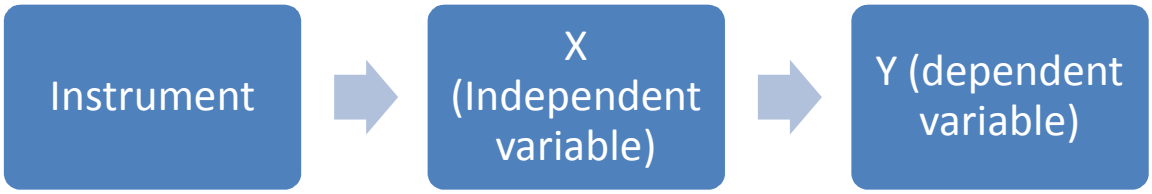

Figure 1: Schematic rendering instrumental variable regression

A good instrument is correlated with the possibly endogenous independent variable (X), for reasons that can be explained and verified. There may be no clear correlation between the instrument and the dependent variable (Y), other than the correlation which is explained by the relationship between the instrument and the endogenous regressor (Angrist and Krueger, 2001). The second criterion is that the instrument is not correlated with the error term. If the instrument is truly exogenous and unrelated to Y, and if the relationship between X and Y is very strong, the results can be interpreted as a causal relationship (Antonakis et al., 2010). Truly exogenous variables are rare. They are often associated with natural experiments, such as when there is an inadvertent policy change, one that could not have been anticipated, and that only directly affects the independent variable, but not the dependent variable (Besley and Case, 2000). In the specific case of this research, variables are required that have a direct effect on generalized trust, yet the instrument should not be associated with happiness too

strongly. Also, the instrument itself may not be endogenous. Variables that satisfy these criteria can be used as instrumental variables.

Hypotheses

Previous research has suggested that there is a relationship between self-reported generalized trust and self-reported happiness. In this research I aim to find additional evidence for this relationship. In order to do that, I perform ordinary least squares (OLS) regression analysis on pooled cross-sectional data from the European Social Survey (ESS). A unique contribution of this research is that – in so far as I am aware – these data have not been used before to study the relationship between generalized trust and happiness. An important advantage to some other research is that both the data on happiness, as well as the data on generalized trust have been extracted from the same data source. Also included in the model are control variables that have been shown to be of influence by previous research, as well as some other variables that are available in the dataset and that I expect might have an effect on the association.

The first hypothesis is [that]: "*There is a positive association between generalized trust and happiness*".

Research concerning the association between these two variables is plagued by endogeneity (Bjørnskov, 2007a; Nannestad, 2008). In order to mitigate the risk of endogeneity affecting the results, I will perform additional regressions with an instrumental variable. Instrumental variable analyses can be used to get consistent results, even if the explanatory variable of interest (generalized trust, in this case) is correlated with the error term, such as is the case when there is reverse-causality, or if important explanatory variables are missing in the model.

The second hypothesis is [that]: "*There is an association between generalized trust and happiness, also when we explicitly model for an endogenous relationship between generalized trust and happiness*".

Identifying potential Instrumental Variables

In the theoretical framework I have discussed generalized trust as an independent variable, yet in the context of finding possible instruments, generalized trust is considered as a dependent variable. On the basis of a literature research, I identified the following variables as candidates for possible use as an instrumental variable: years of education, urbanization, religiosity, Protestantism and average temperature in the coldest month of the year. In the following section each of these candidates will be discussed. The suitability of these variables as instruments will be assessed by; verifying if the variables are correlated with generalized trust and whether the correlation can be explained; verifying that the variables are not , or at least not strongly associated with happiness, and by; verifying if the correlation of the variable and the error term of the regression is unlikely. If the latter is the case, you would introduce exactly the thing an instrumental variable regression is supposed to solve, endogeneity. However, exogeneity of the instrumental variable is difficult to verify with certainty.

Years of education

Knack and Zak (2003) point out that trust is positively related to economic growth. Therefore they investigated how policy makers could increase trust. Their research shows that education affects trust directly, yet also indirectly: education improves institutional quality and reduces inequality in society, both of which lead to an increase in trust. Knack and Keefer (1997) argue that the educational system makes people more informed, enables them to better judge information and makes them better able to judge the results of their own and other people's actions – which in turn, they argue, would make educated people more trusting.

In their systematic review on the determinants of happiness Dolan et al. (2008) find that there likely is a relation between education level and happiness, yet the results of several studies appear to be quite ambiguous. Also, the effect of education level tends to be negated if control variables such as health and income are accounted for – a sign of possible multicollinearity between these three variables. Even though there are indications that education level is associated with self-reported happiness, because the association is quite ambiguous, education level may still be a reasonable instrument to try in the model, as long as variables related to health and income are included as control variables. A possible effect of

multicollinearity is a misleading inflation of the standard errors, which may lead to an unjust conclusion that generalized trust is not significantly associated with happiness.

Urbanization

According to Delhey and Newton (2005) there are both theories to explain a decline in trust as a society modernizes, as well as theories explaining why trust is actually a driving force behind urbanization. In their paper the authors cite evidence in support of both theories. According to the first theory modernization goes hand in hand with individualization, which is thought to alienate people from each other. According to the other line of theory, modern societies are marked by a greater division of labor and more cooperation. Trust is a requirement for both, and thus – it is argued – that modern societies are more trusting. Delhey and Newton find support for this latter theory.

According to Glaeser et al. (2000) there are few variables as strongly related to the level of development of a country as urbanization. Urbanization is a key characteristic of modernization. Rural societies are usually small communities, which are characterized by thick trust. They are known to display relatively low levels of generalized trust. Large urban societies, on the other hand, actually tend to have relatively high levels of generalized trust, which is required for complex social networks and institutions. In accordance with this, De Bliek (2013) finds that urbanized countries have higher rates of generalized trust than countries that are less urbanized. Additionally he argues that generalized trust levels are to a large extent dependent on a country's phase urbanization. Not only does he find evidence that urbanized countries have higher rates of generalized trust, he also finds that countries that are in a state of increasing urbanization have lower generalized trust. This may be explained by the fact that fast urbanization is associated with unemployment, bad infrastructure, general social unrest and high crime rates.

Not a lot of research has been done on the association between urbanization and happiness. Berry and Okulicz-Kozaryn (2011) find greater happiness levels in rural regions in the United States, in comparison to the happiness levels in cities. They cite several possible explanations: the fact that immigrants – who are generally less fortuned than natives – continue to migrate into cities; the fact that a comparatively large percentage of people living in cities are black Americans, who carry the weight of a history of inequality and discrimination; the collapse of many older American cities, related to the American ideal of low-density living and

persistence of cultural differences. Easterlin et al. (2011) on the other hand find that in less developed countries urban life satisfaction tends to be higher, yet the effect can be attributed to economic factors and education. In developed countries the higher life satisfaction in urban regions is not observed, there are actually indications that the opposite might be true. All in all, the relation between urbanization and happiness is somewhat ambiguous. If there is a relation in either positive or negative direction, it does not seem to be a very strong one. Although it might not be a perfectly exogenous instrument, the relation between generalized trust and happiness appears to be weak and ambiguous. Therefore I think it is justified to try urbanization as a potential instrumental variable.

