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Determinants of the Trust Radius: A Panel Data Analysis

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Abstract

In this study, the groundbreaking quantification method of the trust radius of Delhey, Newton and Welzel (2011) is followed, and is analyzed over time. For the first time the trust radius is analyzed across multiple countries and time periods, resulting in a panel data analysis. Three exogenous societal events have been identified that are deemed to be powerful enough to determine the trust radius over time. These three determinants are corruption, terrorism and economic prosperity. The last three WVS waves are used to measure the radius, resulting in a dataset that covers 65 different countries with two or three radius observations. A fixed effects analysis is conducted in order to answer the research question of whether we can identify the medium-term determinants of the trust radius. The panel analysis does not produce conclusive results to support the hypotheses regarding time-variant determinants. The results do leave an increase amount of criticism behind regarding the quantification method over time. The cross-sectional side analysis does find support for the previously found relationship between individualism and the radius of trust.

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1 Introduction

The importance of social trust has long been agreed upon by scholars from different academic fields. Modern societies depend on millions of daily interactions between people that are unknown to each other, and from possibly unfamiliar and distant groups (Delhey & Welzel, 2012). Well renowned economist Kenneth Arrow once stated that "virtually every commercial transaction has within itself an element of trust", and that it "can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence" (Arrow, 1972, p. 357). He hereby implies that trust is an inherent part of our economic prosperity.

The vast majority of the literature on generalized trust, however, has relied on one sole question, answered with either yes or no: do you trust most people? This question has been broadly critiqued, and empirically shown to be incomparable across countries (Delhey, Newton & Welzel, 2011; Torpe & Lolle, 2011). Delhey, Newton and Welzel (2011) demonstrate that the generalized trust question is prone to inconsistent interpretation by respondents from different countries. They have argued that this inconsistency is due to a difference in the radius of trust between societies. The first survey to extend the number of questions regarding social trust, was the fifth wave of the World Value Survey (WVS) in 2005. This was the data used by Delhey et al. (2011). Currently, however, there are three waves (5, 6, and 7) of the WVS that possess these questions, making it possible for the first time to create a panel dataset with the concept of the radius of trust.

In this study we shall look at the radius of trust as a time-variant variable for the first time. Using a fixed effects model, the time-variant determinants shall be analyzed. Country specific time-invariant characteristics, such as culture, shall remain out of scope. The dataset has a range of approximately 15 years, and includes 65 different countries from all continents. The three societal variables that are identified as possible determinants of the trust radius are corruption, terrorism, and economic prosperity.

The radius of trust is the "width of the circle among whom a certain trust level exists" (Van Hoorn (2014, p.1256), and is often seen as a radius among which cooperation is sought. As an increasing amount of literature sees trust as a dynamic concept (e.g. Dinesen, 2012; Glanville & Paxton, 2007), instead of solely a cultural trait (e.g. Uslaner, 2002), it is valuable to increase our knowledge on what determines the levels of trust and cooperation over time. Following

from this the research question emerged: can we identify the time-variant determinants of the trust radius?

First, we will start by covering the background of social trust and the trust radius, after which we shall develop our hypotheses. In the next section the used data is explained and the empirical model is constructed. In the fifth section the results are demonstrated. In the last two sections the findings will be discussed and the conclusions shall be drawn.

2 Background and Hypothesis Development

2.1 Literature Review

Yamagishi defines generalized trust as “the default expectation of people’s trustworthiness” (Yamagishi, 2001, p. 143). Social trust, also known as generalized trust, is trust that is not related to any specific group or person, or related to any specific purpose or situation (i.e. trust in the out-group). Particularized trust on the other hand, is trust in people only like yourself (i.e. trust in the in-group) (Uslaner, 2018). Both of these concepts are distinct from political trust, which concerns trust in institutions. This last concept, however, will remain out of scope for this study.

There is already some debate on the question what trust means. According to Hardin (1992) it is a three-way relationship, in which “A trusts B to do X” (Hardin, 1992, p. 154). In this definition, you could trust someone with your bike, but not with your child. The parameters of context and time were added by Bauer (2021), resulting in the notion “A trust B to do X in context Y at time t”. This is an example of particularized trust. Once we take away the parameters of person B, trusting object X, in context Y, at time t, we are left with ‘A trusts’. This can be seen as generalized trust, or moralistic trust. This does not mean that A trusts everybody all the time. However, it does mean that you would trust most people most of the time (Uslaner, 2002). This is the type of trust that is of interest in this study. More specifically, the time-variant determinants of the trust radius.

2.1.1 Radius of trust

Until the 2011 study of Delhey, Newton and Welzel, the concept of generalized trust was ordinarily measured by the ‘general trust question’. The question being surveyed goes as follows: “Generally speaking, do you believe that most people can be trusted or that you can’t be too careful in dealing with people?” Through time substantial criticism existed on this question (e.g. Sturgis & Smith 2010; Torpe & Lolle, 2011; Reeskens, 2013; Delhey et al., 2011). Delhey et al. (2011) argued that the notion of “most people” most likely varied across cultures of the respondents. In order to explain this, they build on the theory of Fukuyama (1999), who names the radius of trust as a concept within social capital. Fukuyama (1999) provides the examples of Chinese and Latin American cultures revolving more around the family, making it harder to trust strangers that fall outside their kin, leading to a narrower radius of trust. The fact that China always came out of the general trust question as a high trusting culture raised

some suspicion. In fact, in several studies that use data from the generalized trust question, China is omitted for being an outlier (see Niazi & Hassan, 2016; Bjørnskov, 2007; Uslaner, 2002; Uslaner, 2003).

Fukuyama (1999) defines the radius of trust as "the circle of people among whom cooperative norms are operative" (Delhey et al., 2011, p. 787). Delhey et al. (2011) rewrite the radius of trust as "the width of the cooperation circle" (Delhey et al., 2011, p. 787). Following on this logic, Van Hoorn (2014, p. 1256) redefines it as "the width of the circle among whom a certain trust level exists". This study will follow the more specific definition of Van Hoorn (2014). The definition is thus clear. How to quantify this intangible concept, however, is a bigger challenge.

The literature has not yet totally agreed upon a quantification method of the radius of trust. Hu (2017) developed a gradient-based method in which he argues that the trust level decreases the more distance a group has relative to the person. Using the same six specific trust questions, he then argues that the gradient of the downward slope of the trust levels corresponds to the trust radius. One important advantage is that he calculates the trust radius on the individual level. The gradient method, however, is not airtight, as it is disputable whether a person from another nationality, or another religion stands further from the individual. Hereby not every slope of trust level shall be perfectly downward sloping.

This study shall follow the quantification from the groundbreaking paper of Delhey et al. (2011). The most widely accepted measure for the country-level trust radius is created by Delhey et al. (2011). These authors regress the ingroup and outgroup-trust questions with this general trust question. They try to capture how wide the notion of "most people" is, when the respondents answer this question. This means, the more the answer of the outgroup trust questions correspond to the answer of the general trust question, the wider the trust radius. At the same time, the less the ingroup trust results are in line with the general trust results, the wider the trust radius. Conversely, when the respondents in a country answer the ingroup questions and the general trust question very similar, the trust radius will be narrow. Even though this quantification is no perfect match for the definition stated by Fukuyama and Van Hoorn, it is a good proxy measure of the trust radius. In addition, it covers some misinterpretation issues with the sole generalized trust question. A graphical representation of the construction of the trust radius is presented in appendix I.

2.1.2 Static or Dynamic

Within the literature, trust is both argued to be dynamic as well as static, depending on which theory you follow. The first theory views trust as a *cultural* trait that is passed down from parent to child. From this point of view trust is largely immune to experiences and is thus stable throughout life and across generations (Becker, 1996; Jones, 1996; Uslaner, 2002; Dohmen et al., 2012). This view is supported by an abundance of cross-sectional literature. If this was the only truth, however, we could stop worrying about trust as there is little room for policy influence.

The other theory analyzes trust as an *experiential*, or *social learning* construct (Dinesen, 2012; Glanville & Paxton, 2007). This theory argues that generalized trust is a composition of extrapolated localized experiences (Hardin, 2002). It holds that people base their trust on past experiences and whether people kept their word or not. This theory is based on the fundamental assumption that people develop different levels of trust for different domains of interaction (Burns et al., 2003). Generalized trust, in turn, is the summation of all experiences and encounters together.

Important empirical support for this dynamic theory of trust has been found in Denmark. In this study, Dinesen (2012) empirically demonstrated that the trust of young immigrants from low trusting countries converged with the high trust of Denmark's natives. This shows the dynamism of trust, rather than being a static form of trust in which the levels of trust would have stayed similar to their parents. Moreover, Sønderskov and Dinesen (2016) find strong support for a causal relationship from institutional trust to social trust. Given that institutional trust can be influenced, so can social trust. The results of these studies are promising in the sense that the trust level of a society might not be set in stone after all.

2.1.3 Trust as a Dynamic Value

This study follows the line in which trust is a dynamic concept. We hereby argue that trust is a value, following the words of Uslaner (2002). Within the field of social psychology, values are generally defined as abstract ideals that can be interpreted as guiding principles in life (Maio, 2010; Schwartz, 1992; Rokeach, 1968). The abstract nature of values is of vital importance to this concept, while at the same time this abstractness makes it challenging to assess (Maio, 2010). This same challenge we find in the assessment of trust. Schwartz (1992) names five criteria for something to be a value. He states: "Values (1) are concepts or beliefs,

(2) pertain to desirable end states or behaviors, (3) transcend specific situations, (4) guide selection or evaluation of behavior and events, and (5) are ordered by relative importance" (Schwartz, 1992, p. 4). Following these criteria we can state: generalized trust can be seen as a concept, that pertains a desirable behavior, beyond specific persons or situations. It can also influence your evaluation of behavior and events: for instance in dealing with business or family situations, one might give trust a different weight. In this line of thought, general trust will be classified as a value, making the circular value model of Schwartz (1992) a relevant framework in order to analyze the mechanism for the change in trust, and thus the change in the radius of trust.

Schwartz's (1992) model follows the notion that values are self-imposed criteria, that people use to maintain balance between their individual motives and their role as part of a society (Maio, 2010; Schwartz, 1992). Schwartz (1992) argues that you can organize one's values along two dimensions, and that you have to make a relative choice between those values. One side of the dimension focusses on motives that endorse the individual's interest (*self-enhancement*), whereas the other side of the dimension is about the transcendence of one's personal interest and emphasizes the welfare of others (*self-transcendence*). Orthogonal to this dimension, is the dimension that sees conservative values (i.e. following the status quo) opposing the more open and free interests in life (Maio, 2010; Schwartz, 1992). What is important in this model is how the values relate to each other. Values on the same end of the dimension correlate positively to each other, while opposing values correlate negatively to each other (Maio, 2010). Meaning that an individual cannot increase his importance of *self-enhancement* values (e.g. authority), while also relatively increasing the importance of *self-transcendence* values (e.g. equality). Research using the survey data that Schwartz created empirically supported the model (Schwartz & Rubel, 2005; Bardi & Schwartz, 2003; Roccas et al., 2002).

If our mental system of values indeed encompasses conflicts between opposite sides of the value dimensions, then a change one side of the dimension would also mean a change in the opposite side. Experiments have shown that individuals can change their hierarchy of values through manipulation and priming (Maio et al., 2009). This study found that manipulation towards more *self-enhancement*, decreased the importance of *self-transcendence* and vice versa. The orthogonal dimension was indeed uncorrelated (Maio et al., 2009).

Other research in (social) psychology suggests that change in personal values is possible when enabled by environmental cues (i.e. exogenous events) (Bardi & Goodwin, 2011). Acemoglu and Ozdaglar (2011) argue that beliefs and opinions are, besides being attained within families (i.e. in childhood), formed by a process they call "social learning"—again very similar to the *static vs. dynamic* discussion on trust. Meaning that opinions and beliefs are formed by personal experiences, but also by experiences and beliefs of others. This means that an event, as well as the interpretation of an event (e.g. by the media), can influence one's beliefs and opinions (Acemoglu & Ozdaglar, 2011), and in turn their values. In the context of value change, this would mean that values can change due to events that either increase their importance directly, or by decreasing the importance of an opposite value. For instance, given that generalized trust can be seen as a self-transcending value, an event that would increase the importance of authority or security would mean a decrease of generalized trust. This is the basis on which our hypotheses will be formed. We will identify three different exogenous forces that are expected to affect the trust radius of a society over time.

