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“Trust and power as determinants of shadow
economy and corruption: A cross-cultural study in 44
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Abstract

The „slippery slope framework“ (SSF) postulates two main determinants of tax compliance: trust in authorities and power of authorities. Thus, citizens' tax behavior can be positively influenced by either taking measures that increase trust in the authorities or by measures that increase the power of the authorities. While trust enhancing measures are characterized by high benevolence, perceived fairness and transparency, power mainly depends on the extent of tax audits and fines for evasion. These assumptions have been confirmed repeatedly in both experimental and survey studies. Aim of this study is to test the implications of the SSF in a broader light by predicting external data sources of counterproductive behavior in a total of 44 countries via the indicated levels of trust in and power of the authorities. The transaction of illegal trades – shadow economy – and the abuse of power for private gain – corruption – are both destructive phenomena within society and can be seen as counterproductive behavior. The present study manipulates trust and power through scenarios and measures indicated similarities between the scenarios and the perceived situation in participants' home countries. These evaluations serve as a basis for calculating indices representing actual levels of trust and perceived power, which are then applied to predict the size of the shadow economy and the extent of corruption in the respective countries. The results emphasize the importance of trust in and power of authorities as major determinants of counterproductive behavior in society.

1. Introduction

Engaging in illegal trades – shadow economy – and the abuse of power for private gain – corruption – are both destructive phenomena within society and can be seen as counterproductive behavior. Aim of this study is to investigate trust in authorities and the perceived power of authorities as determinants of such counterproductive behavior, as inferable from the slippery slope framework (SSF) (Kirchler, Hoelzl, & Wahl, 2008).

1.1. A model of tax compliance: The Slippery Slope Framework

Taxpayers' compliance is essential for a state's financial capabilities to provide public goods and redistribute wealth among members of society. Therefore, citizens should see it as a societal duty to pay their taxes honestly. However, instead of voluntarily contributing to the public good, which finances education, social security, and infrastructure amongst others, some are assumed to maximize their own profits by legally or illegally reducing their tax share. At the same time they still benefit from public goods that are financed by compliant members of society. Hence, tax avoidance and evasion must be considered counterproductive phenomena within society that cause serious deficits for the general public.

Tax evasion has been investigated in economics since the early 1970s. Classic theories derived from Becker's (1968) economics-of-crime paradigm and define tax evasion as a decision under uncertainty. The main determinants of tax compliance are the level of income, the tax rate, the probability of being audited and the size of sanctions (Allingham & Sandmo, 1972; Srinivasan, 1973). The limitations of these models have been shown in various publications (Andreoni, Erard, & Feinstein, 1998; Fischer, Wartick, & Mark, 1992; Kirchler, Muehlbacher, Kastlunger, & Wahl, 2010). Alm (1991) emphasizes that "the compliance decision depends upon numerous factors, including but not limited to the enforcement activities of the government" (p. 590) and calls for models of tax compliance that go beyond expected utility theory and incorporate explanatory variables from other disciplines. Indeed, in the past two decades an increase in social psychological research on tax behavior could be observed.

Kirchler (2007) gives an overview of psychologically relevant factors for tax compliance and identifies attitudes and beliefs about taxation in general, personal, social and societal norms of tax behavior, given opportunities to cheat, fairness considerations, and the interaction between taxpayers and the authorities as influential variables.

A model that meets Alm's demand by integrating relevant factors from economics and psychology into one model is the SSF by Kirchler et al. (2008). In this framework it is assumed that two dimensions and their interaction determine tax compliance: (1) trust in tax authorities and (2) power of tax authorities. The first dimension – trust – emerges from the perception of fairness, benevolence, and that the authorities work for the common good of society. The second dimension – power – relates to the citizen's perception of the authorities' resources to detect and punish tax evasion. As a consequence, an increase in either dimension should enhance tax compliance. However, trust in and power of authorities are assumed to influence two different types of motivation to comply with tax laws: voluntary and enforced tax compliance.

Trust, as indicated by Eberl (2003) and Tyler (2003), has the social function of maintaining a positive relationship between two interacting partners. According to the SSF, high trust in the authorities, leads to voluntarily tax compliance. This relationship between taxpayers and authorities is described as a synergistic climate, with mutual trust between the two actors. In this case, taxpayers are willing to comply voluntarily and tax authorities provide customer-oriented services.

Enforced compliance on the other hand is determined by high perceived power of the authorities. In this case the mutual trust is low and tax authorities need to apply audits and fines to enforce citizens to pay their tax share. This interaction climate is termed antagonistic (Kirchler et al., 2008).