Protestantism

Other possible instruments are both religiosity and Protestantism. It can be argued that religiosity on the one hand leads to more thick trust – which is required for social interaction within a relatively small religious community – and on the other decreases the trust in strangers. Using data from the Gallup World Poll, spanning 109 countries and 43 U.S. States, Berggren and Bjørnskov (2011) indeed find a negative relation between religiousness and generalized trust. This effect is stronger in countries with more religious diversity. Because they use data on a great number of countries, the risk of bias of one specific religion is minimized in comparison to some other research. Interestingly, Protestantism is thought to have a positive effect on generalized trust. The rationale behind it – originally conceived by Max Weber, and described in his book *The Protestant Ethic and the Spirit of Capitalism*, published in 1905 – is that Protestantism is associated with working hard and being reliable, for both of which social capital is required. Therefore Protestantism is thought to increase social capital and generalized trust. The association between Protestantism and generalized trust is convincingly supported by empirical research (Bjørnskov, 2007a; Delhey and Newton, 2005; Uslaner, 2009; Welch et al., 2007).

There appears to be a positive association between religiosity and happiness, however the relation generally appears to be rather week (Clark and Lelkes, 2009; Eichhorn, 2011; Kahneman and Krueger, 2006; Soydemir et al., 2004). Using data from 1972–1996 General Social Survey Cumulative File, Ferriss (2002) reports that in the United States religiosity shows a positive relation with happiness, yet he finds no meaningful differences between specific religions. As far as I have been able to find, there is no literature that says Protestantism in particular has a specific association with happiness, that cannot be explained

by religiosity in general. Therefore Protestantism could be used as an instrument to estimate generalized trust. Since religiosity appears to be associated with happiness, it may not be a good instrument.

Temperature

Bergh and Bjørnskov (2011) use the temperature in the coldest month as an instrument for generalized trust. According to them, temperature has been used as an instrument for generalized trust previously. They don't cite a source, however. Nevertheless, country-level generalized trust has a strong historical component. Using climate data for the period from 1500 to 2000, Durante (2009) finds clear associations between climate and generalized trust. His findings support the theory that trust developed in harsh preindustrial times as a result of the necessity of cooperation in order to survive. In preindustrial times climatic uncertainty had a more profound effect on food production than it has in modern societies. In order to cope with the effects of climatic uncertainty, people had to work together and form so-called mutual insurances. Although the mutual dependence as a result of climatic uncertainty no longer plays any significant role in modernized societies, these social patterns have persisted over time. Durante finds that generalized trust is higher in regions with more spatially heterogeneous precipitation. The findings are stronger with respect to historical data than they are with respect to more recent variability.

Rehdanz and Maddison (2005) seem to be the first to research the relation between climate and happiness. Using pooled time-series data from the World Database of Hapiness, they find a positive association between average temperature in the coldest month and happiness. However, figure 1 in their paper shows a scatter plot of average temperature versus happiness, which clearly demonstrates significant heteroskedasticity. Besides that, observations are repeatedly drawn from the same country. In order to control for this latter fact, Rehadnz and Maddison rightfully chose to cluster standard errors at the country level. They argue that this should sufficiently deal with the problem of heteroskedasticity as observed. But does it in this case? Also, in their data Eastern European countries tended to be the coldest. The fact that these countries are also former communist countries, may have a confounding effect. Although the research performed by Rehandz and Maddison appears to have its limitations, caution seems to be advised if temperature is to be used as an instrument.

Data and methods

Economists usually infer preferences from observed actions of subjects, such as market behavior or willingness to pay in economic experiments, rather than from what subjects say about their preferences. Notwithstanding this inclination, in 1974 Easterlin studied the relationship between income and happiness based on a survey in nineteen countries (Easterlin, 1974). He was one of the first to use self-reported well-being as a measure of happiness. At the time this was an unusual form of utility in the context of economics (Clark et al., 2008). Easterlin's subjects were simply asked how happy they were, as well as some related questions. The answers to these questions led to a score of Subjective Well-Beling (SWB).

Some economists wonder if the answers to survey-questions could possibly give a reliable proxy for happiness. Barrotta (2008) argues that this proxy is too simple and doesn't fully grasp what happiness is – attaching too much weight to hedonistic aspects of happiness and totally ignoring other aspects, such as autonomy. Kahneman and Krueger (2006) argue that people are able to reliably express how good or bad they feel at the time of asking, but that difficulties are involved when asking people how happy they are, because answering that question requires reconstructions and evaluations of the past. Kahneman discusses the many possible biases involved with these evaluations, which add noise to the data. Di Tella and MacCulloch (2006) acknowledge that biases lead to SWB to have a relatively low signal to noise ratio, yet they show that SWB appears to be clearly correlated to logically associated factors, such as income and suicide rates.

The data for this research is primarily derived from the European Social Survey (ESS) from 2002 to 2010, with some additions from other surveys, of which the World Bank is the primary source. The ESS uses repeated cross-sectional surveys to map attitudes and behavior of various populations in Europe. The first wave was in 2002. The most recent wave incorporated in this dataset is the fifth, performed in 2010. Most European countries have participated, although most have not taken part in every wave. On the basis of the ESS data a dataset was compiled, which contains time-series data on many socio-economic factors that are aggregated at the country-level by taking the mean of all data. Because the data are aggregated at the country-level, they can be used as panel data. Because only fifteen of the thirty-three countries were part of all five waves, the panel is clearly unbalanced. The total number of observations across the five waves is 125. This is be too low a number to get sufficient statistical power for most relations if the data is set up as a panel. If so, it may be

more sensible to pool all time-series data. If all data is pooled, the dataset will contain more observations for some countries than for others. Because of that, it is likely for clustering of standard-errors to occur. Therefore it will be important to adjust for clustering.

Dependent variable: Happiness

The dependent variable of interest is self-reported happiness, derived from the European Social Survey. The variable captures the answers given to the question "Taking all things together, how happy would you say you are?". Response options range from zero to ten, with zero corresponding with "extremely unhappy" and with ten corresponding with "extremely happy".

Independent variable of interest: Generalized trust

The independent variable of interest is generalized trust. This variable captures generalized trust, represented by how people respond to the question "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?". The response options range from zero to ten, with zero meaning the respondent thinks you can't be too careful and ten meaning that most people can be trusted.

Control variables

Gross Domestic Product (GDP) per capita

GDP per capita represents the standard of living of a country. The GDP per capita data are extracted from the World Bank. GDP is the sum of gross value added by all resident producers. To get GDP per capita, GDP is divided by the midyear population. In these data, the distribution of GDP per capita is clearly skewed to the left. It is common to log-transform the data on GDP per capita. This is done to correct the skewing, so that the data better approximates a normal distribution. The expectation is to find that greater GDP per capita is associated with greater happiness (Clark et al., 2008; Dolan et al., 2008; Easterlin, 1995) .

Subjective income gini-coefficient

An additional measure of income is based on the question: "Which of the descriptions on this card comes closest to how you feel about your household's income nowadays?". The response options are: 1) Living comfortably on present income, 2) Coping on present income,

3) Finding it difficult on present income, and; 4) Finding it very difficult on present income. The data has been inversed, so that a score of 4 represents living comfortably on the present income and a score of 1 represents great difficulty on income. The subjective income gini-coefficient is derived from the results to the inverted scale. Calculations were performed using the software library "ineq" (Zeileis et al., 2013). The software may be obtained from: http://cran.r-project.org/web/packages/ineq/index.html. A gini-coefficient is a measure of income inequality. A gini-coefficient of 0 corresponds with perfect income equality. A gini-coefficient of 1 corresponds with absolute inequality. The latter would mean that one household would have all income, while the rest of the country has none. The variable thus is a measure of the perceived income inequality. The variable subjective income gini represents the average gini-coefficient at the country level. The expectation is that a higher subjective income gini score will correspond with greater happiness (Clark et al., 2008; Easterlin, 1995).