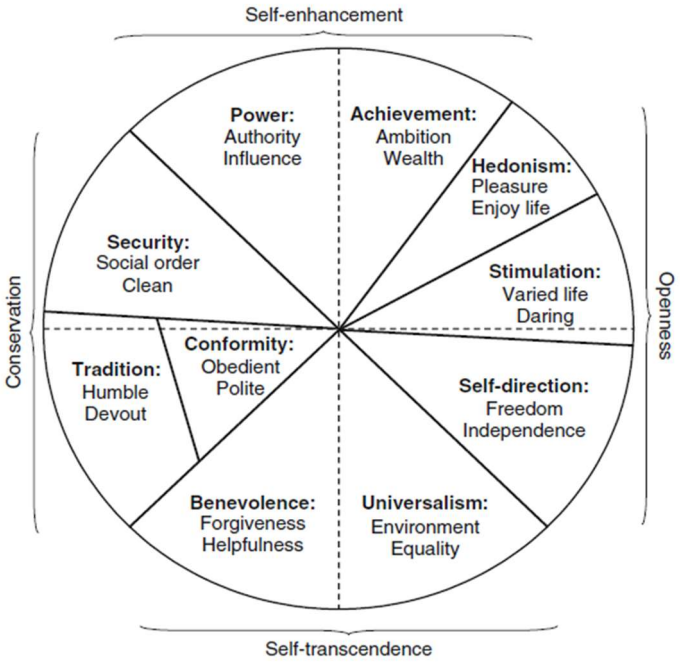


Figure 1: Schwartz's (1992) value model (source: Maio, 2010)

2.2 **Hypotheses Development**

Delhey and Welzel (2012) empirically showed that ingroup and outgroup-trust are established (partly) independently from each other, especially in modern societies, which they call genuine outgroup-trust. They also demonstrate that every country has very high ingroup-trust. Therefore, it is expected that the time variance in the trust radius will mostly be driven by variance in the outgroup-trust. We shall therefore base our hypotheses (partly) on which variables can impact outgroup trust over time.

The trust radius, as quantified by Delhey et al. (2011), is a country-level variable. Hence, for a determinant to have a visible impact on this trust radius, the determinant must affect the whole, or at least a large part, of the society. Personal bad experiences, like being victimized by oral insults or physical violence, did not causally affect the country-level generalized trust measure in Switzerland (Bauer, 2015). However, it is plausible that grander societal issues, like corruption or terrorism, will affect the trust in outer groups, and thereby the trust radius. Moreover, a society wide sentiment, like economic prosperity, or it's opposite, economic downfall, might also have a short-term impact on the trust radius.

2.2.1 Corruption and trust

There are several studies that demonstrate the negative relationship corruption has to institutional trust (e.g. Seligson, 2002; Štulhofer, 2004; Uslaner, 2003). This is an obvious relationship: if a public institution does not act in the expected manner, you reduce your trust for future behavior. A more indirect effect is also expected in the relationship between corruption and interpersonal trust. Uslaner (2003) finds a negative correlation of -.61 between corruption and generalized trust across fifty-two countries worldwide.

Not all literature has found support for this relationship, however. Mishler and Rose (2001) found that the position on the social ladder, and related to that, personal evaluation, matters significantly for whether institutional trust impacts interpersonal trust. Moreover, Graeff and Svendsen (2013) found no impact of corruption on social trust when analyzing 25 countries in the European Union.

The reverse causal way, however, can also be true. Fukuyama (2001) argues that a corrupt environment is the result of a narrow trust radius (i.e. in-group connotated social trust). He argues that a narrow trust radius leads to a strict sense of division between the in-group and

the out-group, and that people therefore feel entitled to a different moral standard towards the out-group (i.e. non-kin). This in turn leads to more corrupt behavior.

Both of these observations are, however, focused on the long term. Fukuyama's argument implies a more cultural trait, while Uslaner's argument stems from cross-sectional data, leaving at least the direction of the relationship inconclusive. One other study, using a panel dataset from 2000 till 2004 in the US, concludes that there is a negative causal relation from governmental corruption towards generalized social trust (Richey, 2010). This result shows that more corruption might make the society seem less trustworthy, leading to a lower generalized trust. Moreover, Rothstein and Stolle (2008) argue that impartiality in our institutions is an important component of our generalized trust, implying that partiality in the act of corruption diminishes social trust. Sønderskov and Dinesen (2016) find strong evidence of causality from institutional trust to social trust by using panel data with a time span of 18 years in Denmark. Hereby we can hypothesize that corruption leads to a lower institutional trust, which leads to a lower social trust. This corresponds to a narrower trust radius, leading to the first hypothesis:

Hypothesis 1.A (H1.A): An increase in corruption corresponds to a directly narrowing of the trust radius.

Hypothesis 1.B (H1.B): An increase in corruption is followed by a narrowing in the trust radius.

2.2.2 Terrorism and trust

Another category of exogenous events that has the expected power to change personal values is terrorism. The mere fact that terrorist attacks are targeted at nobody in particular, makes people feel unsafe rather quickly (Lindsey, 2002). This random target component makes people think that they could become victims as well. Blomberg, Hess and Tan (2011) argue that in times of increased threat, people start acting more authoritarian, which in turn leads to more conflict and more distrust between groups. In a 30-year longitudinal study on persistent terrorist attacks in Israel, Peffley, Hutchison and Shamir (2015) found that fluctuations in attacks were followed by fluctuations in democratic norms and acceptance of minority rights. This study finds a clear short-term effect (3 months after event), while the effect is still visible a year after. In the long term, the values would return to the baseline. Anecdotally, the existence of Guantanamo Bay can be interpreted as a change in personal

values due to terrorist attacks. In this legal black hole on Cuba, the U.S. government detained and tortured “terrorists” for years without any legal prosecution (Schneider, 2004). It is quite clear that terrorist attacks have the power to change personal values, at least in the short term.

While the academic field has not yet fully agreed upon a precise definition of terrorism, it is commonly defined as “the deliberate use of violence and intimidation directed at a large audience to coerce a community (government) into conceding politically or ideologically motivated demands” (Krieger & Meierrieks, 2011, p. 4). Intuitively, but also empirically demonstrated, an increase in terrorist attacks results in an increase in fear for terrorist attacks (Finseraas & Listhaug, 2013; Bardi & Goodwin, 2011). It is possible that this fear of another attack, will lead to an overestimation of the risk of this tail risk event (Bardi & Goodwin, 2011), which will in turn lead to a decrease in trust in the unknown groups (i.e. outgroup trust). In the case of religiously motivated terrorist attacks, the hypothesized reduction of outgroup trust is most likely skewed to a reduction in trust in other religions and to a lesser extent other nationalities. At the same time, it is likely that people will put more trust in people they do know, their neighborhood, familiar faces, thereby it is also expected that an increase in terrorist attacks will lead to an increase in ingroup trust. Both mechanisms lead to a narrower trust radius. Leading to the second hypothesis:

Hypothesis 2.A (H2.A): An increase in terrorism corresponds to a directly narrowing of the trust radius.

Hypothesis 2.B (H2.B): An increase in terrorism is followed by a narrowing in the trust radius.

2.2.3 Economic prosperity and trust

Many scholars have studied the relationship between trust and economic growth (e.g. Whiteley, 2000; Zak & Knack, 2001; Beugelsdijk et al., 2004). The general theory was that trust causally affects economic growth. The empirics, however, have been mostly cross-sectional. Fukyama (1996) for instance argued that social trust reduced transaction costs, and the more modern a society becomes, the more important this so-called “moral bond” becomes. Knack and Keefer (1997) argued that trust is especially important in certain transactions and services, e.g. transactions with future payments and difficult to monitor services. Moreover, cooperative trust is argued to reduce the necessity for protective measures, leaving finances

for more productive input (Fukuyama, 1996; Bjørnskov, 2022). These are all long-term mechanisms, however.

When thinking about the medium term, the reverse of the relationship is also plausible. This causality has not yet been studied much. Batrancea (2021) shows that economic growth, in terms of GDP, affected the economic sentiment (i.e. the overall optimism or pessimism about future economic development) in 28 European countries in the first year of the covid crisis. This implies that economic growth, or economic downfall, can have a short-term impact on consumer behavior, and their optimism about the future. Uslaner (2002) argues that optimism about the future is also an important indicator of generalized trust. This leads to the third, and last, hypothesis:

Hypothesis 3.A (H3.A): A decrease in economic prosperity corresponds to a directly narrowing of the trust radius.

Hypothesis 3.B (H3.B): A decrease in economic prosperity is followed by a narrowing in the trust radius.

3 Data

3.1 Dependent Variable: Trust Radius

For our first variable we look at our dependent variable, the main variable of interest. There is no existence of direct data for the trust radius; it is an autonomously calculated variable that is conducted according to the quantification method of Delhey et al. (2011). In their quantification, they regress six specific trust related questions on the question of whether you trust most people or not. The only survey that included those more specific questions was the World Value Survey (WVS), and the first time they included those questions was in the fifth wave (2005-2009).

The suitable WVS waves are the last three waves, being the fifth wave: 2005-2009 (Inglehart et al., 2018), the sixth wave: 2010-2014 (Inglehart et al., 2018), and the seventh wave: 2017-2022 (EVS/WVS, 2022). The countries included in these survey waves are not all countries of the world, nor are they always the same countries. This is the main difficulty with the data for this variable. In total, there are 160 different observations for the trust radius, divided between 65 different countries. Some countries are included in two survey waves, other countries in all three. Coincidentally, one country has been included in four survey waves, the Netherlands, this is due to the merged datasets of the European Value Survey (EVS) and the WVS, one of which did a survey in the Netherlands in 2018, the other in 2022. However, since the data for our explanatory variables only reached up to 2020, this observation will only be included in the two-year lagged regression.

The quantification of the trust radius starts with the construction of two latent variables, ingroup trust and outgroup trust (cf. Delhey et al., 2011). The individual answers of the three ingroup and the three outgroup questions are added up and recoded to values between 0 and 1. After this, a regression is done for each country in each wave separately. The two trust variables are regressed against the most people question. The resulting regression coefficients are subtracted from each other ($\beta_{OUTGROUP} - \beta_{INGROUP}$) (cf. Delhey et al., 2011). In order to get positive values, Delhey et al., (2011) add 1 to the subtraction and then divide it by 2. A visual representation of this quantification is given in appendix I.

The values for the trust radius vary between 0 and 1, in which a higher value means a wider trust radius. The actual observation values vary between 0.243 (Thailand in 2007, also the narrowest trust radius in Delhey et al., 2011) and 0.97 (Germany in 2018), with a mean of

0.563. Switzerland, the highest observation in the Delhey et al. (2011) study, where they only used the fifth wave, ranks in fourth highest trust radius from all our observations. Moreover, table 1 shows that the average standard deviation of the within-country variance is 0.069, as expected this is not very high, as trust is expected to be fairly constant over time. However, of all trust variables this within-country variance is the highest. Ingroup trust shows itself to be the most constant over time. Intuitively you can expect this, as exogenous factors shall hardly affect how much you trust your family and friends. The data for the dependent variable is fairly normally distributed and shall see no further numerical modification.