Empirical evidence for the SSF has been demonstrated in studies that were carried out in Austria (Wahl, Kastlunger, & Kirchler, 2010) and Italy (Kastlunger, Lozza, Kirchler, & Schabmann, 2013). Additionally, evidence was found in comparative studies in Austria, the United Kingdom, and the Czech Republic (Muehlbacher, Kirchler, & Schwarzenberger, 2011), as well as in Austria, Hungary, Russia, and Romania (Kogler et al., 2013). All these studies confirmed trust and power as determinants of tax compliance in different

cultural and economic settings. Methods applied were questionnaires and experiments exclusively, which raises the point of common method biases that could be caused especially by measurement context effects (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). One way to address common method biases is to obtain measures of the dependent variable from external data sources, thereby validating model assumptions. The closest external source for tax compliance with estimates for an adequate number of countries is the size of shadow economy (Schneider, Buehn, & Montenegro, 2010). Schneider (2004) defines shadow economy as “unreported income from the production of legal goods and services, either from monetary or barter transactions hence, all economic activities which would generally be taxable were they reported to the tax authorities” (p. 286). Thus, engaging in the shadow economy always entails evading taxes and the size of shadow economy can be interpreted as a suitable proxy for tax compliance, which is consistent with previous research (Richardson, 2008; Tsakumis, Curatola, & Porcano, 2007). The size of corruption is another related external data source, which might also entail tax evasion (e.g., avoiding prosecution for tax evasion by the abuse of power) and serves as a proxy for general counterproductive societal behavior. Both – shadow economy and corruption – lead to the benefit of the single individual and cause deficits for the community.

Altogether, the aim of this study is twofold: (1) to extend the previous approaches by validating trust in and power of authorities as determinants of tax compliance with external data sources and (2) to broaden the predictive value of the SSF by investigating a new context of general societal counterproductive behavior. In a total of 44 countries, the following hypotheses will be tested: (1) A negative correlation is expected between perceived trust in the authorities and (a) shadow economy, as well as (b) corruption. Respectively, (2) a negative correlation can be observed between perceived power of the authorities and (a) shadow economy, as well as (b) corruption.

1.2. Shadow economy

There are two prevailing main hypotheses regarding the consequences of shadow economy on the official economy. The first states that a decreasing shadow economy should lead to an increase in tax turnover for the state, which optimally causes economic growth (Loayza, 1996). The opposing hypothesis – the neoclassical view – states that an increasing shadow economy could cause economic growth due to, for instance, more competition, increased financial resources, and the limitation of governmental activities (Asea, 1996). While this ambivalence has not been entirely ruled out empirically (Schneider & Enste, 2000), it is undeniable that there is no country where all members of society solely engage in the official economy. A detailed definition of shadow economy is given by Schneider et al. (2010):

The shadow economy includes all market-based legal production of goods and services that are deliberately concealed from public authorities to avoid payment of income, value added or other taxes; to avoid payment of social security contributions; having to meet certain legal labor market standards, such as minimum wages, maximum working hours, safety standards, etc.; and complying with certain administrative procedures, such as completing statistical questionnaires or administrative forms. (p. 444)

Determinants of the size of shadow economy are summarized comprehensively by Schneider and Buehn (2013). When it comes to avoiding taxes or social security contributions, the size of tax and social security burdens are essential. As a general effect, the larger these burdens, the higher the size of shadow economy (Buehn & Schneider, 2012; Dell’Anno, Gómez-Antonio, & Pardo, 2007; Johnson, Kaufman, & Shleifer, 1997). Another influencing factor is the degree of market regulations, which reduce the freedom of choice, lead to an increase in labor costs, and therefore incentivize people to operate in the shadow economy (Johnson et al., 1997; Johnson, Kaufmann, & Zoido-Lobaton, 1999). However, these effects seem to be moderated by confounding variables. Friedman, Johnson, Kaufmann, and Zoido-Lobaton (2000) emphasize that regulations only drive people into the shadow economy if they are perceived as nonessential, whereas regulations for the purpose of health and safety at work can be perceived as being efficient. According results are found for the quality

of institutions and public sector services, which may play an even more important role than the tax and social security burdens as well as market regulations (Dreher, Kotsogiannis, & McCorriston, 2009; Dreher & Schneider, 2010; Friedrich, 2010; Johnson, Kaufmann, & Zoido-Lobaton, 1998). Results show that if people perceive public institutions as efficient and discretionary as well as public sector services as beneficial, people are less likely to transact in the shadow economy. In this vein, if tax money is spent on efficient policies in the form of high institutional quality and beneficial public sector services, a certain level of taxation is seen as legitimate and does not in principal incentivize people to engage in the shadow economy. The perceived efficiency of the public sector also has an indirect effect on another important determinant which is citizens' moral perspective of complying with tax laws. A combined positive effect of tax morale and institutional quality on shadow economy was confirmed by Torgler and Schneider (2009). If political processes are perceived as being fair and legitimate (Feld & Frey, 2007), and taxpayers are treated in a service-oriented way (Kirchler, 2007; Wahl et al., 2010), tax compliance is increased, directly influencing the size of shadow economy. Finally, deterrence and enforcement activities by governmental authorities are discussed as a relevant factor, which have been investigated thoroughly as determinants of tax compliance (Allingham & Sandmo, 1972; Andreoni et al., 1998), but not explicitly in the context of shadow economy. Buehn and Schneider's (2012) first attempt shows that enforcement can effectively deter shadow economy activities. Their cautious conclusion is that enforcement activities can be seen as a useful policy instrument.

All of the described factors contain elements that are referable to either trust in authorities or the perceived power of the authorities as described in the SSF (Kirchler et al., 2008). For instance, the quality of institutions, public sector services, and tax morale represent the key characteristics of the trust dimension in the SSF, which are fairness, benevolence, and focus on the common good. The remaining variables – tax burdens, regulations, and deterrence – resemble important elements of the power dimension in the SSF. Thus, trust and power as determinants of shadow economy might be a suitable way of combining elements of known cause variables into one model, while at the same time validating the SSF externally with shadow economy as a proxy for tax evasion.