Subjective health

The variable subjective health represents the country-level average of how people judge their own health. Subjects are asked the following question: “How is your health in general? Would you say it is ...”. The response options are in discrete steps that range from 1. Very good, to 5. Very bad. Low scores thus correspond with good subjective health. I expect to find that low scores of subjective health are associated with greater happiness (Diener and Chan, 2011).

Education years

The variable education years represents the average number of years of schooling subjects of the respective country have had.

Unemployment

The variable unemployment represents the long-term unemployment in a country as measured by the World Bank. The World Bank defines long-term unemployment as the referring to the number of people with continuous periods of unemployment extending for a year or longer. The variable represents the percentage of total unemployed. I expect to find a negative association between unemployment and happiness. Unemployment is found to be associated with happiness, however this is most clearly the case on an individual level (Frey and Stutzer, 2002; Gerlach and Stephan, 1996; Helliwell, 2003).

Ethnic minority

The variable ethnicity represents the percentage of people considering themselves to belong to an ethnic minority group. High numbers represent high ethnic heterogeneity. I expect to find a negative association between the percentage of people belonging to an ethnic minority and happiness (Knight et al., 2009).

Religiosity

The variable religiosity represents the average religiosity in a country. The variable is established on the basis of the question "Regardless of whether you belong to a particular religion, how religious would you say you are?". The response options range from 0 to 10, with 0 corresponding with "Not at all religious", and with 10 corresponding with "Very religious".

Roman Catholic

The variable Roman Catholic represents the percentage of people in a country who would refer to themselves as belonging to the Roman Catholic religion.

Protestant

The variable Protestant represents the percentage of people in a country who would refer to themselves as belonging to the Protestant religion.

Islamic

The variable Islamic represents the percentage of people in a country who would refer to themselves as belonging to the Islamic religion.

Instrumental Variables

The variables "Protestant" and "education years" will be used as control variables, but also as instruments. These two variable have been explained above.

Urbanization

The variable urbanization represents the percentage of people in a country who live in urban areas. I expect to find that generalized trust is greater in countries that are more urbanized.

According to the theory discussed in the previous section, the association between urbanization and happiness is unclear and ambiguous.

Temperature

The variable temperature represents the average two-year temperature (corresponding to ESS wave) from the U.K. Met Office.

Table 1 Summary statistics

	mean	sd	min	max	count
Happiness (SWB)	7.21	0.73	5.40	8.50	125
Generalized trust	4.93	0.99	2.34	7.02	125
GDP cap. (log., $)	10.09	0.78	7.38	11.43	125
Subjective income: Gini	0.14	0.04	0.07	0.23	122
Subjective health	2.22	0.30	1.70	3.00	125
Unemployment (long-term, %)	35.67	14.47	6.40	71.95	119
Ethnic minority (% Yes)	5.67	5.19	0.50	29.80	125
Years of education	11.98	1.45	6.35	13.99	125
Religiosity	4.86	1.06	2.30	7.70	125
Roman catholic (%)	48.10	40.48	0.00	98.70	117
Protestant (%)	26.18	33.84	0.00	96.80	117
Islamic (%)	4.83	13.12	0.00	99.20	117

Models and results

In order to investigate the association between generalized trust and happiness – with happiness as the dependent variable – I take the following approach. First, I systematically test the statistical significance of the previously suggested control variables that explain for differences in happiness through OLS. This will result in a "best-fit" model for the available control variables. Then, I will add generalized trust, to test if a positive association between trust and happiness holds. Finally, I will take into account the possibility of endogeneity between generalized trust and happiness, and remedy this potential bias using an instrumental variables estimation.

In order to investigate the association between generalized trust and happiness – with happiness as the dependent variable – the following model is estimated:

$$\begin{aligned} Happiness \quad = \quad & \beta 0 + \beta 1\ Generalized\ trust_i + \beta 2\ GDP\ cap\ (log)_i \\ & + \ \beta 3\ Subjective\ Gini_i + \beta 4\ Control\ variable_i + \\ & \beta 5\ wave\ dummy_i + \varepsilon_i \end{aligned}$$

In the second part of the analyses I will be performing Instrumental Variable (IV) analysis. In those analysis the $\beta 1_i$ for Generalized trust will be estimated by means of instrumental variables.

The data contains information over time, therefore the obvious thing to do would be to consider the dataset as panel data. However, both the number of observations (125) and the variance in happiness across waves are limited. Therefore the data are pooled. To control for variations between waves, dummies for each wave are included in each model. Because the data is pooled and because not all countries have participated in each wave, there will likely be some clustering of the standard errors. Clustering of standard errors will be adjusted for by using the cluster command in STATA. Wave dummies are included in all regressions (except where noted otherwise) to control for between-wave variation. Each of the possible confounding variables are then added to the model individually.

OLS regressions

The first step in these analyses is to identify possible confounding variables. Ten possible confounders have been identified on the basis of a literature research. In order to verify their effect, each of these variables will be individually tested in a model with happiness as the dependent variable. Besides wave dummies, no other variables are included in the first stage regressions, **see table 2**. Inclusion or exclusion of these variables in the final model is decided on the basis the statistical significance of the effect the variable has on happiness. In this first step, eight out of ten have a statistically significant effect on happiness.

Tabel 2 OLS, individually testing each control variable

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Wave dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Subjective health	-1.78*** (0.26)									
Unemployment (long-term, %)		-0.03*** (0.00)								
GDP cap. (log., $)			0.82*** (0.08)							
Ethnic minority (% Yes)				-0.06** (0.02)						
Subjective income: Gini					-17.05** (1.38)					
Years of education						0.22*** (0.06)				
Religiosity							-0.11 (0.09)			
Roman catholic (%)								-0.00 (0.00)		
Protestant (%)									0.01*** (0.00)	
Islamic (%)										-0.01** (0.00)
Constant	11.28** (0.64)	8.50*** (0.18)	-0.82 (0.75)	7.64*** (0.17)	9.58*** (0.18)	4.84*** (0.70)	7.94*** (0.49)	7.48*** (0.22)	7.05*** (0.15)	7.44*** (0.14)
Observations	125	119	125	125	122	125	125	117	117	117
R^2	0.54	0.45	0.79	0.19	0.74	0.21	0.05	0.03	0.35	0.06
Adjusted R^2	0.52	0.43	0.78	0.16	0.73	0.17	0.01	-0.01	0.33	0.02

Clustered standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The two variables that have no statistically significant effect are religiosity and Roman Catholic. The remaining eight control variables will be jointly tested in the OLS model. The results are displayed in **table 4,** row 1. In this model the following variables are significant: subjective health, unemployment, GDP per capita (log) and subjective income: gini. Years of education and Islamic have an effect size greater than zero, yet are not statistically significant. The coefficients for Ethnic minority and Protestant are zero and these results are not statistically significant. Therefore these latter two variables are dropped for the next regression, see **table 4**, row 2. In this next regression four regression give statistically significant results: subjective health, GDP per captia (log), subjective income: gini and Islamic. Interestingly, the results for Islamic were not statistically significant in the previous model, which included ethnic minority and Protestant. Two variables are not significant in the model of which the results are reported in row 2: unemployment and years of education. These two variables are dropped for the next regression, of which the results are reported in **table 4,** row 3. This regression consists of four control variables: subjective health, GDP per capita (log), subjective income: gini and Islamic. All of these variables are statically significant. Islamic is significant at the 5% level, subjective health and GDP per capita (log) are significant at the 1% level and subjective income: gini is significant at the 0.1% level.