Table 1. Descriptive Statistics and Variance Components of Key Variables

Variable	Mean	Std.dev.	Min	Max	Observations		
Trust Radius							
overall	0.563	0.121	0.243	0.977	N	=	160
between		0.1	0.383	0.815	n	=	65
within		0.069	0.339	0.807	T-bar	=	2.462
Most People Trust							
overall	0.262	0.178	0.02	0.752	N	=	160
between		0.169	0.034	0.747	n	=	65
within		0.052	0.077	0.447	T-bar	=	2.462
Ingroup Trust							
overall	0.74	0.065	0.542	0.881	N	=	160
between		0.06	0.567	0.87	n	=	65
within		0.024	0.662	0.825	T-bar	=	2.462
Outgroup Trust							
overall	0.399	0.101	0.171	0.69	N	=	160
between		0.096	0.205	0.647	n	=	65
within		0.031	0.287	0.513	T-bar	=	2.462
Corruption							
overall	0.255	1.081	-1.627	2.465	N	=	1235
between		1.075	-1.346	2.28	n	=	65
within		0.171	-1.135	0.885	T	=	19
GTI							
overall	2.198	2.357	0	9.394	N	=	1235
between		2.154	0	8.114	n	=	65
within		0.993	-2.486	6.514	T	=	19
GDP growth (%)							
overall	3.334	6.419	-62.076	123.14	N	=	1235
between		2.002	-0.347	8.972	n	=	65
within		6.104	-62.584	122.632	T	=	19
GDP/cap							
overall	21995.6	17241.7	503.972	102573	N	=	1235
between		16466.6	1271.764	76390.2	n	=	65
within		5484.94	-9274.15	48178.5	T	=	19
Individualism							
overall	43.291	24.689	8	91	N	=	857
between		24.95	8	91	n	=	45
within		0	43.291	43.291	T-bar	=	19.04

3.2 Independent variables

For our explanatory variables, we have data for all years between 2002 and 2020, for the 65 countries that have observations on more than one WVS wave. This means that we have more observations for our explanatory variables than our dependent variable. This is necessary as the years in which we have observations for the dependent variable vary per country. Moreover, by having excess yearly observations of our independent variables we can conduct lagged analyses.

3.2.1 Corruption

The first explanatory variable we will cover regards corruption. For this variable we will use data from one of the six World Governance Indicators (WGI) of Kaufmann, Kraay and Mastruzzi (2011). This data is publicly available through the World Bank databank[1]. Their WGI data has covered over 200 countries, and is currently available from 1996 till 2020. Governance data, and corruption data in particular, always have a component of subjectivity, making it relatively difficult to measure and objectively compare across time and observational units. For instance, a corrupt government will not provide scholars with truthful data about their wrongdoings by its own preference. Because of this subjective component, the WGI project relies solely on perceptions-based governance data (Kaufmann et al., 2011), but they do so from as many relevant perspectives and sources as possible. They use both surveys of firms and households, as well as expert opinions and analyses of commercial organizations, NGOs and public sector bodies. In total they include 31 different data sources. The fact that they use such a wide variety of difference perspectives increases the value of this data. The data from the different sources is recoded into comparable indices and aggregated into the six governance indices. The scores reach from -2.5, which represents the highest possible corruption, or for instance the lowest rule of law. Up to 2.5, which represents the "better" end of the spectrum.

In our dataset, the values of the corruption index reach from -1.627 up to 2.465, with a mean of 0.255, as can be seen in table 1. Countries with high corruption (and thus the lowest corruption values) are Libya, Iraq, Nigeria and Zimbabwe. Countries with the lowest levels of corruption are Finland, Singapore, Norway and Sweden. This information is retraceable from

[1] Retrieved from: https://databank.worldbank.org/source/worldwide-governance-indicators

appendix II, which displays averages per country. Noticeable from table 1, is that the within standard deviation is .171, meaning that the within-country variation is not very high. It is likely that the year-on-year variability is quite low, as a country can hardly go from very corrupt to very incorruptible in one year. However, given that the dependent variable has observations approximately every 5 years, a noticeable change may be expected to be visible in the case of a changing level of corruption. The distribution of the data is a bit skewed to the left. No modification of the variable is necessary, however.

3.2.2 Terrorism

The second explanatory variable regards terrorism. For this variable the dataset from Global Terrorism Database (GTD) (START, 2022) will be used. This database collects data from news channels and converts it into quantitative data from 1970 until 2020. The GTD is a database that displays terrorist events with information on the date, the location, the number of fatalities, the target and much more. Many studies have relied on two types of terrorist data: the number of events, and the number of fatalities (Adabie & Gardeazabal. 2008). On first sight, these seem sufficient for this study as well. However, Abadie and Gardeazabal (2008) argue that solely looking at these absolute numbers is inadequate for usage in a fixed effects model. Firstly, they argue that the number of events might underestimate the number of fatalities. While the reverse might also be true. They argue that the nature of the sentiment on terrorism lies the in the uncertainty of possible future events. Given the fact that this thesis aims to study the impact on the trust radius, it is better to search for the risk of terrorism. This risk is better captured by the Global Terrorism Index (GTI).

The GTI tries to capture the impact of terrorism on a given country for a year. The index bases itself of the GTD and construct values between 0 and 10. Hyslop and Morgan (2014, p. 97) describe it as follows: “The GTI attempts to capture the multidimensional direct impact of terrorist related violence, in terms of its physical effect, as well as emotional wounds and fear, by attributing a single-weighted average national level score.” The GTI does so by allocating different weights to different properties of the terrorist events. The highest weight is allocated to the number of fatalities, hereafter the number of incidents, and thirdly the number of injuries. The last component is either related to the amount of damage (Hyslop & Morgan, 2014; IEP, 2022). Together these four values make up a raw score. One important characteristic of the GTI, is the fact that they also incorporate the scores of past years in the

current year index score. Hereby the index score is a five-year weighted average, with the yearly weights diminishing every year (IEP, 2022). This means that this index goes beyond the impact of terrorism in one year. This is important as in reality the impact of a terrorist event often surpasses the time of one year. Think of the September 11 attacks: this impacted the whole (Western) world for a much longer period than one year. Therefore, it is argued that this value better represents the sentiment than solely looking at absolute numbers. Data for the GTI was only available from 2010 till 2020. However, since this index is calculated based on data from the GTD, and the GTD goes back till 1996, the GTI is recreated based on the methodology published in 'Global Terrorism Index 2022', by the Institute for Economics & Peace on page 87 and 88 (IEP, 2022).

The observational values reach between 0 and 9.394, with a mean of 2.198. The majority of countries have an index value of 0. The highest 7 values are all on the name of Iraq. Other high-ranking countries are Nigeria and Pakistan. The distribution of the values is heavily skewed to the left (towards the zero value). However, since a vast number of values is 0, or below 1, the natural log modification is unfit for this scenario. The variable will not be modified. Despite the many zero scores in the observations, only four countries show an average of 0, meaning only these countries have seen a constant GTI value of 0. The other countries do have a time-varying terrorism index, which is confirmed by the .99 within-country standard deviation shown in table 1, making it interesting to see its effects on the trust radius.

3.2.3 GDP Growth

Lastly, for our explanatory variable on economic prosperity, the data of annual GDP growth in percentages from the World Bank (2022a) will be used. Their data on this variable comprises almost every country in the world, with 2020 as the latest data year by the time of this writing. The GDP growth rate is an annual percentage based on the prior year at market prices in the local currency, which are in turn expressed in US dollars based on constant 2015 prices (World Bank, 2022a). This means that the GDP value and the growth percentages are decently comparable across countries. Data for Taiwan had to be extracted from another place, as it is not accepted as a sovereign country by all. The GDP data for Taiwan is extracted from Trading Economics (2022). Importantly, the GDP data for China does not include the Taiwanese numbers, meaning these numbers are not doubly included (World Bank, 2022a).

Most observations are centered around the zero mark, with a slight skew to the right. This is not surprising as most economies grow at a rate around 2-3% each year. However, there are some outliers that show extraordinary GDP growth percentages. These countries are our usual suspects: the countries that rely heavily on exports of fossil fuels and other natural recourses. The GDPs of those countries have a tendency of following the graph of the oil price. Two major outliers are Libya in 2011 and in 2012. In 2011 their GDP shrunk by 62.1%, only to increase a year later by 123.1%. A similar story is visible for Iraq in 2003 and 2004, where they saw a negative GDP growth of -36.6% in 2003, and a positive GDP growth of 53.4% a year later. Even though these are outliers, the data is truthful and will therefore not be excluded by default.

3.3 Control variables

Based on prior research, two main variables have been identified that show cross-sectional correlation with the trust radius. The Delhey et al. (2011) study concluded that economic prosperity, measured in GDP per capita in PPP, together with Confucianism, explained 43% of the variance in the trust radius. The GDP per capita will therefore be included as a control variable in our analysis. The cultural explanation was later retested by Van Hoorn (2015) who used *individualism* versus *collectivism*. He found such strong correlations between the trust radius and individualism and collectivism, that he concluded that the trust radius may be seen as an inherent part of the cultural spectrum (Van Hoorn, 2015). However, since we are analyzing the time-varying determinants with a fixed effects model, it is impossible to include time-invariant variables. The individualism variable will therefore only be included in the cross-sectional analyses.

3.3.1 GDP per Capita

The data for the GDP per capita is retracted from the World Bank (2022b) databank. Similar to the GDP growth rate, the data is available for most countries in the world—except for Taiwan, which has been discussed in the paragraph above. The per capita variable is more relevant than the country total, as it gives a better insight in the actual welfare at the individual level. That being said, one has to keep in mind that the number is just an average, and the majority of the population generally has lower income than a country's GDP per capita, depending on the inequality within a country.

3.3.2 Individualism

We use Hofstede's (2001) data on individualism. The data was available for 45 out of the 65 countries in our dataset. The values range from 8, the lowest level of individualism, up till 91, the highest level. The lowest value is obtained by Ecuador, the highest represents the United States of America. This variable is not time-variant, and will thus not be included in the fixed effects regressions.

3.4 Bivariate correlations

The bivariate correlation between the main variables of interest is presented below in table 2. Even though this is no prognostic of the upcoming fixed effects regressions, it is still valuable information as a preliminary analysis, as well as an important indication of possible multicollinearity issues. Corruption seems to have a positive correlation with the trust radius (.352). This is something we would expect, as a higher corruption score means less corruption is a country, and these are generally the more developed and individualistic countries. Scandinavian countries showed both high corruption scores as well as high trust radiuses. The Global Terrorism Index shows hardly any correlation with the trust radius (-.017). The GDP growth variable also shows a bit more correlation (-.274). The control variables of GDP per capita and individualism show a correlation of respectively .36 and .493. Both correlations were expected to be fairly high, as it was one of the main conclusions of the Delhey et al. (2011) study. Lastly, it is noteworthy that the correlations between the three trust variables that constructed the trust radius are fairly low. Outgroup trust shows the highest correlation at .41, ingroup trust the lowest at .21, and trust in most people a correlation of .22. This shows that trust radius is something different than the other trust indices. These numbers are in line with the results from the commenting article of Van Hoorn (2014), in which he addresses the labelling mistake, and the complementary conclusion made by Delhey et al. (2011), that outgroup trust is a valid proxy for the trust radius measure. They later restate their conclusion as they say they meant outgroup trust would be a valid proxy for generalized trust (Delhey et al., 2014).

When we scrutinize the correlations between our explanatory variables, the first noteworthy observations are the correlations of the corruption variable. It shows a fairly high correlation of -.435 with the GTI, however, this should not be problematic. The correlation with the control variable of GDP per capita (.786), however, could raise some multicollinearity

issues, as the regression analysis might not be able to tell the where the different effects are coming from. Additional testing of the Variation Inflation Factor (VIF), is necessary in this case. Two other noteworthy correlations, which are only displayed in the correlation matrix in table 2, are the correlation between corruption and most people trust (.634), and the correlation with the outgroup trust (.714). Both are much higher than the relation to the trust radius. Moreover, outgroup trust shows to be much more predictable in its bilateral correlations. A much higher correlation with the other two trust variables, a higher relation to GDP per capita, corruption and GTI. Given the fact that we base our hypothesis partly on this outgroup trust, as it is an important component of the trust radius, we will need to test for this. Therefore, we will also include some regression analysis with the outgroup trust as the dependent variable.

The GTI variable shows a relation of -.396 with our control variable of GDP per capita. Besides the relation to corruption, the others are quite low. The relation the GDP growth variable has to other variables is the lowest. This is not surprising as the value is always a percentage based on the prior year. Lastly, individualism shows high correlations with all the trust variables, reinforcing the notion that trust has a large cultural component. It also shows high correlation with corruption and economic development level of a country.