1.3. Corruption

Johnston (2001) illustrates that a precise definition of corruption is not an easy task. Since the present paper has a strong behavioral approach, a behavioral-focused definition of corruption is given here. In this vein, corruption is seen as “the abuse of public office, powers, or resources for private benefit” (p. 17).

Research on the causes and consequences of corruption is complex and requires investigations by a number of scientific fields, especially political science, economics, sociology, and psychology. As Lambsdorff (2007) points out, one challenge is that many causes of corruption also seem to be consequences of corruption. The focus of this paper will be on the emergence of corruption. Numerous variables have been discussed as determinants in the past decades, which can only be covered here rudimentarily; see Jain (2001) and Lambsdorff (2007) for extensive reviews.

Political science and economics consider corruption within the political system of a country and the economic consequences that evolve from it. For instance, Rose-Ackerman (2001) argues that democratic structures lower corruption because members of oppositional parties have an interest to expose corruption by politicians in office to the public. However, Serra (2006) and Treisman (2000) point out that the current degree of democracy in a country is not of relevance, but that lower levels of corruption are especially seen in countries with long-standing democratic structures. Serra shows that corruption is lower where political stability is predominant and – in general – in richer countries. From a business perspective, market regulations in the form of higher barriers to enter new markets lead to higher corruption (Broadman & Recanatini, 2001; Djankov, Porta, Lopez-de-Silanes, & Shleifer, 2002). The longer it takes and the more costs it requires to open a new business, the higher the extent of corruption in a country, while at the same time the quality of private or public goods is not better. Jain (2001) argues that the net utility from corruption must be worth the inconveniences caused by possible penalties. In reference to Becker's (1968) economics-of-crime paradigm, Jain emphasizes that for corruption to exist, among two further elements, the legal system must be characterized by sufficiently low probabilities of detection and low penalties

for the crime. In other words, if the political authorities do not have the power to catch and punish people engaging in corruption, levels of corruption will be high, which resembles the power dimension in the SSF (Kirchler et al., 2008). Jain calls for an empirical investigation with respect to the importance of this element as a determinant of corruption.

Psychologically relevant variables have also been studied as causes for corruption. However, not exclusively in their field of origin, but also in the fields of economics and political science. The emphasis has been laid on values, morale, culture, and especially trust, which will be described in the next section.

Uslaner (1999, 2004) investigated under which circumstances people pay heed to the law and especially the relationship between trust and corruption. He describes trust and corruption as opposing forces, where trust resembles a cooperative spirit in a society and corruption constitutes an expression of selfishness. Uslaner's conclusion is that people who trust other members of society have stronger standards of morale and act in accordance with the law. He finds a high negative correlation between trust in others and corruption. La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997) confirm that an increase in trust leads to higher anti-corruption scores. However these works focus on moral trust between members of society. As Rothstein (2000) points out, interpersonal trust and trust in societal institutions differ substantially. Combined results on the latter indicate that high corruption is strongly associated with low trust in the political institutions and civil servants (Anderson & Tverdova, 2003; Chang & Chu, 2006; Morris & Klesner, 2010). Morris and Klesner (2010), referring to a study carried out in Mexico, suggest a vicious circle in which corruption causes a climate of distrust that in turn feeds corruption, which is similar to an antagonistic climate as described in the SSF in the case of a powerless state that is unable to enforce compliance (Kirchler et al., 2008).

Referring to the SSF, both dimensions – trust and power – have already been discussed as determinants of corruption and tested apart from each other. An empirical investigation of both determinants in combination is still pending in this context.

2. Method

2.1. Experiment

2.1.1. Participants

A total of 14,876 individuals from 44 countries, a median of 323 subjects per country, participated in the present study. Due to missing values 182 subjects had to be excluded. Most subjects were students of Economics or Business Administration (88%) and were recruited on a voluntary basis by collaborators at universities in each country. The sample consisted of 52% females and the mean age was 21.5 years ($SD = 3.3$). Demographic information per country is shown in Table 2.

2.1.2. Material

Subjects were randomly assigned to one of four different scenarios describing a fictitious country named Varosia. The four experimental conditions differed with regard to the manipulation of trust in and power of authorities as high or low in Varosia, resulting in a 2 x 2 between-subject design. The scenarios were adapted from Kogler et al. (2013) and changed with regard to country size and population, matching the geographic and demographic information of each participating country¹. This general information on Varosia was the same in all four experimental conditions per country.