The final regression of the first stage contains these four control variables and generalized trust, see **table 4,** row 4. In this regression all control variables except Islamic are statistically significant. Generalized trust is significant at the 1% percent. However, generalized trust is still potentially endogenous. Therefore the next step takes to solve the endogeneity problem, using 2SLS regressions.

Table 2: OLS regressions to test control variables. Base-line regression including generalized trust in row 4.

	(1) Happiness (SWB)	(2) Happiness (SWB)	(3) Happiness (SWB)	(4) Happiness (SWB)
Wave dummies	YES	YES	YES	YES
Subjective health	-0.54**	-0.56**	-0.69**	-0.61**
	(0.19)	(0.18)	(0.20)	(0.17)
Unemployment (long-term, %)	-0.01*	-0.01		
	(0.00)	(0.00)		
GDP cap. (log., $)	0.30**	0.30**	0.26**	0.22**
	(0.10)	(0.09)	(0.09)	(0.07)
Ethnic minority (% Yes)	0.00			
	(0.01)			
Subjective income: Gini	-8.52***	-8.27***	-9.80***	-7.55***
	(1.49)	(1.40)	(1.63)	(1.52)
Years of education	0.03	0.02		
	(0.02)	(0.02)		
Protestant (%)	-0.00			
	(0.00)			
Islamic (%)	-0.01	-0.01*	-0.00*	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Generalized trust				0.16**
				(0.05)
Constant	6.60***	6.70***	7.60***	6.71***
	(1.40)	(1.25)	(1.20)	(0.96)
Observations	110	110	116	116
R^2	0.89	0.89	0.89	0.91
Adjusted R^2	0.87	0.88	0.88	0.90

Clustered Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Note: Generalized trust is potentially endogenous in these regressions

2SLS regressions and solving the endogeneity problem

The first step in solving the endogeneity problem, is to verify if the potential instrumental variables do indeed explain generalized trust. In order to verify that, First-Stage OLS regressions are run. In these regressions generalized trust is the dependent variable, each individual instrument is used as the independent variable. Wave dummies are included. The results of these regressions are presented in **table 3.** All four potential instruments are associated with generalized trust. Of these four, two are significant at the 0.1% level: years of education and Protestant. Urban population is significant at the 1% level and temperature (2 year average) is significant at the 5% level. The results of the First-Stage OLS regression thus indicate that each of the four potential instruments may explain generalized trust.

Table 3: First-Stage OLS regressions of instruments on generalized trust

	(1) Generalized trust	(2) Generalized trust	(3) Generalized trust	(4) Generalized trust
Years of education	0.39***			
	(0.09)			
Protestant (%)		0.02***		
		(0.00)		
Urban population (%)			0.05**	
			(0.01)	
Temperature (2yr avg.)				-0.08*
				(0.04)
Constant	0.25	4.32***	1.40	5.86***
	(1.09)	(0.14)	(0.93)	(0.47)
Observations	125	117	125	125
R^2	0.33	0.66	0.32	0.15
Adjusted R^2	0.32	0.66	0.31	0.14

Clustered standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The next step in verifying if the variables can be used as instruments is to check if the instruments may not also be used to explain happiness. In order to do that, an OLS regression is run with happiness as the dependent variable and the potential instrumental variables as the independent variables (see table 4) The association between the variables education years and Protestantism had already been tested (the results are displayed in table 2). However, for convenience of the reader the results for these two variables are presented in table 4 as well.
The regression in row 1 represents the baseline-regression including urbanization as a control variable. When included in the baseline-regression, the effect of urbanization on happiness is

positive and statistically significant at the 0.1% level. This means that urbanization is not only associated with generalized trust, but also with happiness. It is therefore not an exogenous variable and thus not a suitable instrument.

The regressions in rows two, three and four represent the baseline-regression including temperature (year average), years of education and Protestant respectively as an additional control variable. In these models, the effect of the potential instrumental variables on happiness is small and not statistically significant. Therefore, the variables temperature, years of education and Protestant may be a suitable instrumental variables.

Tabel 4: OLS regressions of instruments on happiness, to verify if instruments are exogenous.

	(1) Happiness (SWB)	(2) Happiness (SWB)	(3) Happiness (SWB)	(4) Happiness (SWB)
Wave dummies	YES	YES	YES	YES
Subjective health	-0.72***	-0.65**	-0.65**	-0.70**
	(0.16)	(0.20)	(0.20)	(0.21)
GDP cap. (log., $)	0.17*	0.25**	0.27**	0.25**
	(0.07)	(0.09)	(0.08)	(0.08)
Subjective income:	-9.60***	-10.28***	-9.40***	-9.26***
Gini	(1.19)	(1.68)	(1.57)	(1.68)
Islamic (%)	-0.01***	-0.00*	-0.00	-0.00*
	(0.00)	(0.00)	(0.00)	(0.00)
Urban population (%)	0.01***			
	(0.00)			
Temperature (2yr avg.)		0.01		
		(0.01)		
Years of education			0.03	
			(0.02)	
Protestant (%)				0.00
				(0.00)
Constant	7.68***	7.57***	6.99***	7.59***
	(0.91)	(1.26)	(1.29)	(1.14)
Observations	116	116	116	116
R^2	0.92	0.89	0.89	0.89
Adjusted R^2	0.91	0.88	0.88	0.88

Clustered standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The final step in solving the endogeneity problem is to perform the 2SLS regressions. The results of the 2SLS regressions are shown in table 5. Table 5 shows eight different regressions. The first three regressions (table 5, columns 1 to 3) incorporate the base-line model, including one of the three potential instrumental variables. In this model happiness is the dependent variable, Subjective health, GDP cap. (log., $), Subjective income: Gini and

Islamic are the control variables.

In order to get a good instrumental estimation of generalized trust, the instrument must be correlated with the endogenous variable (generalized trust), but not with the error term. If these conditions are met and we have sufficient instruments so that the 2SLS estimator yields unique estimates, the parameters are said to be identified (Baum, 2006, chap. 8). The first requirement (correlation with the endogenous variable) is already tested in the First-Stage regressions (see table 3). It is impossible to observe the error term directly.
Under-identification refers to having insufficient instruments for consistent estimation of the endogenous variable. When more than enough instruments are included, the equation is over-identified. Weak-identification refers to low correlation between the instruments and the endogenous variables. Over-identification is not a problem. Under-identification is a problem. It means that more instruments are required to yield a consistent estimate of the endogenous variable. Under-identification leads to non-consistent outcomes. Weak-identification tend to bias outcomes. The ivreg2 command in STATA automatically runs the following additional tests: the under-identification test Kleibergen-Paap rk LM statistic, the weak identification test Cragg-Donald Wald F statistic and the over-identification test of all instruments, called the Hansen J statistic. The Kleibergen-Paap rk LM statistic tests both under-identification and weak identification. If the null-hypothesis is rejected, the results for this test are significant and the model is identified. The Cragg-Donald Wald F statistic is similar to the Kleibegen-Paap statistic, but is robust. The Hansen J statistic tests over-identification. The null-hypothesis is that the instruments are valid and uncorrelated with the error term. If the null-hypothesis is rejected, the instruments possibly are not valid.