Table 2. Matrix of Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Trust Radius	1								
(2) Corruption	.352	1							
(3) GTI	-.017	-.435	1						
(4) GDP Growth	-.274	-.371	.122	1					
(5) GDP/cap	.36	.786	-.396	-.473	1				
(6) Individualism	.493	.628	-.11	-.381	.546	1			
(7) Gen. Trust	.22	.634	-.215	-.198	.497	.539	1		
(8) Ingroup Trust	.21	.493	-.099	-.07	.33	.533	.674	1	
(9) Outgroup Trust	.41	.714	-.268	-.343	.64	.747	.668	.767	1

4 Method

4.1 Panel data

In order to get more insight on the time-variant determinants of the trust radius, a quantitative cross-country analysis will be conducted. In measuring and analyzing social trust, cross-country survey analysis has been seen as an important tool (Torpe & Lolle, 2011). Given the fact that our dependent variable is obtained out of such survey data, and the fact that the variable is measured at the country level, a cross-country analysis is the way to go. Conducting such an analysis over time is an important addition to the literature. Having data on different countries over different time periods means that we have a panel dataset. The mere fact that we have a panel dataset channels our choice of methods into the direction of fixed effects, random effects and first differences. In the following chapter we will explain the choice made for one of these empirical methods.

4.1.1 Random Effects

One important difference between the random effects model and the fixed effects model, is the way the constant unobserved variable in the error term is treated. In the random effects model this country effect is seen to be random instead of fixed. In statistical terms this means that this effect is assumed to be uncorrelated with the explanatory variables. You therefore need to have a covariance of zero between the country specific error term and the explanatory variables for all time periods (Wooldridge, 2010). As a result, this random effects model does not include dummy variables for all units of observation. Meaning you lose less degrees of freedom in your analysis. This could be a major advantage, as the degrees of freedom in our analysis are fairly low due to a low number of observations (N = 160). The degrees of freedom would be less when using the fixed effects or first difference method. Another general advantage of the random effects model is that you can include time-invariant variables in your analysis, unlike the other two models. The main time-invariant variable that has shown a significant relationship with our dependent variable is individualism versus collectivism (Van Hoorn, 2015). Therefore, this is a variable that you would want to include as a control variable. However, the random effects model assumption that the omitted variable (i.e. error term) may not correlate with our explanatory variables, will be difficult to meet. Especially when you look at the corruption variable in table 2. Corruption shows a high correlation with the

majority of the variables. Moreover, it displays a .621 correlation with the individualism variable of Hofstede.

In our study we are interested in the partial effects that our observable explanatory variables have on the dependent variable. In a panel data set like the one we have, it is very possible that we have a time-invariant country specific characteristic that is affecting our dependent variable (generally denoted as a_i). This basically means that different countries (the unit of observation in this case) have different constant error terms that are influencing the outcome. An example of such a time-invariant variable is culture. Cultural traits (generally) do not change over time, while they do affect the way that people respond to for instance corruption or terrorism. Given that this study is not interested in such time-invariant determinants, but only in time-variant determinants, we want to take the country fixed effect out of the equation. Another important reason why this is preferable, is because there is little empirical literature proving time-invariant determinants of the trust radius, leaving ample room for omitting important constant variables, and thereby increasing the risk of the omitted variable bias (Wooldridge, 2010). The two most relevant models for losing the country specific error term are the fixed effects model and first differencing.

4.1.2 First Differences

In the model of first differences, one looks at the difference between two time periods. In order to obtain your variable values, you subtract t_1 from t_2 for both the dependent and all the independent variables. With these values you then conduct a simple OLS regression. In this first differencing transformation of the variables, you eliminate the unobserved variable (a_j). Similar to the fixed effects model, we would lose valuable observations, as you diminish the data by T-1 per unit of observation. The first difference model has a less strict exogeneity assumption, and should therefore be preferred if this assumption is not met in the fixed effects model (Wooldridge, 2010). Interpretability of the results is generally seen as an important disadvantage of the first differences method. The value of the coefficients is not as valuable, only the direction in which they go (Wooldridge, 2010).

4.1.3 Fixed Effects

By using the fixed effects model (FE) we can effectively lose the unobserved time-invariant error term for each country. The FE model is time demeaned, meaning that the time-invariant nature of the unobserved variable is accounted for (Wooldridge, 2010; 2012). In order to get

a consistent estimation from our FE model, there are some criteria we must satisfy. The first condition is that our explanatory variables are strict exogenous from the idiosyncratic error. In return, however, the time-invariant country fixed effects may correlate with our explanatory variables—something that is definitely the case when you think of the high correlation between individualism and corruption for example.

In contrary to the random effects model, in the FE model it is possible to make consistent partial estimations when the constant observed variables are correlated to the constant unobserved omitted variables. However, this has the consequence that we may not include these time-invariant observed variables, as the effect the observed variables has on our dependent variable is indistinguishable from the unobserved (Wooldridge, 2010). Meaning we cannot include constant factors such as a countries region, culture or religion in our fixed effects model. This is both an advantage as well as a disadvantage. The analytical power of our model decreases as we may not include possible valuable information. However, given the fact that our dependent variable has only been tested twice (see Delhey et al., 2011; Van Hoorn, 2014), we do not have repetitive conclusive information on the time-invariant determinants. The fact that the scope of this study is only related to time-variant determinants makes this characteristic of the FE model an advantage.

There are some cases in which the usage of one of these models is preferred. In general, the difference in the superiority of the model hinges on the assumptions concerning the idiosyncratic error. In the case of a serially uncorrelated idiosyncratic error, the fixed effects model is more efficient, whereas the first difference method is more efficient if the idiosyncratic error takes a random walk (Wooldridge, 2010). However, when you only have two time periods, the FD and FE estimations are identical (Wooldridge, 2010). In our case we have two and three time periods for our units of observations. This means that the regression outcomes will not differ significantly. Given that a fixed effects model is much better interpretable, this model has our preference. Given that the focus of this study is to identify time-variant determinants of the trust radius. And that one of the main risks is the omitted variable bias. Both the objective and the risk are well captured in the fixed effects model, hence the decision for its usage.

4.2 The Empirical Model

The academic field of social trust generally relies on cross-sectional studies (Dinesen et al., 2020), often leaving the question of causality open for discussion. If scholars used panel data, it was only with the generalized trust measure—the one that was shown to be empirically incomparable across cultures (Delhey et al., 2011). It is therefore necessary to do more panel studies in the field of social trust.

One possible issue in analyses with multiple time periods is the problem of autocorrelation. This is the influence of prior observations on the observation in question (Baltagi, 2001; Wooldridge, 2010). Serial autocorrelation can bias the standard errors by inflating the T-statistic (Drukker, 2003). The problem can the solved by including a lagged term of the dependent variable, this is generally known as a dynamic panel model. The test created by Drukker (2003) is conducted to estimate the presence of autocorrelation in our variables. The results show that there is no case of autocorrelation, which was expected given low number of time periods.

All of the upcoming regressions will be executed by the bootstrap command. This is a command that looks at variation in a model based on small changes in data values. This is necessary in our case as we have a self-quantified dependent variable. The regressions are done with 1000 repetitions.

As this is the first study that analyzes the determinants of the trust radius over time, we are entering unknown waters. It is therefore prudent to first start with a cross-sectional analysis, and then compare that with the fixed effects analysis, which is the main object of this study. In this section, two empirical equations will be described. The first one being the cross-sectional, and the second one is the country fixed effects model. Both models will have small modifications added over time, resulting in three cross-sectional models (models 1 - 3), and five effects models (models 4 - 8).

4.2.1 Cross-sectional model

Starting with the cross-sectional models. The first model will consist of only the explanatory variables, after which we will separately add the two control variables of economic development level and individualism. These three models will give us a first insight in the cross-sectional relationship our variables have with the trust radius. The equation of the cross-sectional model will be as follows:

$$R_i = \beta_0 + \beta_1 C_i + \beta_2 T_i + \beta_3 G_i + Z_i + u_i$$

R_i represents the trust radius per observation. Our explanatory variables corruption, terrorism and economic growth are respectively represented by C_i, $T_i$and G_i, being observations from that same year and country. Together, without the control variables, this will be model 1. The Z_i represents our two control variables. The first one being economic modernity, which is added first, making up model 2. And the second cross-sectional control variable being individualism, which is added in order to produce model 3. Lastly, u_i represents the error term for each observation.

The inclusion of year effects has also been considered, as one can thereby look for possible impacts that are noticeable for a substantial amount of countries in the same year. For instance, if the trust radius would have become narrower for a significant amount of countries due to the covid pandemic in 2020, or the global financial crisis in 2008, this would become visible by inclusion of year effects. By including such year dummies, you can exclude these yearly effects from your main analysis. However, as not all countries have trust radius observations for each year, in our case including year dummies will not capture year effects, but rather effects of which countries are included in which year.

4.2.2 Fixed Effects model (with lags)

After we have analyzed how our variables interact cross-sectionally, we will continue with the main models of interest for our research. In the first country fixed effects model, model 4, solely the explanatory variables are included. In model 5, the control variable of economic development level is added. The time-invariant control variable of individualism is omitted, as it is not time-variant and thus not possible to include in a fixed effects model. Hereafter we include lags for the explanatory variables. Model 6 shall be a one lagged model, and model 7 a two-year lagged model. Model 8 will include the lags that have shown the highest T-statistics in the previous models. The regression equation is as follows:

$$R_{jt} = \beta_0 + \beta_1 C_{jt-1} + \beta_2 T_{jt-1}$$
$$+\beta_3 G_{jt-1} + Z_{jt-1} + D_j + u_{jt}$$

In which R_{jt} is the trust radius for country *j* in year *t*. The explanatory variables have the same capital letter as in the cross-sectional model, *C* (corruption)*, T* (terrorism) and *G* (economic growth), but now for country *j* in year *t*. For model 6 it will be *t*-1, model 7 *t*-2, and in model 8 *t*-3. Z_{jt} now only consists of economic modernity, and follows the same lags as the

explanatory variables. For each country a country dummy is added, represented by D_j. By including country dummies, we are now analyzing the effect of our explanatory variables on our dependent variable within each country over time, instead of between the countries. Lastly, the u_{jt} represents the error term for country *j* at time *t*.

4.2.3 Comparison model: Outgroup trust as dependent variable

As our hypotheses are (partly) based on the expectation that a change in outgroup trust will result in a change in the trust radius, it will be interesting how our explanatory variables behave when we take outgroup trust as the dependent variable. In order to increase our understanding regarding the trust radius and outgroup trust, a comparison model is created. In this model we replace the dependent variable by the average outgroup trust in a country per survey wave. We will replicate the cross-sectional model with included controls, and the fixed effects models with and without lags. The models with outgroup trust as the dependent variable are as follows:

Cross-sectional model:

$$OT_i = \beta_0 + \beta_1 C_i + \beta_2 T_i + \beta_3 G_i + Z_i + u_i$$

Fixed effects model with lags

$$OT_{jt} = \beta_0 + \beta_1 C_{jt-1} + \beta_2 T_{jt-1} + \beta_3 G_{jt-1} + \beta_4 Z_{jt-1} + u_{jt}$$

5 Results

In order to be able to do a thorough analysis multiple models are regressed, which can be compared with each other. The first results are displayed in table 3. On the left-hand side, the predictor variables are outlined. On the right side of that the different regressions coefficients with their respective t-values are demonstrated. Below that it is indicated whether or not the model is conducted with fixed effects or with year effects. Lastly, the number of observations, the R-squared and the significance of the overall model is displayed. Generally, the probability of a model needs to be below .05 in order to be a decent model.

5.1 Cross-sectional Trust Radius

Starting with the explanatory variables, corruption shows an expected positive correlation, meaning that less corruption correlates with a wider trust radius. The high significance of the first two models vanishes by the inclusion of individualism. Terrorism shows a coefficient that is in the opposite direction as expected, with a significance level below 10% in the first two models. Unlike the bivariate correlation, which is shown in table 2, the multivariate analysis switches the negative sign to a positive one, although not being significant, and even less so after including the control variables. One possible reason that the sign of the coefficient changed is because the slightly negative correlation is now captured more by corruption. Lastly, the variable of economic growth shows a negative coefficient, meaning that a higher growth percentage is linked with a lower trust radius, albeit that it is not significant at all—even less so when including the controls. The negative coefficient can be reasoned back to the observation that the level of economic growth a country experiences is largely related to the level of development it has fulfilled. For instance, a country such as China has showed many years of high economic growth, while showing a low trust radius at the same time. Whereas Western European countries generally show a much slower economic growth pace, while often having a higher trust radius.