In the *high trust* condition Varosia's tax authorities were described as highly trustworthy. For instance the text stated that Varosia is politically highly stable and that the legislation is transparent to the citizens. Furthermore, the public authorities were described as service-oriented and interested in supporting citizens. In the *low trust* condition Varosia's tax authorities were characterized as highly untrustworthy. Budget expenditures of the state were portrayed as not traceable and the majority of Varosia's citizens had the

¹ It is common practice to present the exact same scenario to participants in every country in cross-cultural studies, while the adaptation of information to country specific properties is unusual. In this case however, a uniform description of Varosia is believed to be more problematic, because then different similarity constellations between the fictitious country of Varosia and the respective country of participation would evolve. As seen later on, the perceived similarity between Varosia and the home country is essential for this study. By adapting the scenario to country specific geographic and demographic information, a controlled level of general similarity is given and the main difference will be made by the manipulations of trust and power.

impression that their tax money was not used reasonably. In the *high power* condition Varosia's tax authorities were described as being effective in prosecuting and punishing tax evasion. Chances to be audited were described as high and fines for tax evasion as very severe. In the *low power* condition the authorities were characterized as ineffective in applying the legislation against tax evasion. For example a low budget was assigned to detecting and punishing tax evasion and fines were not severe. These characteristics of trust and power were combined into four different scenarios: (1) high trust and high power, (2) low trust and high power, (3) high trust and low power, and (4) low trust and low power.

Subjects were asked to read the description of Varosia and to imagine living there as a self-employed citizens with a prosperous business and paying taxes. They were then asked to fill in a questionnaire, containing scales on manipulation checks of trust and power, perceived similarity of Varosia and the home country, and a number of other tax related variables that are not of relevance to this study and are analyzed by Batrancea, Kirchler, Kogler, Nichita, and Olsen (2014).

The manipulation checks on indicated trust in the authorities (e.g., "The governmental authorities in Varosia act fair towards their citizens") and on perceived power of the authorities in Varosia (e.g., "The governmental institutions in Varosia are very effective in the suppression of tax criminality") consisted of three items each with an answering format from 1 (*strong disagreement*) to 9 (*strong agreement*). Both scales had high reliability ($\alpha_{\text{trust}} = 0.83$; $\alpha_{\text{power}} = 0.85$).

In order to measure the similarity between Varosia and the participants' home countries, three different items were presented. The first item measured the general similarity between Varosia and the home country (i.e., "How similar do you perceive the country of Varosia in comparison to your own country?"), the second concerned the similarity of perceived power (i.e., "How similar do you perceive the power of authorities in the country of Varosia to your own country?"), and the third registered the similarity of experienced trust (i.e., "How similar do you perceive the trust of authorities in the country of Varosia to your own country?"). The answering format ranged from 1 (*very unsimilar*) to 9 (*very similar*).

The scenarios and the relevant items of the questionnaire are shown in Appendix A.

2.1.3. Procedure

The experimental data were collected between Summer 2011 and Autumn 2013, with the majority of questionnaires being completed in 2012. The questionnaires were translated from English to the respective language of the participating country, if the program of the collaborating university was not English, and then translated back to English by an independent translator to check for accuracy of the translations. The questionnaires were given to the participants in paper form and it took about 15 minutes to finish the task. Participation was voluntary and no monetary or other payment was given to the subjects².

2.2. Country level data

In addition to the experimental data, external data sources were needed as dependent variables and country indices of trust and power had to be calculated as predictor variables.

2.2.1. Shadow economy

Schneider et al. (2010) provide estimates of the shadow economy for a total of 162 countries; the latest of the year 2007. Data for 43 countries were available for 2007. Only in one case – United Arab Emirates – data of the year 2006 had to be used. The authors use the definition of shadow economy that is given in the introductory section.

The index is calculated using a structural equation model with varying indicator variables depending on the number of countries and available data (Schneider, Buehn, & Montenegro, 2011). For the 44 countries that are included in this study, variables used to estimate the size of shadow economy were size of government, unemployment rate, gross domestic product (GDP) per capita,

² Exceptions are Canada and Norway. In Canada participants were given course credits. Participants in Norway received a small monetary compensation.

proportion of currency outside of banks, government effectiveness, growth rate of GDP per capita, and labor force participation rate.

The size of shadow economy is given as a percentage of the official GDP, meaning that low scores indicate low levels of shadow economy. The mean value in the sample is 23% of official GDP in 2007. Scores reach from 8.1% (Switzerland) to 48.2% (Thailand). Confirmation of the negative relationship of trust and power with shadow economy, as hypothesized in hypotheses 1a and 2a, will be expressed in a negative relationship between the predictors and the shadow economy estimates.

2.2.2. Corruption

Data on corruption were drawn from Transparency International Corruption Perceptions Index (CPI) for the year 2013 for all 44 countries in the sample. They define corruption as the abuse of entrusted power for private gain. The index is calculated by aggregating up to 13 different sources of data that are corruption-related (e.g., World Economic Forum, World Justice Project, World Bank; see Appendix B for an overview of all sources). The inclusion criterion is the evaluation of a country by at least three of the 13 sources. Data of each source is standardized and all sources per country are averaged by mean. The average number of sources for the 44 countries in this sample was $M = 7.8$ ($SD = 1.37$). As Saisana and Saltelli (2012) report in their analysis of the CPI methodology, this way of data aggregation leads to a balanced CPI calculation and reliable results.

CPI scores range from 0 (*highly corrupt*) to 100 (*very clean*). Hence, high scores indicate a low level of corruption. Scores in the sample reach from 25 (Iran) to 89 (Sweden and Finland) with $M = 56.8$ ($SD = 19.04$). Confirmation of the negative relationship of trust and power with corruption, as hypothesized in H1b and H2b, will be expressed in a positive relationship between the predictors and the CPI score.