In the regression of which the results are shown in column 1, generalized trust is instrumented with the variable Protestantism. In this model generalized trust has a positive sign, yet the result is not statistically significant. The under-specification test shows that the model is identified. The weak-identification test gives a score that is much higher than the Stock-Yogo weak ID test critical values, which indicates that instrument is not weak. The second regression (table 5, column 2) shows the same regression as is shown in the first column, however the instrument Protestantism is substituted for temperature. Here, the coefficient for trust has a negative sign and it is not statistically significant. The under-identification test rejects the null-hypothesis at the 5% level, which indicates that the model is identified. The

weak-identification test shows a score of 19.185, which is a little higher than the Stock-Yogo weak ID test critical values for 10% maximal IV size. This indicates that the identification is not weak. In the third regression the instrument is substituted for education years. When generalized trust is instrumented with the variable education years, the sign is again positive, yet the result is not statistically significant. The under-identification test rejects the null-hypothesis at the 5% level, which indicates that the model is identified. The weak-identification test shows a score that is much higher than the Stock-Yogo weak ID test critical values. This indicates that the identification is not weak. In the fourth regression, two instruments are used jointly to estimate generalized trust: education years and Protestant. The sign is positive, yet not statistically significant. The under-identification test shows a result that is significant at the 1% level, thus the null-hypothesis is rejected. The weak-identification test shows a result that is much higher than the Stock-Yogo weak ID test critical values, which indicates that the identification is not week. The Hansen J statistic is not significant, indicating that the instruments chosen are valid.

According to Uslaner and Brown (2005) generalized trust is strongly affected by income inequality, a notion supported by Knack and Keefer (1997). Income inequality seems to also have a strong effect on happiness (Alesina et al., 2004; Bjørnskov, 2007a; Di Tella and MacCulloch, 2006). Therefore, the variable subjective income: Gini may be collinear with generalized trust. In these data the correlation between the two variables is -0.78. Therefore, the variable subjective income: Gini should be dropped from the equation. In order to verify if that would not degrade the model fit of the baseline model too much, additional OLS regressions are performed (see Appendix C). The first column presents the baseline regression, identical to the one shown in table 2, column 4. The second column presents the result of the same model, yet without the variable subjective income: Gini. The baseline model has a very high goodness of fit, with an adjusted R^2 of 0.90. The model without subjective income: Gini still has an R^2 of 0.85. This is still a very decent goodness of fit.

In columns 5 to 8 in table 5 I show the results for regressions that are identical to the ones shown in rows 1 to 4 respectively, the only difference being that the control variable subjective income: Gini is dropped. Column 5 shows the results of the regression using Protestant as the instrumental variable. The sign of the coefficient for generalized trust is positive and it is significant at the 1% level. The under-identification and weak-identification

tests do not indicate any problems. According to the Hansen J statistic the equation is exactly specified. In column 6 the results are shows of the same regression, yet with temperature (2 year average) as the instrumental variable. The sign of generalized trust is again positive and the results are significant at the 5% level. The under-identification and weak-identification test again indicate no problems and the Hansen J statistic indicates that the equation is exactly specified. In colunn 7 the results of the regression with education years as the instrument are shown. The coefficient for generalized trust is positive and the results are statistically significant at the 1% level. The under-identification test yields a p-value of 0.0521. This means that the null-hypothesis cannot be rejected at the 5% level. Therefore the model is under-identified. The weak-identification test does not indicate any problems. The Hansen J statistic indicates that the equation is exactly specified.

In the final column of table 5 the results of a regression with two instruments is shown: education years and Protestantism. The coefficient of generalized trust is positive and statically significant at the 1% level. The under-identification test and the weak-identification test indicate no problems. The Hansen J test gives a coefficient of 0.001, yet the p-value is 0.9760. This indicates that endogeneity is probably not an issue in this equation. These results show that the instrumental variable approach can be used to effectively solve the endogeneity problem.

Tabel 5: 2SLS regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Instrument(s):	Protestant	Temperature	Education y.	Educ&Prot	Protestant	Temperature	Education y.	Educ&Prot
Dependent variable:	(SWB)	(SWB)	(SWB)	(SWB)	(SWB)	(SWB)	(SWB)	(SWB)
Generalized trust	0.06	-0.10	0.14	0.08	0.23**	0.22*	0.27**	0.22**
	(0.08)	(0.21)	(0.09)	(0.07)	(0.07)	(0.11)	(0.09)	(0.07)
Wave dummies	YES	YES	YES	YES	YES	YES	YES	YES
Subjective health	-0.66***	-0.73**	-0.62***	-0.65***	-0.34	-0.34	-0.35	-0.34
	(0.18)	(0.27)	(0.17)	(0.17)	(0.28)	(0.28)	(0.26)	(0.28)
GDP cap. (log., $)	0.24**	0.28*	0.22***	0.24***	0.51***	0.51***	0.47***	0.51***
	(0.07)	(0.12)	(0.06)	(0.07)	(0.11)	(0.14)	(0.09)	(0.11)
Subjective income: Gini	-8.90***	-11.15***	-7.85***	-8.71***				
	(1.62)	(3.01)	(1.87)	(1.56)				
Islamic (%)	-0.00	-0.01	-0.00	-0.00	-0.00	-0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	7.21***	8.14***	6.77***	7.13***	1.67	1.66	1.85	1.67
	(0.98)	(2.03)	(1.09)	(0.96)	(1.66)	(1.71)	(1.46)	(1.67)
Observations	116	116	116	116	117	117	117	117
R^2	0.90	0.86	0.91	0.90	0.86	0.86	0.86	0.86
Adjusted R^2	0.89	0.85	0.90	0.90	0.85	0.85	0.85	0.85

Clustered standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The research on the association between generalized trust and happiness is still scarce. The existing literature predominantly offers evidence that there is indeed a positive relationship between the two, although the association is disputed by other research. The OLS regressions performed in this research indicate that the association between happiness and generalized trust is strong and statistically significant. However, several authors point out the difficulties when drawing conclusions from such equations (Durlauf, 2002; Nannestad, 2008). Endogeneity as a result of omitted confounding variables is one of the prime threats to the validity of such inferences. In order to solve the problem of endogeneity, I performed 2-Stage Least Square (2SLS) regressions. The 2SLS regression uses so-called instruments to estimate the independent variable of interest (in this research that is generalized trust). The instrumented independent variable is consequently used in the estimation of the dependent variable. The instruments are required to be exogenous, i.e. they may not themselves be correlated with the error term of the estimation. If these criteria are met, the 2SLS regression solves most problems of endogeneity. Of the four potential instruments found on the basis of a literature research, three (the average number of years of education people have had, the twe-year average temperature and the percentage of people in a country considering themselves to be Protestants) appeared to be sufficiently associated with generalized trust and at the same time not clearly associated with happiness. It is however difficult to say with certainty that these variables are not themselves endogenous. If the instruments are themselves endogenous, the instrumental variable analysis defeats its own purpose. According to Bjørnskov (2007) only few variables can be reliably linked to generalized trust. He too finds income inequality to correlate with generalized trust, as well as ethnic diversity, having previously been a communist country, Protestantism and having a monarchy. In this research I have not been able to confirm the association between generalized trust and ethnic diversity, while the association between Protestantism and generalized trust was confirmed. However, the ESS dataset used for my research does not include data on having previously been a communist country and having a monarchy. If these variables are indeed possible confounders, the omission of these variables in the model to estimate generalized trust – using only education years an Protestantism as instruments – may be underspecified. If this is the case, the results may be biased.