The inclusion of the control variables proves to be important. In the first two models, the explanatory variable of corruption shows strong significance, with a coefficient in the expected direction. The effect already decreases when we introduce the first control variable of economic modernity, which shows a significant impact in the expected direction in model 2. However, once the last control variable is introduced, all other coefficients lose its significance. This is in line with the previously mentioned conclusion of Van Hoorn (2015,

p.275), in which he stated that “the trust radius might be best understood as an inherent part of the individualism-collectivism cultural syndrome”.

The control variable of economic modernity even loses its significance as well. This is somewhat surprising given the results that Delhey et al. (2011) have reported with this exact same variable. Moreover, their analysis showed an adjusted R-squared of .43, whereas in our case it does not reach above .23. The expected reason for this is that Delhey et al. (2011) used dummy variables for Protestantism and Confucianism instead of Hofstede’s individualism. Inclusion of dummies can have an increasing effect on the R-squared (Wooldridge, 2010), and in this case might have biased the goodness of fit upward.

5.2 Variation in Trust Radius within Countries

We continue with the main analysis of this research: the fixed effects model. Now we are analyzing the variation within a country instead of between countries. Unsurprisingly you see the model’s outcomes changing significantly. In model 4 and 5, the first thing to notice is the change in direction of the corruption coefficient. Indicating that an increase in the corruption score of 1 would statistically correspond with a decrease in the trust radius of 0.0753, although not significantly different from 0. This is in the opposite direction than the direction hypothesized.

The reason for this is not directly obvious. You can hypothesize that an increase in corruption makes people more skeptical of people in power, and that this increases the interpersonal trust and in turn broadens the trust radius. Even though Uslaner (2013) argues the exact opposite, by stating that the ingroup will even accept corruption if it means that someone from the ingroup is in power, whereas the outgroup (i.e. strangers) will be less and less trusted by corrupt actors. Theoretically this would mean that we would get a narrower trust radius, statically we observe we do not. Another hypothesis we can make is that corruption scores are generally increasing, while the trust radius is decreasing, and that there is an omitted variable responsible for this. However, even after including the inequality variable (which is not reported) of Uslaner’s (2013) thesis, the coefficient remains negative in all models (also the later reported outgroup trust models). As the result is not significant we will return to this later.

Our second explanatory variable, terrorism, also shows a coefficient in the opposite direction of the direction hypothesized. According to our fixed effects regression, an increase

in the terrorism index of 1, would result in an increase of the trust radius of .0118, although not statistically significant. In this case it is more straightforward to explain the possible reason for this. As discussed in the chapter of the hypothesis development, several scholars have concluded that it is possible that a society comes together after a terroristic event. Especially in the short term these effects are possibly observable. In the long term the effect diminishes (Peffley et al., 2015). It is also possible that some countries which are prosperous in multiple ways (e.g. economically, socially, and safety wise), and have a broadening trust radius are becoming more impactful targets for terrorist groups.

The last of the explanatory variables is economic growth. This variable generally showed the lowest significance of all variables. The regression statistics show that an increase in the economic growth rate within one country does not have a significant effect on the trust radius. The t-value is so low, and even switches sides after inclusion of the control variable, that it is not useful to hypothesize the direction of the effect. The insignificance, however, can most likely be reasoned back to the variability of one's economic growth rate, and the stability of the trust radius.

In general, the within-country variation is not very well explained by our explanatory variables. According to the R-squared, 7.2% of the variation in the radius of trust is explained by the explanatory variables and the control variable. The first results of the study did not reveal significant evidence for a direct effect of our three explanatory variables on the trust radius. The first three hypotheses, H1.1, H2.1 and H3.1, cannot be confirmed based on our results.

Table 3. Regression results with the Trust Radius as the dependent variable

	Cross-sectional			Fixed Effects	
Predictors	Model 1	Model 2	Model 3	Model 4	Model 5
Explanatory Variables					
Corruption	0.0486***	0.0331***	0.000755	-0.0589	-0.0753
	(5.23)	(2.85)	(0.04)	(-1.04)	(-1.32)
Terrorism	0.00638*	0.00682*	0.00533	0.0162	0.0118
	(1.70)	(1.76)	(0.90)	(1.07)	(0.72)
Economic Growth	-0.00324	-0.00188	-0.00272	-0.000480	0.000381
	(-1.50)	(-0.83)	(-0.60)	(-0.12)	(0.09)
Control Variables					
Development level		0.0278**	0.0257		0.0485
		(2.17)	(0.97)		(1.13)
Individualism			0.00205***		
			(2.81)		
Intercept	0.545***	0.273**	0.234	0.544***	0.0827
	(33.52)	(2.23)	(0.89)	(11.52)	(0.20)
Fixed Effects	NO	NO	NO	YES	YES
Bootstrap regression	YES	YES	YES	YES	YES
Observations	156	156	112	156	156
R^2 (within)	-	-	-	0.054	0.072
Adjusted R-squared	0.148	0.161	0.231	-	-
Prob > Chi2	0.000	0.000	0.000	0.409	0.345

Note: All analyses are conducted with robust standard errors. T statistics in parentheses. *p<0.1; **p<0.05; ***p<0.01. All regression models are executed with a 1000 bootstrap repetitions.

Table 4 shows the regression models with a lagged effect. It is statistically tested for two different lag periods, a lag of one year (model 6), and a lag of two years (model7). Any lag beyond that will be theoretically too difficult to explain. The regression with a direct effect (model 5) is analyzed in the previous section and is included there as a reference.

To be concise, we see no significant improvement of the model, nor of the individual variables, that indicates that a lagged effect is present in our model. The t-values only slightly increase, in the case of terrorism and economic growth rate, while it slightly decreases in the case of the development level. Corruption almost stays the same in all models.

When we combine the coefficients of the different lags with the highest t-values into one model, the model fit does increase substantially. In model 8, the direct effect of corruption is included, the lagged effect of one year of the control variable is included, and lastly the two-year lagged effect of economic growth and terrorism are included. Still, none of the effects are significant at the five percent level, nor the ten percent level. The R-squared, however, does almost double, while the significance of the model almost reaches the 5% threshold. We

can hereby reject the remaining hypotheses, H1.2, H2.2, and H3.2. We see no lagged impacts of our explanatory variables on our dependent variable.

Table 4. Regression results of lagged models with the Trust Radius as the dependent variable

Predictors	Model 5		Model 6		Model 7		Model 8	
Corruption	-0.0753	(-1.32)					-0.0842	(-1.57)
Terrorism	0.0118	(0.72)						
Economic Growth	0.000381	(0.09)						
Development Level	0.0485	(1.13)						
$Corruption_{t-1}$			-0.0560	(-1.20)				
$Terrorism_{t-1}$			0.0116	(0.86)				
$Economic\ Growth_{t-1}$			0.00111	(0.31)				
$Development\ Level_{t-1}$			0.0468	(1.10)			0.0516	(1.26)
$Corruption_{t-2}$					-0.0676	(-1.29)		
$Terrorism_{t-2}$					0.0152	(1.20)	0.0146	(1.21)
$Economic\ Growth_{t-2}$					0.000967	(0.40)	0.002526	(1.47)
$Development\ Level_{t-2}$					0.0383	(0.95)		
Constant,	0.0827	(0.20)	0.0930	(0.23)	0.173	(0.45)	0.0362	(0.09)
Fixed Effects	YES		YES		YES		YES	
Bootstrap	YES		YES		YES		YES	
Observations	156		159		160		156	
R^2 (within)	0.072		0.063		0.079		0.124	
Prob > Chi2	0.345		0.3955		0.3264		0.0837	

Note: All analyses are conducted with robust standard errors. T statistics in parentheses. *p<0.1; **p<0.05; ***p<0.01.

All regression models are executed with a 1000 bootstrap repetitions.

5.3 Outgroup Trust as the Dependent Variable

As our dependent variable is a subtraction of two regression coefficients, it is fairly difficult to predict in the height of its value. The value of the trust radius is influenced by three trust components, where all three can change in any direction, resulting in a difficult to predict variability of the radius. The outgroup trust, on the other hand, seems more stable and more predictable. By replacing outgroup trust as the dependent variable, we might increase our knowledge of the previously analyzed regressions. The results are shown in table 5, in which we conducted one cross-sectional analysis (model 9), and three fixed effects analyses (model 10, 11, and 12). Important to mention here is that the increased T-statistics we shall find in this section do not solely result from the decreased T-statistics from the bootstrapped regressions done with the radius as the dependent variable, as this has been tested.

5.3.1 Outgroup Trust Cross-Sectionally

Starting with the cross-sectional analysis, we immediately see two strong results on outgroup trust. Firstly, it seems that individualism has a fairly strong positive significant effect on outgroup trust. As the Hofstede individualism score has a range of 0-100, and outgroup trust of 0-1, individualism has a possible impact of 0.219 on the outgroup trust. The t-value is the highest we have seen yet. Secondly, corruption also has a positive significant relationship with outgroup trust. An increase in the corruption score of 1, corresponds to an increase of .0302 of outgroup trust. This is a stronger correlation than we found on the trust radius, in which case the correlation disappeared after inclusion of the control variables.

Thirdly, the level of development nearly reaches a significant correlation with outgroup trust. Given that we used a logarithmic transformation, a 10% increase in the economic development level, corresponds to an increase of .00205 in outgroup trust, which is obviously very small. Lastly, terrorism and the economic growth pace do not show significant correlations, meaning we can hereby conclude that these variables do not have a cross-sectional correlation with trust, nor the outgroup nor the radius.

The adjusted R-squared shows a very high model fit, as it seems that 65.1% of the variation in outgroup trust is explained by our variables. The majority of the variance is culturally explained. The risk of multicollinearity is not confirmed by high VIF scores in this model (Wooldridge, 2010).

5.3.2 Fixed Effects Analysis: Outgroup Trust

In our fixed effects analysis we can immediately see a model improvement. The adjusted R-squared is substantially higher, and we see more significant results, of overall models also show a significant probability in all cases. The lagged models seem better fitted than the model of direct impact.

Corruption still shows a negative impact on trust, this time even significant in the two lagged models. An increase in the corruption score by 1 is followed by a decrease of .0522 in outgroup trust two years later. From the perspective of a decreasing corruption score, thus more corruption, it is possible to reason that this increases interpersonal trust, and thereby outgroup trust. If we reason in the opposite direction, however, it feels more farfetched. You can argue that an increasing corruption score results in people trusting the system more and more, and then in turn lose a bit of interpersonal trust instead. This would explain the lagged effect that it has, as it takes time to convert your trust from people to the system. However, no literature has been found to support this hypothesis.

Terrorism has no significant effect over time on outgroup trust. Although it does come close in the two-year lagged model. There an increase of 1 in the terrorism index is followed by an increase in outgroup trust of .00589 two year later. It is, however, not significant at the 5% level. Moreover, terrorism should theoretically have a direct impact and not a lagged one. The other explanatory variable with no impact over time is the economic growth pace. Similar to the trust radius models we do not find any relation to trust here, making our conclusion regarding the relation over time between a change in economic growth pace and trust crystal clear.

Lastly, the control variable of the economic development level does show significant relationships in all fixed effects models. Albeit a very small effect. The most significant impact a change in the development level seems to have is after two years, here an increase of 10% in GDP per capita, is followed by an increase of .00323 in outgroup trust. A change in development level has direct impact on outgroup trust, and the impact increases over time per year with very small increments.

Table 5. Regression results with the Outgroup Trust as the dependent variable

	Cross-Sectional		Fixed effects					
Predictors	Model 9		Model 10		Model 11		Model 12	
Corruption	0.0302***	(2.88)	-0.0196	(-0.93)				
Terrorism	-0.00172	(-0.68)	0.00408	(0.98)				
Economic Growth	0.000859	(0.41)	-0.000915	(-0.86)				
Dev. Level	0.0215*	(1.73)	0.0298**	(2.30)				
Individualism	0.00219***	(8.54)						
$Corruption_{t-1}$					-0.0510**	(-2.25)		
$Terrorism_{t-1}$					0.00508	(1.50)		
$Economic\ Growth_{t-1}$					-0.00107	(-1.14)		
$Dev.\ Level_{t-1}$					0.0303**	(2.19)		
$Corruption_{t-2}$							-0.0522***	(-2.76)
$Terrorism_{t-2}$							0.00589*	(1.68)
$Economic\ Growth_{t-2}$							-0.000147	(-0.60)
$Dev.\ Level_{t-2}$							0.0339***	(2.75)
Intercept	0.0876	(0.70)	0.108	(0.84)	0.110	(0.86)	0.0732	(0.64)
Fixed Effects	NO		YES		YES		YES	
Bootstrap	NO		NO		NO		NO	
Observations	112		156		159		160	
R^2 (within)	-		0.102		0.153		0.156	
Adjusted R^2	0.651		-		-		-	
Prob > F	0.000		0.0088		0.0004		0.0027	

Note: All analyses are conducted with robust standard errors. T statistics in parentheses. *p<0.1; **p<0.05; ***p<0.01. These regressions are not bootstrapped, unlike the other regression models.