2.2.3. Trust and power on country level

In order to predict shadow economy and corruption on a country level, it was necessary to generate trust and power indices per country from the experimental data. Up to this point, data were based on observations per participant in each country. However, instead of having data for single individuals, the aim was to gather two single values per country from this large dataset; one for trust and one for power. This data reduction was performed using the similarity item, which asked participants for the similarity between Varosia and their home country. The first similarity item asked for the general similarity between Varosia and the home country and was used here³.

Participants were assigned to one of four scenarios with different combinations of manipulation of trust and power. As shown before, the combinations were (1) high trust and high power, (2) low trust and high power, (3) high trust and low power, and (4) low trust and low power. In a first step, similarity item responses by the participants were averaged for each condition, leading to a similarity score for each of the four conditions per country. The higher the similarity score in one of the conditions, the more similar this particular trust and power combination was perceived with regard to the home country. In order to obtain trust and power indices, these four scores were further processed as follows.

Trust was calculated by averaging the scores of the two high trust conditions (conditions one and three) and of the two low trust conditions (conditions two and four). This approach of averaging the two conditions identical with regard to their trust manipulations was essential to eliminate the influence of power on the scores per condition. The first of the two newly created scores represents the similarity of high trust with the home country and respectively the second indicates the similarity of the low trust scenarios with the home country. A country with high trust in authorities should have a high

³ There were also two items that asked for the similarity of trust and power specifically. However, correlations between $\text{Trust}_{\text{General}}$ and $\text{Trust}_{\text{Specific}}$ with $r(42) = .97, p < .001$ and between $\text{Power}_{\text{General}}$ and $\text{Power}_{\text{Specific}}$ with $r(42) = .93, p < .001$ were close to 1. Therefore the general similarity item was used here.

Additionally, it is unclear whether participants are able to distinguish between trust in and power of authorities in their mental representations of a country. Thus, using the general similarity was seen as a suitable approach to address this concern. In total however, separate analyses indicate that the final regression models with trust and power as predictor variables, presented in the results section, are very similar using either class of items for the calculation of the indices.

mean of the two conditions where the fictitious country is presented as trustworthy (conditions one and three) and a low second score where Varosia is described as untrustworthy (conditions two and four). The difference of these two scores represents the perceived trust in the given country. Positive values indicate higher levels of trust, negative values lower levels of trust. The formula of calculation of trust can be seen in Equation 1 for the country y .

$$Trust_y = \frac{Similarity\ C1_y + Similarity\ C3_y}{2} - \frac{Similarity\ C2_y + Similarity\ C4_y}{2} \quad (1)$$

Calculations for power were performed according to the same procedure. This time the averages of the general similarity scores in the high power conditions (conditions one and two) and in the low power conditions (conditions three and four) were calculated in order to eliminate the influence of trust and were then subtracted from each other. As before, positive values represent higher levels of power, negative values lower levels of power. Equation 2 shows the formula of calculation of power for the country y .

$$Power_y = \frac{Similarity\ C1_y + Similarity\ C2_y}{2} - \frac{Similarity\ C3_y + Similarity\ C4_y}{2} \quad (2)$$

A concrete example for the application of both procedures is shown in the results section.

3. Results

3.1. Manipulation check

The reduction of data from individual level to country level and calculation of trust and power indices is only sensible if the manipulations of low versus high trust and power had their intended effect on participants' perception. Manipulation check items were included to test whether these manipulations were successful.

Due to the large sample size, statistical tests reach significance easily. Therefore it is important to consider the estimated effect sizes carefully (Cohen, 1994). A three-way MANOVA was calculated, with trust, power, and country as independent factors, and the responses observed concerning perceived trust

and power as dependent variables. As expected, the multivariate analyses showed a strong main effect for trust ($F(2, 14517) = 8,152.22, p < .001, \eta^2 = .53$), as well as for power ($F(2, 14517) = 9,494.35, p < .001, \eta^2 = .57$). In addition, there were also significant effects for country ($F(86, 29036) = 5.55, p < .001, \eta^2 = .02$), for the two-way interactions trust x power ($F(2, 14517) = 118.38, p < .001, \eta^2 = .02$), trust x country ($F(86, 29036) = 8.51, p < .001, \eta^2 = .03$), power x country ($F(86, 29036) = 20.44, p < .001, \eta^2 = .06$), and for the three-way interaction trust x power x country ($F(86, 29036) = 2.62, p < .001, \eta^2 = .01$), but considering the small estimated effect sizes, these might be rather negligible.⁴

To sum up, the manipulation of trust in and power of authorities proved to be successful. Thus, calculations of trust and power indices per country were feasible.

3.2. Calculation of trust and power

Equations 1 and 2 are given in the method section and explain the calculation of trust and power indices per country. The application of both procedures for the country Sweden can be seen below in Table 1 and Equations 3 and 4.

Table 1: Means and standard deviations of general similarity between Varosia and home country per condition.

Country	Condition 1	Condition 2	Condition 3	Condition 4
	Power high		Power low	
	Trust high	Trust low	Trust high	Trust low
Sweden	6.13 (1.99)	2.55 (1.76)	4.52 (2.30)	1.85 (1.30)

Note: $N = 388$. Higher scores indicate higher perceived similarity between Varosia and country of participation.