Based on their research covering 60 nations worldwide, Delhey and Newton (2005) show that generalized trust is “an integral part of a tight syndrome of social, political and economic

conditions". They find that generalized trust is associated with ethnic homogeneity, dominantly Protestant views and traditions, good government and equal distribution of wealth.

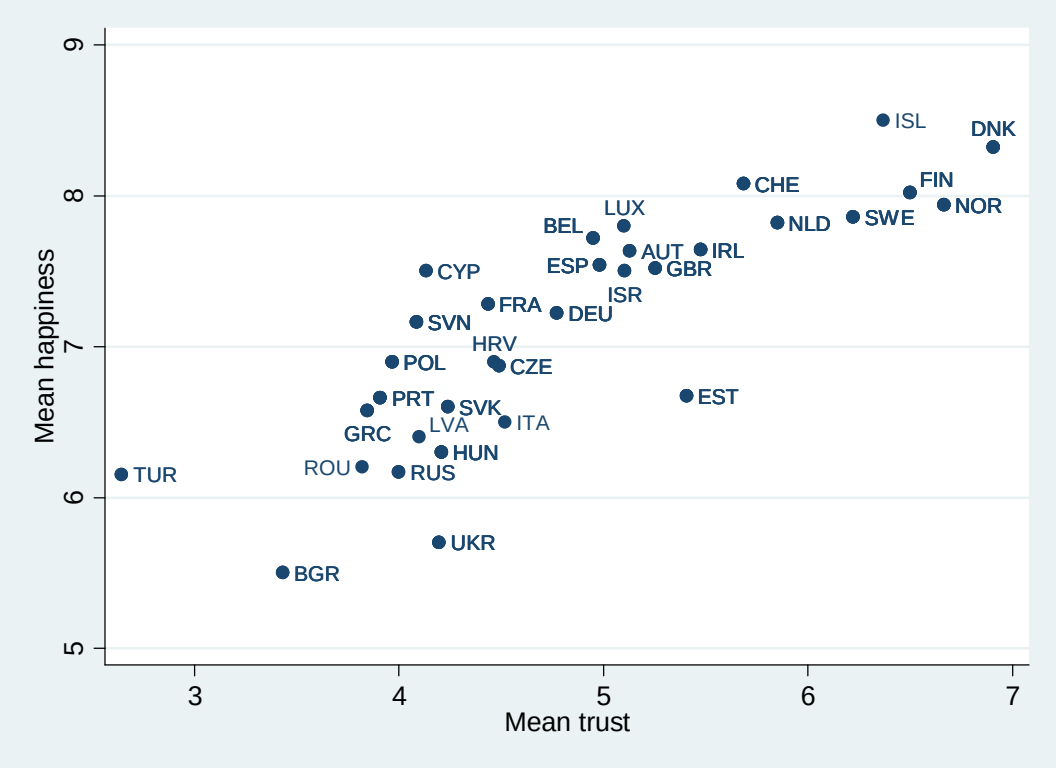

Figure 2: Scatter-plot of mean trust and mean happiness (country codes are ISO 3166-1 alpha-3)

This pattern was found in each of the sixty countries in their research, yet Delhey and Newton argue that the conditions are especially met in the Scandinavian countries, leading them to coin the term "Nordic Syndrome". Interestingly, good government and equal distribution of wealth are also linked to happiness (Diener et al., 1995).

Figure 1 shows a scatter plot with generalized trust on the horizontal axis and happiness on the vertical axis, based on the dataset that was used for the research described in this thesis. The dots in the plot represent all 33 countries in the dataset, country codes are ISO 3166-1 alpha-3. The values for both happiness and generalized trust are averages across all waves. The positive association between generalized trust and happiness as found in this research, is evidently reflected in this scatter plot. The most trusting countries are in fact the Nordic countries (Denmark, Finland, Norway, Iceland and Sweden). Interestingly, according to these data the Nordic countries are not only the most trusting, they are also the happiest countries.

According to Bjørnskov, having previously been a communist country is one of the predictors of low generalized trust. And indeed, in the scatter plot we find countries such as Bulgaria, Romania, Poland, Russia, Ukraine, Slovenia and Hungary at the lower end of the scale. The plot shows that these countries represent not only low levels of generalized trust, they appear to be less happy as well. This is no coincidence. Inglehart et al. (2008) found that happiness is lower in former communist countries. They found that the level of happiness in ex-Soviet states is lower than it is in much poorer countries, such as India, Bangladesh, Nigeria, Mali and Ethiopia.

This research shows that the relationship between generalized trust and happiness is strong and statistically significant. On the other hand it is clear that happiness and generalized trust are both associated with what Delhey and Newton call a "tight syndrome of social, political and economic conditions". The syndromes associated with both variables show clear overlap. The result of this is that endogeneity affects the validity of inferences based on research on the topic of happiness and generalized trust. In order to solve the endogeneity problem, instrumental variable analyses were performed. The results of these analyses were both strong and statistically significant, depending of the exact specification of the model. This is most likely caused by underspecification of the instrumental model to estimate generalized trust on the one hand, as well as simultaneity – cross-relationships between happiness, generalized trust and other explanatory variables.

In this research I have mitigated the endogeneity problem, although I have not been able to eliminate the problem. In order to mitigate the problem of endogeneity further, it may be useful to find additional, preferably more clearly exogenous instrumental variables.

Conclusion

In this thesis I have shown evidence in support of an association between generalized trust and happiness. For this research I used a dataset that was compiled on the basis of primarily the European Social Survey (2002-2011). The dataset contains data on generalized trust and self-reported happiness, yet also on several other socio-economic variables. The dataset covers 33 European countries, including Turkey and Russia. Previous research has already provided evidence that generalized trust and happiness are indeed associated, but much of the research on this topic is plagued by endogeneity. The prime source of endogeneity is omission of important confounding variables. A possible consequence of endogeneity is that it may lead to the unjustified rejection of a null-hypothesis. For the research described in this thesis I have used 2-Stage Least Squares (2SLS) regressions to solve the endogeneity problem. The 2SLS – also called instrumental variable regression – uses exogenous variables (so-called instruments) to estimate the endogenous independent variable. The estimate of the independent variable is consequently used to estimate the association between the independent variable and the dependent variable.