6 Discussion

This study had the objective to identify possible time-variant determinants of the trust radius. The determinants that were analyzed are corruption, terrorism and economic prosperity. The hypothesized impacts were either direct or with a lagged impact for all determinants. Even though we did not find significant results in support of our hypotheses, important lessons regarding the trust radius are learned.

6.1 Findings

Considering that this study followed the quantification developed by Delhey et al. (2011), it is natural that we compare our results to theirs, especially given that we also did cross-sectional analyses with their main conclusive variables. They concluded that there were two societal level variables that significantly influenced the trust radius, whether or not a society has Confucianist heritage and the level of economic development. With more than twice as many observations in our analysis, we cannot confirm their conclusions. The cross-sectional correlation of economic development and the trust radius loses all of its significance after inclusion of the cultural variable of individualism. The usage of the cultural dummy variables in the Delhey et al. (2011) study seems to overestimate the explained variance, and inaccurately present economic development as a significant societal explainer.

The conclusion of Van Hoorn (2015), however, can be fully confirmed. With more than three times as many observations, we can support the claim that “the trust radius can be best understood as an inherent part of the individualism-collectivism cultural syndrome” (Van Hoorn, 2015, p. 275). Even though this is not a new insight, it is an important confirmation. As our analysis included much more observations (more countries, with multiple time periods), as well as more other (independent) variables, hereby strengthening the claim.

The last finding that we have to discuss regards the time-variant behavior of corruption on both the trust radius as well as outgroup trust. In the cross-sectional analyses, corruption shows the expected relation, less corruption relates to a broader trust radius and more outgroup trust, although not significant in the case of the trust radius. This is in line with previous research (e.g. Seligson, 2002; Štulhofer, 2004; Uslaner, 2003). Not all literature follows these conclusions, however. Mishler and Rose (2001) concluded that social position—and related to that personal evaluation—matters most for whether institutional trust relates

to interpersonal trust. Moreover, Graeff and Svendsen (2012) conclude that corruption does not seem to be able to affect social trust when studying 25 countries in the European Union.

Our analysis directly opposes the conclusion made by Richey (2010), who finds a direct relation between change in corruption levels and change in generalized trust in the United States. This study does lack generalizability as it focusses on only one country over a time period of only 4 years. It is thus possible that the results for one country, the US, demonstrates an opposite relationship to the rest of the world.

6.2 Limitations

The first limitation, which is not uncommon in the trust literature (Uslaner, 2002), is the low number of observations. On the first hand, this might be one of the reasons that we find inconclusive results. If an effect is small, which is likely given that we are studying change in trust, the effect might not create a T-statistic that is high enough for significant results, leading to an inconclusive study. More time periods per country would have been desirable in order to conduct a conclusive panel study. Now countries only had 2 or 3 time periods, with on average 5 years in between the observations. Obviously, many things can happen in 5 years; macro societal trends can go up and down in such a time period.

Secondly, a more general coverage of countries worldwide would have increased the generalizability of the results. The value surveys are conducted by researchers on the ground, meaning it is a very labor-intensive process (WVS, 2020). Understandably, they are not able to conduct a round of surveys in every country in every year. This would, however, be preferable for increasing our knowledge on values.

Last, and most importantly, the value outcomes of the trust radius have also raised some questions. Especially when you look at the trust radius over time. When analyzing the biggest deltas of the trust radius, and you look at the deltas of the generalized trust, the outgroup trust, as well as the ingroup trust, it is often difficult to observe where this change is coming from.

By regressing the in- and outgroup trust with the generalized trust, Delhey et al. (2011) impressively demonstrated that the most people question was imprecise. However, by using regression coefficients they also made the trust radius more volatile and vulnerable. For instance, Germany in 2018 (no. 82 in appendix IV), the trust radius increased by .45, while the generalized trust, outgroup trust and the ingroup trust, only increased by .02, .04, and .04.

More examples where the origin of the change in the trust radius is not logically traceable are findable in appendix IV (e.g. numbers 1 till 5, and numbers 75, 78, 80, and 81). Even outside the list of the biggest deltas some noteworthy changes can be identified. Observably, the trust radius can increase while the other three trust variables decrease (see Thailand, number 73 in appendix IV), and can decrease while the other variables increase (see Slovenia, number 10 in appendix IV). The fact that the dependent variable is so time inconsistent makes it very difficult, if not impossible, to formulate valid hypotheses.

Yes, in some cases (e.g. China), the trust radius is lower than the generalized trust, demonstrating a society might have had an ingroup connotated thought when answering the question whether they trust most people or not. The other way around even more examples can be found. A country like Zimbabwe, where only 4.9% say they trust most people, while 34.9% says they trust the outgroup. Such countries now have a trust radius value that possibly better represent the width of their trust radius. But one could also make this conclusion by just analyzing the outgroup trust in comparison to the generalized trust. One does not need to subtract of two regression coefficients to come to this conclusion. All we needed were some more specific trust related questions.

6.3 Future Research

In the field of cross-cultural research, it is often a challenge to make correct interpretations about the generalizability of cultural variables. How much within-country consensus on a variable do you need in order to conclude that it is an important value in one culture? Values have been argued to be a cultural dimension (Hofstede, 2001), properties of individuals (Schwartz, 1992), or reflections of social structures (Hitlin & Piliavin, 2004). A study which compared the between country variability with the within-country variability of values concluded that value ratings varied much more between individuals than between countries (Fischer & Schwartz, 2011). One limitation of this manner of calculating the trust radius is that it is only possible to obtain it as a country level value. Future research on trust should also focus on individual level studies, preferably also by resurveying the same individuals over longer time periods.

Panel analyses remains to be an insufficiently investigated area in the trust literature. Finally, since 2005 more specific trust related questions are included in the value surveys. Only time can reduce the lack of trust data over time. Future research should stay interested in

time-variant determinants of the different trust concepts in order to increase our knowledge in this important concept. That this quantification of the trust radius is the best way forward, however, is not supported based on our results.

7 Conclusion

The fixed effects analysis did not produce supporting results for the stated hypotheses. This means that this study was not able to identify time-variant determinants of the trust radius. The hypotheses that were developed were based on expected variation in the outgroup trust, an important fragment of the trust radius. The results, however, demonstrated differently. The comparison models exposed that the explanatory variables explained much more variance of outgroup trust than of the trust radius. This indicates that either outgroup trust is not that big of a determinant of the radius of trust, or that the quantification of the trust radius is fit for time-variant analysis. Based on the many large within-country deltas found in the radius of trust that are not explained by variance in the other trust concepts, the latter is argued. The regression quantification method created by Delhey et al. (2011) shows weaknesses when analyzed over time, whereas it did not show this in the cross-sectional analyses done prior to this study. This weakness, its impreciseness, is argued to currently be a problem due to the low number of observations of the radius.

Cross-sectionally our study also gave valuable insights. The fact that the control variable, individualism, showed a strong relationship with the trust radius may be seen as a supportive result for Van Hoorn's (2015) conclusion. Demonstrating the robustness of this relationship. At the same time the relationship between the economic development level and the trust radius that was concluded by Delhey et al. (2011) has to be attenuated based on the results of this study. This study had more than twice the observations and the relationship did not hold. It is argued that the significance they found is likely due to usage of dummy variables and omission of inclusion of individualism as a variable.

Future research should continue on the path of using panel data in the field of trust. The newly added questions shall give us more valuable insights. Unfortunately, only time will help, and we shall need a lot of time before we have valuable data regarding the new trust questions.

References

Abadie, A. & Gardeazabal, J. (2008). Terrorism and the world economy. *European Economic Review*, *52*(1), 1–27. https://doi.org/10.1016/j.euroecorev.2007.08.005

Acemoglu, D. & Ozdaglar, A. (2011). Opinion Dynamics and Learning in Social Networks. *Dyn Games Appl* 1, 3–49. https://doi.org/10.1007/s13235-010-0004-1

Arrow, K. J. (1972). Gifts and Exchanges. *Philosophy & Public Affairs*, *1*(4), 343–362. http://www.jstor.org/stable/2265097

Baltagi, B. H. (2001). *Econometric analysis of panel data* (2nd ed.). New York:

John Wiley

Bardi, A., & Goodwin, R. (2011). The Dual Route to Value Change: Individual Processes and Cultural Moderators. *Journal of Cross-Cultural Psychology*, *42*(2), 271–287. https://doi.org/10.1177/0022022110396916

Bardi, A., & Schwartz, S. H. (2003). Values and Behavior: Strength and Structure of Relations. *Personality and Social Psychology Bulletin*, *29*(10), 1207–1220. https://doi.org/10.1177/0146167203254602

Batrancea, L. (2021). Empirical Evidence Regarding the Impact of Economic Growth and Inflation on Economic Sentiment and Household Consumption. *Journal of Risk and Financial Management*, *14*(7), 336. https://doi.org/10.3390/jrfm14070336

Bauer, P. C. (2015). Negative Experiences and Trust: A Causal Analysis of the Effects of Victimization on Generalized Trust. *European Sociological Review*, *31*(4), 397–417. https://doi.org/10.1093/esr/jcu096

Bauer, P. C. (2021). Clearing the Jungle: Conceptualising Trust and Trustworthiness. In Freitas, R.B., & Iacono, S.L. (Eds.), Trust Matters: Cross-Disciplinary Essays (p. 17-34). Oxford: Hart Publishing. http://dx.doi.org/10.5040/9781509935284

Becker, L. C. (1996). Trust as Noncognitive Security about Motives. *Ethics*, *107*(1), 43–61. https://doi.org/10.1086/233696

Beugelsdijk, S., de Groot, H. L. F., & van Schaik, A. B. T. M. (2004). Trust and economic growth: A robustness analysis. *Oxford Economic Papers*, *56*(1), 118–134. https://doi.org/10.1093/oep/56.1.118

Bjørnskov, C. (2007). Determinants of generalized trust: A cross-country comparison. *Public Choice*, *130*(1–2), 1–21. https://doi.org/10.1007/s11127-006-9069-1

Bjørnskov, C. (2022). Social trust and patterns of growth. *Southern Economic Journal*, *89*(1), 216–237. https://doi.org/10.1002/soej.12590

Blomberg, S. B., Hess, G. D., & Tan, D. Y. (2011). Terrorism and the economics of trust. *Journal of Peace Research*, *48*(3), 383–398. https://doi.org/10.1177/0022343311401641

Burns, N., Kinder, D., & Rahn, W. (2003, March 31). *Social Trust and Democratic Politics* [Conference paper]. Political Science Association, Chicago, Illinois, US. Retrieved from https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.203.4681&rep=rep1&type=pdf

Delhey, J., Newton, K., & Welzel, C. (2011). How General Is Trust in "Most People"? Solving the Radius of Trust Problem. *American Sociological Review*, *76*(5), 786–807. https://doi.org/10.1177/0003122411420817

Delhey, J., Newton, K., & Welzel, C. (2014). The Radius of Trust Problem Remains Resolved. *American Sociological Review*, *79*(6), 1260–1265. https://doi.org/10.1177/0003122414555399

Delhey, J., & Welzel, C. (2012) Generalizing Trust: How Outgroup-Trust Grows Beyond Ingroup-Trust. World Values Research, WVR *5*(3) https://doi.org/10.2139/ssrn.2390636

Dinesen, P. T. (2012). Parental Transmission of Trust or Perceptions of Institutional Fairness: Generalized Trust of Non-Western Immigrants in a High-Trust Society. *Comparative Politics*, *44*(3), 273–289. https://doi.org/10.5129/001041512800078986

Dinesen, P. T., Schaeffer, M., & Sønderskov, K. M. (2020). Ethnic Diversity and Social Trust: A Narrative and Meta-Analytical Review. *Annual Review of Political Science*, *23*, 441-465. https://doi.org/10.1146/annurev-polisci-052918-020708

Dohmen, T., Falk, A., Huffman, D., & Sunde, U. (2012). The Intergenerational Transmission of Risk and Trust Attitudes. *The Review of Economic Studies*, *79*(2), 645–677. https://doi.org/10.1093/restud/rdr027

Drukker, D. M. (2003). Testing for Serial Correlation in Linear Panel-data Models. *The Stata Journal: Promoting Communications on Statistics and Stata*, *3*(2), 168–177. https://doi.org/10.1177/1536867X0300300206

EVS/WVS (2022). European Values Study and World Values Survey: Joint EVS/WVS 2017-2022 Dataset (Joint EVS/WVS). JD Systems Institute & WVSA. Dataset Version 3.0.0, https://doi.org/10.14281/18241.19

Finseraas, H., & Listhaug, O. (2013). It can happen here: The impact of the Mumbai terror attacks on public opinion in Western Europe. *Public Choice*, *156*(1–2), 213–228. https://doi.org/10.1007/s11127-011-9895-7

Fischer, R., & Schwartz, S. (2011). Whence Differences in Value Priorities?: Individual, Cultural, or Artifactual Sources. *Journal of Cross-Cultural Psychology*, *42*(7), 1127–1144. https://doi.org/10.1177/0022022110381429

Fukuyama, F. (1996). *Trust: The social virtues and the creation of prosperity*. Simon and Schuster.