⁴ Univariate results show that participants in the high trust conditions indicated more trust in the authorities of Varosia than those in the low trust conditions ($F(1, 14518) = 16,288.68, p < .001, \eta^2 = .53$; high trust: $M = 6.26$; low trust: $M = 2.83$). Considering the manipulation of power, subjects in the high power groups showed a significantly higher perception of power of authorities compared to subjects in the low power conditions ($F(1, 14518) = 18,986.47, p < .001, \eta^2 = .57$; high power: $M = 6.86$; low power: $M = 3.05$). These results indicate a successful manipulation.

Furthermore, participants in the high trust conditions reported a higher perception of power of the authorities than the low trust groups ($F(1, 14518) = 274.46, p < .001, \eta^2 = .02$; high trust: $M = 5.18$; low trust: $M = 4.72$) and an effect of the power manipulation on the level of perceived trust was found ($F(1, 14518) = 581.72, p < .001, \eta^2 = .04$; high power: $M = 4.87$; low power: $M = 4.23$). Again, considering the small effects sizes, these might be negligible.

The highest similarity in the Swedish sample can be seen in condition 1 with a value of 6.13, which means that participants perceived Sweden as a country with relatively high trust in authorities and high power of authorities. The lowest similarity is given in condition 4 (1.85), indicating that Sweden was not perceived as a country with low trust in and low power of authorities. The conditions 2 and 3 with mixed trust and power configurations are in between the two other conditions, indicating a medium similarity perception.

$$Trust_{Sweden} = \frac{6.13 + 4.52}{2} - \frac{2.55 + 1.85}{2} = 3.13 \quad (3)$$

$$Power_{Sweden} = \frac{6.13 + 2.55}{2} - \frac{4.52 + 1.85}{2} = 1.16 \quad (4)$$

There was a positive correlation between trust and power with $r(42) = .79$, $p < .001$. After calculating trust and power indices, the variables were z-transformed for further analysis. Figure 1 shows the distribution of trust and power for all countries. Values for each country can be seen in Table 2.

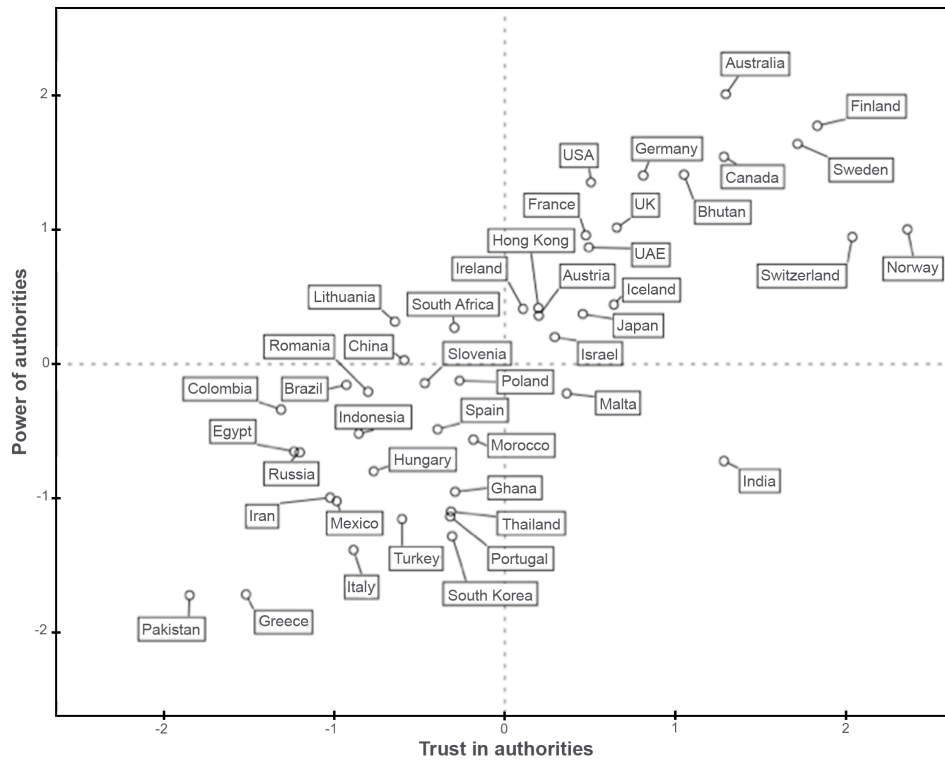


Figure 1: Distribution of trust and power for $N = 44$ countries.

Table 2: *Descriptive statistics, trust and power indices, and dependent variables per country.*