There are two stages of statistical analyses performed in this thesis. In the first stage Ordinary Least Squares (OLS) regressions were performed in order to research the association between generalized trust and happiness. The main control variables have been identified and these have been added to the model. The main confounders are the natural logarithm of GDP per capita, subjective health and subjective income. When controlling for these confounders, generalized trust was positively associated with happiness. The results were statistically significant at the 1% level. The first hypothesis is [that]: "*There is an association between generalized trust and happiness*". This hypothesis can be confirmed. In order to improve the robustness of the association found between generalized trust and happiness, thereby accounting for the possible adverse effects of endogeneity, consequently a 2SLS regression has been performed. Out of five candidate instrumental variables, the two-year average temperature in a country (temperature), the average number of years of education people have had (education years) and the percentage of Protestants in a country (Protestant) appeared to be suitable for use as instruments. In the 2SLS regression, generalized trust was again associated with happiness, however the results were not statistically significant in the original model. The effect size of generalized trust did however increase when a potentially collinear variable – a gini coefficient for subjective income – was omitted from the regression. Then

the effect of generalized trust was significant at the 1% level. The second hypothesis is [that]: ”*There is an association between generalized trust and happiness, also when we explicitly model for an endogenous relationship between generalized trust and happiness*”. The 2SLS regressions have shown that this hypothesis can also be confirmed. Although the results of 2SLS are in line with the results of the OLS regression and although the association found was statistically significant when the gini coefficient for subjective income was omitted, the results of the 2SLS regression are not statistically significant in the full model. Therefore the second hypothesis cannot be confirmed with great certainty. More research is required to improve the robustness of these findings.

References

Angrist, J., Krueger, A.B., 2001. Instrumental Variables and the Search for Identification: From Supply and Demand to Natural Experiments (Working Paper No. 8456). National Bureau of Economic Research.

Antonakis, J., Bendahan, S., Jacquart, P., Lalive, R., 2010. On making causal claims: A review and recommendations. Leadersh. Q. 21, 1086–1120.

Barrotta, P., 2008. WHY ECONOMISTS SHOULD BE UNHAPPY WITH THE ECONOMICS OF HAPPINESS. Econ. Philos. 24, 145–165.

Baum, C.F., 2006. An Introduction to Modern Econometrics Using Stata. Stata Press.

Berggren, N., Bjørnskov, C., 2011. Is the importance of religion in daily life related to social trust? Cross-country and cross-state comparisons. J. Econ. Behav. Organ. 80, 459–480.

Bentham, J., 1879. An Introduction to the Principles of Morals and Legislation. Clarendon Press.

Bergh, A., Bjørnskov, C., 2011. Historical Trust Levels Predict the Current Size of the Welfare State. Kyklos 64, 1–19. doi:10.1111/j.1467-6435.2010.00492.x

Berry, B.J.L., Okulicz-Kozaryn, A., 2011. An Urban-Rural Happiness Gradient. Urban Geogr. 32, 871–883.

Besley, T., Case, A., 2000. Unnatural Experiments? Estimating the Incidence of Endogenous Policies. Econ. J. 110, 672–694.

Bjørnskov, C., 2003. The Happy Few: Cross–Country Evidence on Social Capital and Life Satisfaction. Kyklos 56, 3–16.

Bjørnskov, C., 2007. Determinants of generalized trust: A cross-country comparison. Public Choice 130, 1–21.

Bjørnskov, C., 2008. Social Capital and Happiness in the United States. Appl. Res. Qual. Life 3, 43–62.

Bliek, De., R., 2013. Rapid Urbanization: A Strike for Civil Society, or a Necessary Transition? (SSRN Scholarly Paper No. ID 2318429). Social Science Research Network, Rochester, NY.

Burns, J.H., 2005. Happiness and utility: Jeremy Bentham's equation. Utilitas 17, 46–61.

Clark, A.E., Frijters, P., Shields, M.A., 2008. Relative income, happiness, and utility: An explanation for the Easterlin paradox and other puzzles. J. Econ. Lit. 95–144.

Clark, A.E., Lelkes, O., 2009. Let us pray: religious interactions in life satisfaction.

Delhey, J., Newton, K., 2005. Predicting Cross-National Levels of Social Trust: Global Pattern or Nordic Exceptionalism? Eur. Sociol. Rev. 21, 311–327. Di Tella, R., MacCulloch, R., 2006. Some uses of happiness data in economics. J. Econ. Perspect. 20, 25–46.

Diener, E. 1, Ng, W., Harter, J., Arora, R., 2010. Wealth and Happiness Across the World: Material Prosperity Predicts Life Evaluation, Whereas Psychosocial Prosperity Predicts Positive Feeling. J. Pers. 99, 52–61.

Diener, E., Chan, M.Y., 2011. Happy People Live Longer: Subjective Well-Being Contributes to Health and Longevity. Appl. Psychol. Health Well-Being 3, 1–43.

Diener, E., Diener, M., Diener, C., 1995. Factors predicting the subjective well-being of nations. J. Pers. Soc. Psychol. 69, 851–864.

Dixon, H.D., Frank, R., Ng, Y., Oswald, A., 1997. Economics and happiness. Econ. J. November.

Dolan, P., Peasgood, T., White, M., 2008. Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. J. Econ. Psychol. 29, 94 – 122.
Durante, R., 2009. Risk, Cooperation and the Economic Origins of Social Trust: an Empirical Investigation
Durlauf, S.N., 2002. On The Empirics Of Social Capital*. Econ. J. 112, F459–F479.
Easterlin, R.A., 1974. Does economic growth improve the human lot? Some empirical evidence. Nations Househ. Econ. Growth 89.
Easterlin, R.A., 1995. Will raising the incomes of all increase the happiness of all? J. Econ. Behav. Organ. 27, 35–47.
Easterlin, R.A., Angelescu, L., Zweig, J.S., 2011. The Impact of Modern Economic Growth on Urban–Rural Differences in Subjective Well-Being. World Dev. 39, 2187–2198.
Eichhorn, J., 2011. Happiness for Believers? Contextualizing the Effects of Religiosity on Life-Satisfaction. Eur. Sociol. Rev. jcr027. doi:10.1093/esr/jcr027
Ferriss, A.L., 2002. Religion and the Quality of Life. J. Happiness Stud. 3, 199–215.
Frey, B.S., Stutzer, A., 2002. What Can Economists Learn from Happiness Research? J. Econ. Lit. 40, 402–435.
Gerlach, K., Stephan, G., 1996. A paper on unhappiness and unemployment in Germany. Econ. Lett. 52, 325–330.
Gill TM, Feinstein AR, 1994. A critical appraisal of the quality of quality-of-life measurements. JAMA 272, 619–626.
Glaeser, E.L., Laibson, D.I., Scheinkman, J.A., Soutter, C.L., 2000. Measuring trust. Q. J. Econ. 115, 811–846.
Granger, C.W.J., 1980. Testing for causality: A personal viewpoint. J. Econ. Dyn. Control 2, 329–352.
Guillemin, F., Bombardier, C., Beaton, D., 1993. Cross-cultural adaptation of health-related quality of life measures: Literature review and proposed guidelines. J. Clin. Epidemiol. 46, 1417–1432.
Helliwell, J., 2001. Social Capital, the Economy and Well-being (The Review of Economic Performance and Social Progress). Centre for the Study of Living Standards & The Institutute for Research on Public Policy.
Helliwell, J.F., 2003. How's life? Combining individual and national variables to explain subjective well-being. Econ. Model. 20, 331–360.
Helliwell, J.F., 2006. Well-Being, Social Capital and Public Policy: What's New?*. Econ. J. 116, C34–C45.
Helliwell, J.F., Putnam, R.D., 1995. Economic Growth and Social Capital in Italy. East. Econ. J. 21, 295–307.
Holländer, H., 2001. On the validity of utility statements: standard theory versus Duesenberry's. J. Econ. Behav. Organ., Subjective Well-Being and Economic Analysis 45, 227–249.
Inglehart, R., Foa, R., Peterson, C., Welzel, C., 2008. Development, Freedom, and Rising Happiness: A Global Perspective (1981–2007). Perspect. Psychol. Sci. 3, 264–285.
Kahneman, D., Krueger, A.B., 2006. Developments in the Measurement of Subjective Well-Being. J. Econ. Perspect. 20, 3–24.
Kahneman, D., Wakker, P.P., Sarin, R., 1997. Back to Bentham? Explorations of Experienced Utility. Q. J. Econ. 112, 375–405.
Knack, S., Keefer, P., 1997. Does Social Capital Have an Economic Payoff? A Cross-Country Investigation. Q. J. Econ. 112, 1251–1288.