Fukuyama, F. (1999). Social Capital and Civil Society. Presented at IMF Conference on Second Generation Reforms, IMF. Washington, DC

Fukuyama, F. (2001). Social capital, civil society and development. *Third World Quarterly*, *22*(1), 7–20. https://doi.org/10.1080/713701144

Glanville, J. L., & Paxton, P. (2007). How do We Learn to Trust? A Confirmatory Tetrad Analysis of the Sources of Generalized Trust. *Social Psychology Quarterly*, *70*(3), 230–242. https://doi.org/10.1177/019027250707000303

Graeff, P., & Svendsen, G. T. (2013). Trust and corruption: The influence of positive and negative social capital on the economic development in the European Union. *Quality & Quantity*, *47*(5), 2829–2846. https://doi.org/10.1007/s11135-012-9693-4

Hardin, R. (1992). The Street-Level Epistemology of Trust. *Analyse & Kritik*, *14*(2), 152–176. https://doi.org/10.1515/auk-1992-0204

Hardin, R. (2002). *Trust and trustworthiness*. Russell Sage Foundation.

Hitlin, S., & Piliavin, J. A. (2004). Values: Reviving a Dormant Concept. *Annual Review of Sociology*, *30*(1), 359–393. https://doi.org/10.1146/annurev.soc.30.012703.110640

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations* (2nd Edition). Thousand Oaks, CA: Sage.

Hu, A. (2017). Radius of trust: Gradient-based conceptualization and measurement. *Social Science Research*, *68*, 147–162. https://doi.org/10.1016/j.ssresearch.2017.08.004

Hyslop, D., & Morgan, T. (2014). Measuring Terrorism with the Global Terrorism Index. In *Contributions to Conflict Management, Peace Economics and Development* (Vol. 22, pp. 97–114). Emerald Group Publishing. https://doi.org/10.1108/S1572-8323(2014)0000022010

Inglehart, R., C. Haerpfer, A. Moreno, C. Welzel, K. Kizilova, J. Diez-Medrano, M. Lagos, P. Norris, E. Ponarin & B. Puranen (2018). World Values Survey: Round Five - Country-Pooled [Datafile]. Madrid, Spain & Vienna, Austria: JD Systems Institute & WVSA Secretariat. doi.org/10.14281/18241.7

Inglehart, R., C. Haerpfer, A. Moreno, C. Welzel, K. Kizilova, J. Diez-Medrano, M. Lagos, P. Norris, E. Ponarin & B. Puranen (2018). World Values Survey: Round Six - CountryPooled [Datafile]. Madrid, Spain & Vienna, Austria: JD Systems Institute & WVSA Secretariat. doi.org/10.14281/18241.8

IEP (Institute for Economics & Peace). (2022, March). Global Terrorism Index 2022: Measuring the Impact of Terrorism. Sydney. Retrieved from: http://visionofhumanity.org/resources

Jones, K. (1996). Trust as an affective attitude. *Ethics*, *107*(1), 4-25. https://www.jstor.org/stable/2382241

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2011). The Worldwide Governance Indicators: Methodology and Analytical Issues. *Hague Journal on the Rule of Law, 3*(2), 220-246. https://doi.org/10.1017/S1876404511200046

Knack, S., & Keefer, P. (1997). Does Social Capital Have an Economic Payoff? A Cross-Country Investigation. *The Quarterly Journal of Economics*, *112*(4), 1251–1288. https://doi.org/10.1162/003355300555475

Krieger, T., & Meierrieks, D. (2011). What causes terrorism?. *Public Choice*, *147*(1), 3-27. https://doi.org/10.1007/s11127-010-9601-1

Lindsey, B. (2002, November 20) Terrorism & Trust. CATO Institute. Retrieved from https://www.cato.org/commentary/terrorism-trust

Maio, G. R. (2010). Mental representations of social values. In M. P. Zanna (Ed.), *Advances in experimental social psychology Vol 42*, (pp. 1–43). Academic Press. https://doi.org/10.1016/S0065-2601(10)42001-8

Maio, G. R., Pakizeh, A., Cheung, W.-Y., & Rees, K. J. (2009). Changing, priming, and acting on values: Effects via motivational relations in a circular model. *Journal of Personality and Social Psychology*, *97*(4), 699–715. https://doi.org/10.1037/a0016420

Mishler, W., & Rose, R. (2001). What Are the Origins of Political Trust?: Testing Institutional and Cultural Theories in Post-communist Societies. *Comparative Political Studies*, *34*(1), 30–62. https://doi.org/10.1177/0010414001034001002

Niazi, A., & Hassan, H. (2016). Trust and economic performance: Evidence from cross-country panel data analysis. *Review of International Business and Strategy*, *26*(3), 371–391. https://doi.org/10.1108/RIBS-02-2016-0010

Peffley, M., Hutchison, M. L., & Shamir, M. (2015). The Impact of Persistent Terrorism on Political Tolerance: Israel, 1980 to 2011. *American Political Science Review*, *109*(4), 817–832. https://doi.org/10.1017/S0003055415000441

Reeskens, T. (2013). But Who Are Those “Most People” That Can Be Trusted? Evaluating the Radius of Trust Across 29 European Societies. *Social Indicators Research*, *114*(2), 703–722. https://doi.org/10.1007/s11205-012-0169-7

Richey, S. (2010). The Impact of Corruption on Social Trust. *American Politics Research*, *38*(4), 676–690. https://doi.org/10.1177/1532673X09341531

Roccas, S., Sagiv, L., Schwartz, S. H., & Knafo, A. (2002). The Big Five Personality Factors and Personal Values. *Personality and Social Psychology Bulletin*, *28*(6), 789–801. https://doi.org/10.1177/0146167202289008

Rokeach, M. (1968). A Theory of Organization and Change Within Value-Attitude Systems. *Journal of Social Issues*, *24*(1), 13–33. https://doi.org/10.1111/j.1540-4560.1968.tb01466.x

Rothstein, B., & Stolle, D. (2008). The State and Social Capital: An Institutional Theory of Generalized Trust. *Comparative Politics*, *40*(4), 441–459. https://doi.org/10.5129/001041508X12911362383354

Schneider, D. (2004). Human Rights Issues in Guantanamo Bay. *The Journal of Criminal Law*, *68*(5), 423–439. https://doi.org/10.1350/jcla.68.5.423.43228

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. P. Zanna (Ed.), *Advances in experimental social*

psychology Vol. 25, pp. 1–65). Academic Press. https://doi.org/10.1016/S0065-2601(08)60281-6

Schwartz, S. H., & Rubel, T. (2005). Sex differences in value priorities: Cross-cultural and multimethod studies. *Journal of Personality and Social Psychology*, *89*(6), 1010–1028. https://doi.org/10.1037/0022-3514.89.6.1010

Seligson, M. A. (2002). The Impact of Corruption on Regime Legitimacy: A Comparative Study of Four Latin American Countries. *The Journal of Politics*, *64*(2), 408–433. https://doi.org/10.1111/1468-2508.00132

Sønderskov, K. M., & Dinesen, P. T. (2016). Trusting the State, Trusting Each Other? The Effect of Institutional Trust on Social Trust. *Political Behavior*, *38*(1), 179–202. https://doi.org/10.1007/s11109-015-9322-8

START (National Consortium for the Study of Terrorism and Responses to Terrorism). (2022). Global Terrorism Database 1970 - 2020 [data file]. https://www.start.umd.edu/gtd

Štulhofer, A. (2004). Perception of Corruption and the Erosion of Social Capital in Croatia 1995-2003. *Politička misao, 61*(5)*,* 74–86. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.716.8114&rep=rep1&type=pdf

Sturgis, P., & Smith, P. (2010). Assessing the Validity of Generalized Trust Questions: What Kind of Trust are we Measuring? *International Journal of Public Opinion Research*, *22*(1), 74–92. https://doi.org/10.1093/ijpor/edq003

The World Bank. (2022a). *GDP Growth, annual %* [Data file]. Retrieved from https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG

The World Bank. (2022b). *GDP per capita, PPP (current international $)* [Data file]. Retrieved from https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD

Torpe, L., & Lolle, H. (2011). Identifying Social Trust in Cross-Country Analysis: Do We Really Measure the Same? *Social Indicators Research*, *103*(3), 481–500. https://doi.org/10.1007/s11205-010-9713-5

Trading Economics. (2022). *Taiwan GDP*. Retrieved from https://tradingeconomics.com/taiwan/gdp

Uslaner, E. M. (2002). *The Moral Foundations of Trust*. Cambridge University Press.

Uslaner, E.M. (2003). Trust, Democracy and Governance: Can Government Policies Influence Generalized Trust? In M. Hooghe & D. Stolle (Eds.), *Generating Social Capital* (pp. 171 – 190). Palgrave Macmillan, New York.

Uslaner, E. M. (2013). Trust and corruption revisited: How and why trust and corruption shape each other. *Quality & Quantity*, *47*(6), 3603–3608. https://doi.org/10.1007/s11135-012-9742-z

Uslaner, E. M. (2018). The Study of Trust. In E.M. Uslaner (Eds.), *The Oxford handbook of social and political trust* (3-14). Oxford University Press.

Van Hoorn, A. (2014). Trust Radius versus Trust Level: Radius of Trust as a Distinct Trust Construct. *American Sociological Review*, *79*(6), 1256–1259. https://doi.org/10.1177/0003122414555398

Van Hoorn, A. (2015). Individualist–Collectivist Culture and Trust Radius: A Multilevel Approach. *Journal of Cross-Cultural Psychology*, *46*(2), 269–276. https://doi.org/10.1177/0022022114551053

Whiteley, P. F. (2000). Economic Growth and Social Capital. *Political Studies*, *48*(3), 443–466. https://doi.org/10.1111/1467-9248.00269

Wooldridge, J. M. (2010). *Econometric Analysis of Cross Section and Panel Data* (2nd Edition). The MIT Press.