Country	N	Language	Sex (f %)	Age M (SD)	Trust	Power	S.E.	CPI
Australia	356	English	59.0	20.89 (6.7)	1.30	1.99	13.5	81
Austria	323	German	58.8	21.97 (3.4)	0.20	0.34	9.5	69
Bhutan	322	English	53.9	21.59 (3.1)	1.05	1.39	27.7	63
Brazil	316	Portuguese	49.7	21.18 (2.1)	-0.93	-0.17	36.6	42
Canada	279	English	58.6	20.30 (2.0)	1.29	1.53	15.3	81
China	352	Chinese	57.1	20.56 (2.0)	-0.59	0.01	11.9	40
Colombia	193	Spanish	40.4	20.33 (3.3)	-1.31	-0.36	33.5	36
Egypt	396	English	56.1	21.33 (3.7)	-1.24	-0.67	33.1	32
Finland	397	Finish	50.6	23.27 (4.9)	1.83	1.76	17.7	89
France	321	French	47.4	21.46 (2.0)	0.47	0.94	14.7	71
Germany	314	German	43.3	21.21 (2.3)	0.81	1.39	15.3	78
Ghana	331	English	52.0	21.39 (1.3)	-0.29	-0.97	38.3	46
Greece	316	Greek	55.5	20.89 (2.4)	-1.52	-1.73	26.5	40
Hong Kong	334	Chinese	50.9	24.50 (4.1)	0.20	0.40	14.7	75
Hungary	280	Hungarian	68.6	21.11 (2.1)	-0.77	-0.81	23.7	54
Iceland	307	Icelandic	49.3	24.30 (4.2)	0.64	0.43	15.0	78
India	317	English	57.7	20.84 (1.5)	1.29	-0.74	20.7	36
Indonesia	317	Indonesian	53.5	19.67 (1.4)	-0.86	-0.53	17.9	32
Iran	311	Persian	46.9	24.20 (3.1)	-1.03	-1.01	17.3	25
Ireland	400	English	46.0	21.06 (4.4)	0.11	0.40	15.4	72
Israel	322	Hebrew	52.8	24.02 (2.8)	0.29	0.19	20.7	61
Italy	306	Italian	54.1	20.36 (1.5)	-0.89	-1.40	26.8	43
Japan	346	Japanese	27.2	20.04 (1.4)	0.46	0.36	10.3	74
Lithuania	318	Lithuanian	72.2	20.94 (1.0)	-0.64	0.30	29.7	57
Malta	335	English	53.4	20.32 (2.3)	0.36	-0.24	26.5	56
Mexico	309	Spanish	45.3	20.70 (2.0)	-0.99	-1.04	28.8	34
Morocco	320	French	55.0	21.03 (2.1)	-0.18	-0.58	33.1	37
Norway	343	Norwegian	46.3	23.68 (2.5)	2.36	0.99	18.0	86
Pakistan	320	Urdu	59.7	21.29 (1.3)	-1.85	-1.74	33.6	28
Poland	332	Polish	59.4	22.28 (1.9)	-0.27	-0.14	26.0	60
Portugal	327	Portuguese	52.7	22.48 (6.3)	-0.32	-1.15	23.0	62
Romania	400	Romanian	62.5	21.73 (1.4)	-0.80	-0.22	30.2	43
Russia	334	Russian	54.9	18.83 (1.9)	-1.20	-0.67	40.6	28
Slovenia	340	Slovenian	64.2	22.67 (5.1)	-0.47	-0.16	24.7	57
South Africa	634	English	47.7	20.77 (2.5)	-0.30	0.26	25.2	42
South Korea	333	Korean	45.7	22.50 (2.3)	-0.31	-1.30	25.6	55
Spain	320	Spanish	49.1	21.07 (3.4)	-0.39	-0.50	22.2	59
Sweden	388	Swedish	43.9	22.75 (3.8)	1.72	1.62	17.9	89
Switzerland	433	German	42.3	21.07 (2.2)	2.04	0.93	8.1	85
Thailand	351	Thai	64.4	20.27 (1.7)	-0.32	-1.11	48.2	35
Turkey	299	Turkish	59.3	22.11 (2.1)	-0.60	-1.17	29.1	50
UAE	323	English	54.5	20.27 (1.5)	0.49	0.85	23.5	69
UK	160	English	52.8	20.08 (2.0)	0.66	1.00	12.2	76
USA	319	English	36.1	21.49 (3.6)	0.51	1.34	8.4	73
Total	14,694							
Mean	334		52.4	21.49 (3.3)	0 ⁵	0	23.0	57.8

Note. S.E. = Estimated size of shadow economy. CPI = Corruption Perception Index.

⁵ The mean of a z-transformed variable is always 0.

3.3. Trust and power as determinants of shadow economy

To test hypotheses 1a and 2a, a multiple regression with trust and power as independent and shadow economy as dependent variable was calculated. Results are shown in Table 3.

Table 3: *Summary of multiple regression analyses for variables predicting shadow economy.*

Variable	Shadow Economy		
	<i>B</i>	<i>SE B</i>	β
Constant	22.98	1.12	
Trust	-2.51	1.86	-.27
Power	-3.55	1.86	-.38
R^2		.39	
<i>F</i>		12.95***	

Note. $N = 44$.

*** $p < .001$.

Results indicate the two predictors explained 39% of the variance ($R^2 = .39$, $F(2, 43) = 12.95$, $p < .001$). However both predictors, power ($\beta = -.38$, $p = .06$) and trust ($\beta = -.27$, $p = .18$), were not significant, whereas the relatively high β -values indicate influences on the dependent variable. It was expected that this was a problem of a too small sample size. Therefore, additionally bootstrapping was applied with 1,000 bootstraps stratified to the country variable. Both predictors, power ($\beta = -.38$, $p < .001$) and trust ($\beta = -.27$, $p < .001$), reached significance. The model is shown in Figure 2.

The high correlation of trust and power could lead to a violation of no perfect multicollinearity between predictors in a regression model. The variance inflation factor (VIF) is one suitable way to check for this assumption. Myers (1990) states that VIF values larger than 10 indicate multicollinearity problems. The VIF reveals only a low level of multicollinearity with $VIF = 2.71$.