Knack, S., Zak, P.J., 2003. Building Trust: Public Policy, Interpersonal Trust, and Economic Development. Supreme Court Econ. Rev. 10, 91–107.
Knight, J., Song, L., GUNATILAKA, R., 2009. Subjective well-being and its determinants in rural China. China Econ. Rev., Symposium on Health Economics Issues in China Health Symposium 20, 635–649.
Lederman, D., Loayza, N., Menéndez, A.M., 2002. Violent Crime: Does Social Capital Matter? Econ. Dev. Cult. Change 50, 509–539.
Loewenstein, G., Ubel, P.A., 2008. Hedonic adaptation and the role of decision and experience utility in public policy. J. Public Econ. 92, 1795–1810.
Mauro, P., 1995. Corruption and growth. Q. J. Econ. 110, 681.
Myers, D.G., Diener, E., 1995. Who is happy? Psychol. Sci. 6, 10–19.
Nannestad, P., 2008. What Have We Learned About Generalized Trust, If Anything? Annu. Rev. Polit. Sci. 11, 413–436. doi:10.1146/annurev.polisci.11.060606.135412
Oswald, A.J., 1997. Happiness and Economic Performance. Econ. J. 107, 1815–1831.
Putnam, R.D., 1995. Bowling alone: America's declining social capital. J. Democr. 6, 65–78.
Ram, R., 2010. Social capital and happiness: Additional cross-country evidence. J. Happiness Stud. 11, 409–418.
Rehdanz, K., Maddison, D., 2005. Climate and happiness. Ecol. Econ. 52, 111–125.
Rodrik, D., 2000. Institutions for high-quality growth: What they are and how to acquire them. Stud. Comp. Int. Dev. 35, 3–31.
Rothstein, B., 2000. Trust, Social Dilemmas and Collective Memories. J. Theor. Polit. 12, 477–501.
Rothstein, B., 2010. Corruption, Happiness, Social Trust and the Welfare State: A Causal Mechanisms Approach. QoG Work. Pap. Ser. 9.
Rothstein, B., Uslaner, E.M., 2005. All for All: Equality, Corruption, and Social Trust. World Polit. 58, 41–72.
Sobel, J., 2002. Can We Trust Social Capital? J. Econ. Lit. 40, 139–154.
Soydemir, G.A., Bastida, E., Gonzalez, G., 2004. The impact of religiosity on self-assessments of health and happiness: evidence from the US Southwest. Appl. Econ. 36, 665–672.
Uslaner, E.M., 2009. Trust, Diversity, and Segregation (SSRN Scholarly Paper No. ID 1523721). Social Science Research Network, Rochester, NY.
Uslaner, E.M., Brown, M., 2005. Inequality, trust, and civic engagement. Am. Polit. Res. 33, 868–894.
Veenhoven, R., 1993. Happiness in Nations: Subjective Appreciation of Life in 56 Nations 1946-1992. Rotterdam Erasmus U Press.
Vlastos, G., 1985. Happiness and virtue in Socrates' moral theory. Topoi 4, 3–22.
Welch, M.R., Sikkink, D., Loveland, M.T., 2007. The Radius of Trust: Religion, Social Embeddedness and Trust in Strangers. Soc. Forces 86, 23–46.
Woolcock, M., Narayan, D., 2000. Social Capital: Implications for Development Theory, Research, and Policy. World Bank Res. Obs. 15, 225–249.
Zak, P.J., Knack, S., 2001. Trust and Growth. Econ. J. 111, 295–321.
Zeileis, A., Kleiber, C., Zeileis, M.A., 2013. Package "ineq."

Appendix

Table of contents of Appendix:

- **Appendix A**, correlation table of all variables
- **Appendix B**, Summery statistics of the instrumental variables
- **Appendix C**, OLS regressions; baseline with and without subjective health

Appendix A, correlation table of all variables

	Happiness (SWB)	Generalized trust	GDP cap. (log., $)	Subjective income: Gini	Subjective health	Unemployment (long-term, %)	Ethnic minority (% Yes)	Years of education	Religiosity	Roman catholic (%)	Protestant (%)	Islamic (%)
Happiness (SWB)	1.00											
Generalized trust	0.81	1.00										
GDP cap. (log., $)	0.86	0.71	1.00									
Subjective income: Gini	-0.86	-0.75	-0.73	1.00								
Subjective health	-0.72	-0.51	-0.76	0.47	1.00							
Unemployment (long-term, %)	-0.63	-0.65	-0.55	0.51	0.51	1.00						
Ethnic minority (% Yes)	-0.43	-0.21	-0.33	0.48	0.26	0.13	1.00					
Years of education	0.40	0.57	0.36	-0.35	-0.27	-0.25	0.01	1.00				
Religiosity	-0.15	-0.37	-0.21	0.23	-0.11	0.16	-0.14	-0.45	1.00			
Roman catholic (%)	-0.04	-0.34	-0.03	-0.07	0.12	0.52	-0.42	-0.16	0.09	1.00		
Protestant (%)	0.58	0.81	0.51	-0.62	-0.31	-0.59	-0.17	0.40	-0.36	-0.57	1.00	
Islamic (%)	-0.20	-0.31	-0.17	0.21	0.01	-0.05	0.26	-0.42	0.20	-0.24	-0.12	1.00

Appendix B: Summery statistics of the instrumental variables

	mean	sd	min	max
Years of education	11.98	1.45	6.35	13.99
Protestant (%)	26.18	33.84	0.00	96.80
Urban population (%)	72.78	11.47	49.94	97.47
Temperature (2yr avg.)	11.20	4.62	4.50	27.00
Observations	125			

Appendix C: OLS regressions, baseline with and without subjective health

	(1) Happiness (SWB)	(2) Happiness (SWB)
Wave dummies	YES	YES
Subjective health	-0.61**	-0.35
	(0.17)	(0.27)
GDP cap. (log., $)	0.22**	0.45***
	(0.07)	(0.09)
Subjective income:	-7.55***	
Gini	(1.52)	
Islamic (%)	-0.00	0.00
	(0.00)	(0.00)
Generalized trust	0.16**	0.29***
	(0.05)	(0.06)
Constant	6.71***	2.19
	(0.96)	(1.49)
Observations	116	117
R^2	0.91	0.86
Adjusted R^2	0.90	0.85

Clustered standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$