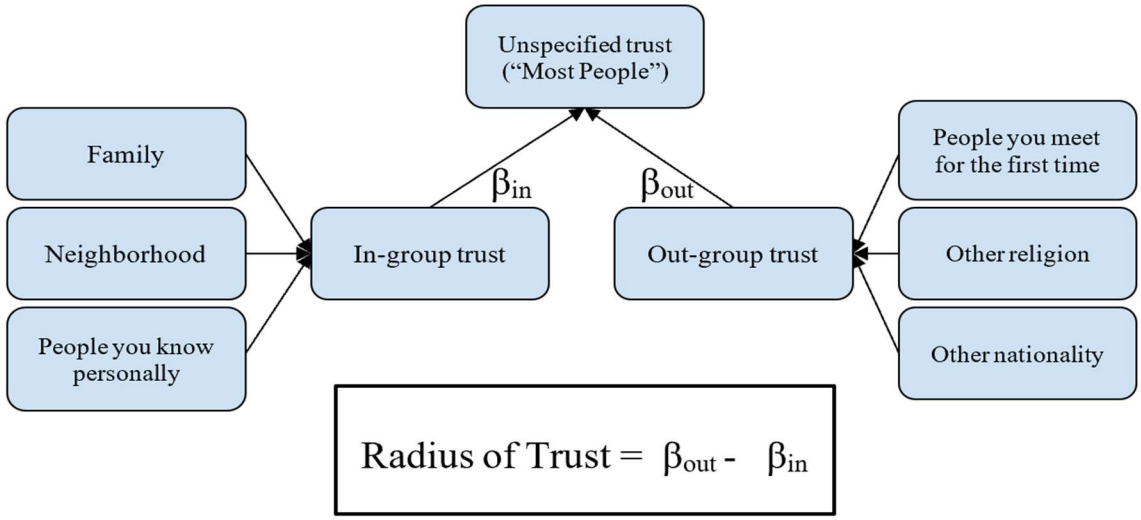
Wooldridge, J. M. (2012). *Introductory Econometrics: A Modern Approach* (5th Edition). Cengage Learning.

WVS. (2020). *What we do: Fieldwork and Sampling*. WVS. Retrieved from https://www.worldvaluessurvey.org/WVSContents.jsp

Yamagishi, T. (2001). Trust as a form of social intelligence. In K. S. Cook (Eds.), *Trust in society* (pp. 121–147). Russell Sage Foundation.

Zak, P. J., & Knack, S. (2001). Trust and Growth. *The Economic Journal*, *111*(470), 295–321. https://doi.org/10.1111/1468-0297.00609

Appendix I: Quantification Radius of Trust by Delhey, Newton and Welzel (2011)



Appendix II: Means per country main variables

no.	*Country*	*N*	*Radius*	*Gen. Trust*	*In.Trust*	*Out.Trust*	*Corruption*	*GTI*	*GDP Growth*	*GDP/cap*	Individualism
1	Andorra	2	0.532	0.231	0.729	0.474	1.269	0	0.601	39689.92	-
2	Azerbaijan	2	0.383	0.241	0.679	0.284	-1.045	0.763	7.905	12429.91	-
3	Argentina	3	0.618	0.207	0.768	0.484	-0.359	0.547	1.839	17896.65	46
4	Australia	3	0.61	0.53	0.784	0.549	1.911	0.855	2.755	41341.51	90
5	Armenia	3	0.585	0.138	0.741	0.307	-0.553	0.446	5.716	8694.552	-
6	Brazil	3	0.531	0.074	0.621	0.341	-0.147	1.19	2.038	13472.24	38
7	Bulgaria	2	0.472	0.201	0.76	0.407	-0.173	0.574	3.015	15881.17	30
8	Belarus	2	0.421	0.394	0.745	0.405	-0.489	0.917	4.177	15025.98	-
9	Canada	2	0.697	0.461	0.787	0.564	1.919	1.435	2.241	41575.55	80
10	Chile	3	0.516	0.141	0.685	0.381	1.357	1.67	3.185	19112.55	23
11	China	3	0.424	0.609	0.766	0.304	-0.412	3.843	8.727	10028.17	20
12	Taiwan	3	0.569	0.287	0.76	0.435	0.787	0.225	3.86	20978.37	17
13	Colombia	3	0.509	0.076	0.639	0.29	-0.268	5.656	3.416	11422.46	13
14	Cyprus	3	0.564	0.101	0.745	0.319	0.956	0.134	2.089	32646.16	-
15	Ecuador	2	0.524	0.066	0.584	0.267	-0.685	1.094	2.863	9578.084	8
16	Ethiopia	2	0.509	0.18	0.748	0.403	-0.576	4.069	8.972	1271.764	-
17	Estonia	2	0.517	0.38	0.778	0.457	1.148	0.04	3.251	25022.47	60
18	Finland	2	0.665	0.666	0.848	0.587	2.28	0.828	1.142	40035.67	63
19	France	2	0.683	0.245	0.795	0.554	1.36	3.458	0.792	37594.81	71
20	Georgia	3	0.515	0.129	0.77	0.412	0.156	2.167	4.978	9249.377	-
21	Germany	3	0.733	0.421	0.757	0.448	1.833	2.374	0.959	42164.93	67
22	Ghana	2	0.461	0.066	0.647	0.369	-0.137	0.337	6.005	3784.955	-
23	Hong Kong	2	0.479	0.443	0.731	0.438	1.761	0.292	2.976	49075.24	25
24	Hungary	2	0.557	0.298	0.792	0.511	0.36	0.128	2.099	23337.92	80
25	India	2	0.534	0.209	0.793	0.398	-0.378	6.904	5.976	4541.167	48

no.	*Country*	*N*	*Radius*	*Gen. Trust*	*In.Trust*	*Out.Trust*	*Corruption*	*GTI*	*GDP Growth*	*GDP/cap*	Individualism
26	Indonesia	2	0.485	0.237	0.692	0.336	-0.645	4.383	4.978	8829.703	14
27	Iraq	2	0.511	0.215	0.802	0.34	-1.346	8.114	3.929	11263.92	-
28	Italy	2	0.815	0.299	0.713	0.425	0.286	2.048	-0.347	35935.38	76
29	Japan	2	0.546	0.346	0.683	0.312	1.421	0.87	0.502	36675.66	46
30	Kazakhstan	2	0.643	0.316	0.74	0.395	-0.868	1.038	5.511	20005.19	-
31	Jordan	3	0.48	0.199	0.787	0.367	0.176	2.277	4.083	9080.686	-
32	South Korea	3	0.452	0.309	0.729	0.362	0.532	0.347	3.564	32893.17	18
33	Kyrgyzstan	2	0.477	0.247	0.758	0.331	-1.138	0.869	3.675	3592.821	-
34	Lebanon	2	0.589	0.104	0.681	0.384	-0.877	4.255	1.918	13220.81	-
35	Libya	2	0.501	0.102	0.805	0.282	-1.295	3.312	3.842	19591.75	-
36	Malaysia	3	0.586	0.123	0.73	0.333	0.2	1.231	4.546	21641.24	26
37	Mexico	3	0.609	0.128	0.635	0.266	-0.49	3.208	1.508	16059.24	30
38	Morocco	3	0.515	0.145	0.738	0.304	-0.284	1.69	3.528	6209.872	46
39	Netherlands	4	0.651	0.613	0.796	0.53	2.017	1.076	1.099	46795.54	80
40	Nigeria	2	0.458	0.137	0.682	0.368	-1.143	6.454	5.291	4509.572	-
41	Norway	2	0.586	0.747	0.87	0.622	2.114	0.926	1.421	57626.86	69
42	Pakistan	2	0.763	0.244	0.75	0.307	-0.915	7.14	4.021	3964.835	14
43	Peru	3	0.507	0.065	0.567	0.205	-0.348	2.995	4.259	9744.848	16
44	Philippines	2	0.526	0.041	0.73	0.36	-0.592	6.178	4.866	6154.305	32
45	Poland	3	0.739	0.242	0.714	0.441	0.524	0.082	3.597	22306.16	60
46	Romania	3	0.481	0.135	0.64	0.311	-0.215	0	3.649	18552.39	30
47	Russian Federation	3	0.565	0.265	0.74	0.368	-0.939	5.527	2.997	20664.38	39
48	Rwanda	2	0.552	0.106	0.768	0.439	0.226	2.54	7.095	1464.505	-
49	Serbia	2	0.524	0.165	0.746	0.418	-0.373	0.384	3.069	13260.56	25
50	Singapore	2	0.47	0.363	0.754	0.443	2.174	0	4.739	76390.2	20
51	Vietnam	2	0.405	0.397	0.761	0.374	-0.56	0.016	6.289	4967.431	20

no.	*Country*	*N*	*Radius*	*Gen. Trust*	*In.Trust*	*Out.Trust*	*Corruption*	*GTI*	*GDP Growth*	*GDP/cap*	Individualism
52	Slovenia	3	0.747	0.22	0.735	0.35	0.892	0	2.015	29814.44	27
53	Zimbabwe	2	0.439	0.046	0.685	0.349	-1.32	1.408	0.232	2411.086	-
54	Spain	3	0.629	0.28	0.791	0.474	1.001	3.076	0.897	32884.75	51
55	Sweden	3	0.682	0.67	0.846	0.647	2.185	1.04	1.976	43806.27	71
56	Switzerland	2	0.804	0.569	0.783	0.557	2.072	0.476	1.686	56983.09	68
57	Thailand	3	0.385	0.353	0.744	0.34	-0.352	5.607	3.454	13819.5	20
58	Trinidad and Tobago	2	0.526	0.034	0.683	0.423	-0.147	0.139	2.262	26740.74	16
59	Tunisia	2	0.536	0.154	0.732	0.274	-0.086	2.943	2.352	9969.334	-
60	Turkey	3	0.584	0.106	0.756	0.346	-0.101	5.318	5.231	19446.61	37
61	Ukraine	3	0.633	0.283	0.742	0.412	-0.912	2.804	1.578	9530.435	-
62	Egypt	3	0.46	0.153	0.853	0.342	-0.636	4.497	4.289	9609.464	-
63	United Kingdom	2	0.633	0.375	0.819	0.578	1.796	4.039	1.124	38848.83	89
64	United States	3	0.69	0.393	0.741	0.53	1.418	4.551	1.767	51460.95	91
65	Uruguay	2	0.632	0.23	0.734	0.422	1.227	0.046	2.665	17138.66	36
	Total(mean)	*2.46*	*0.560*	*0.261*	*0.740*	*0.401*	*0.255*	*2.198*	*3.334*	*21995.64*	*43.2*

Appendix III: Highest and lowest Trust Radius deltas

no.	*Country*	*Year*	*Region*	*Subregion*	*Δ Radius*	*Δ Gen Trust*	*Δ Out. Trust*	*Δ In. Trust*
1	Singapore	2020	Asia	South-eastern Asia	-0.36162	-0.04463	-0.04148	-0.02268
2	Australia	2012	Oceania	Australia and New Zealand	-0.20547	0.065699	-0.013	-0.00724
3	Georgia	2014	Asia	Western Asia	-0.18777	-0.09493	-0.02175	-0.0328
4	Germany	2013	Europe	Western Europe	-0.18626	0.09413	0.062132	-0.00959
5	Taiwan	2019	Asia	Eastern Asia	-0.17883	0.004162	-0.00105	-0.00349
6	Chile	2012	Americas	Latin America and the Caribbean	-0.17337	-0.0072	0.09891	0.053729
7	Armenia	2021	Asia	Western Asia	-0.14287	-0.15342	-0.07626	0.006173
8	Egypt	2013	Africa	Northern Africa	-0.13704	0.021895	-0.00582	0.025157
9	Sweden	2011	Europe	Northern Europe	-0.12871	-0.03556	-0.02705	-0.0377
10	Slovenia	2011	Europe	Southern Europe	-0.12085	0.010668	0.003364	0.002453
73	Thailand	2013	Asia	South-eastern Asia	0.169001	-0.09104	-0.04861	-0.00041
74	Malaysia	2018	Asia	South-eastern Asia	0.170754	0.110285	0.098166	-0.00902
75	South Korea	2010	Asia	Eastern Asia	0.171356	-0.00492	0.012047	-0.00245
76	Japan	2019	Asia	Eastern Asia	0.192699	-0.05308	0.023729	-0.00096
77	Ukraine	2020	Europe	Eastern Europe	0.196279	0.05058	-0.01617	-0.03389
78	Cyprus	2019	Asia	Western Asia	0.20406	-0.01117	0.007077	0.008955
79	Slovenia	2017	Europe	Southern Europe	0.225341	0.074489	0.063468	0.032854
80	Hong Kong	2018	Asia	Eastern Asia	0.239736	-0.08537	0.014242	-0.05271
81	Morocco	2011	Africa	Northern Africa	0.313469	-0.00197	-0.03567	-0.05644
82	Germany	2018	Europe	Western Europe	0.458634	0.024465	0.040285	0.034154