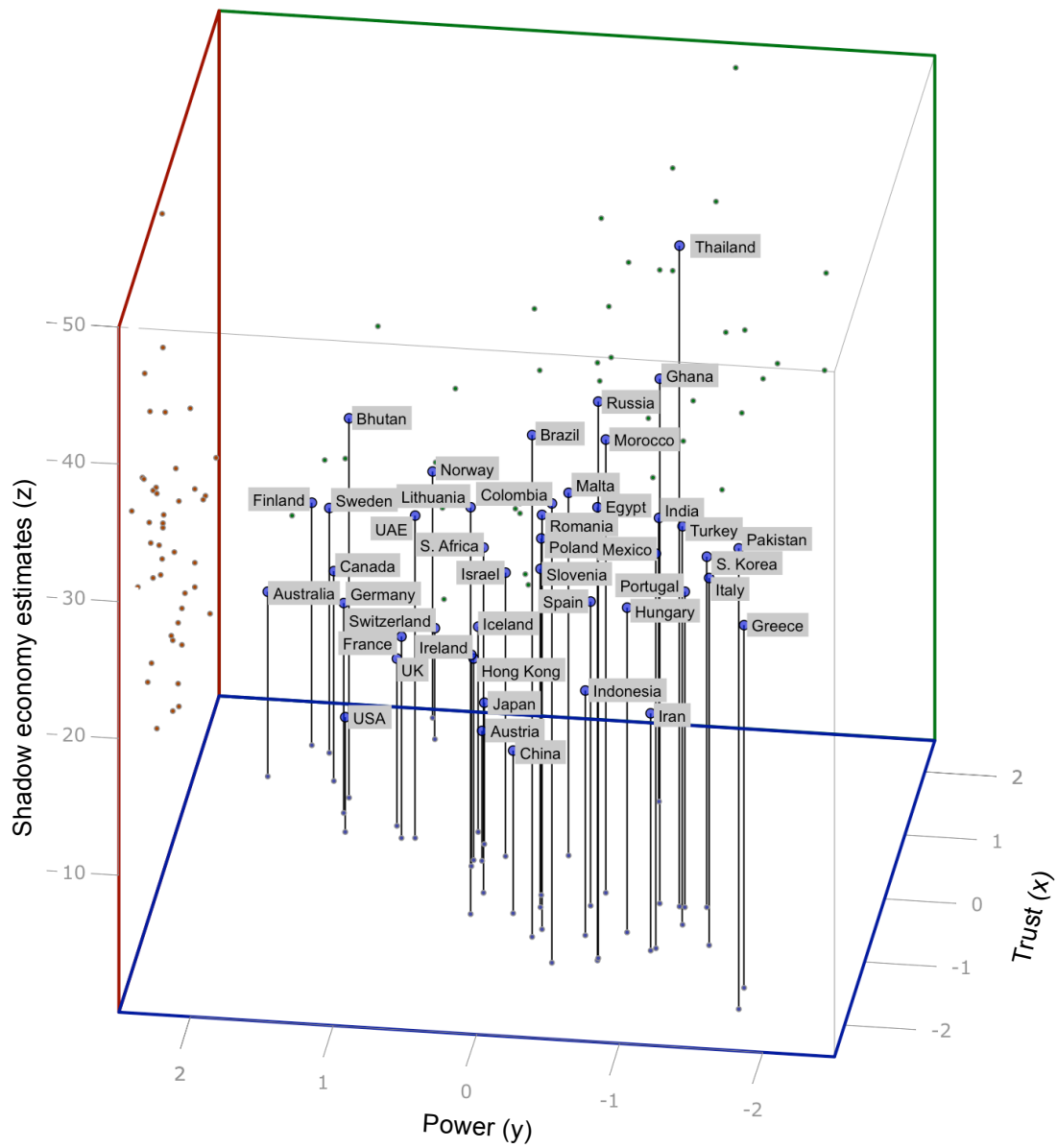


Figure 2: Shadow economy as a function of trust and power. Z-lines per country indicate the estimated size of shadow economy. Points on the x-z-plane represent the relationship of trust and shadow economy. Respectively, points on the y-z-plane indicate the relationship of power and shadow economy.

3.4. Trust and power as determinants of corruption

To test hypotheses 1b and 2b, a multiple regression with trust and power as independent variables and CPI as dependent variable was performed. Results are shown in Table 4.

Table 4: *Summary of multiple regression analyses for variables predicting CPI.*

Variable	Corruption Perception Index		
	<i>B</i>	<i>SE B</i>	β
Constant	56.80	1.46	
Trust	9.56	2.44	.50***
Power	7.87	2.44	.41**
R^2		.75	
<i>F</i>		62.21***	

Note. $N = 44$.

** $p < .01$. *** $p < .001$.

Results indicate the two predictors explained 75% of the variance ($R^2 = .75$, $F(2, 43) = 62.21$, $p < .001$). It was found that trust significantly predicted corruption ($\beta = .50$, $p < .001$), as did power ($\beta = .41$, $p < .01$). Trust was the stronger predictor in this model, as indicated by its higher β -value. The model is shown in Figure 3.

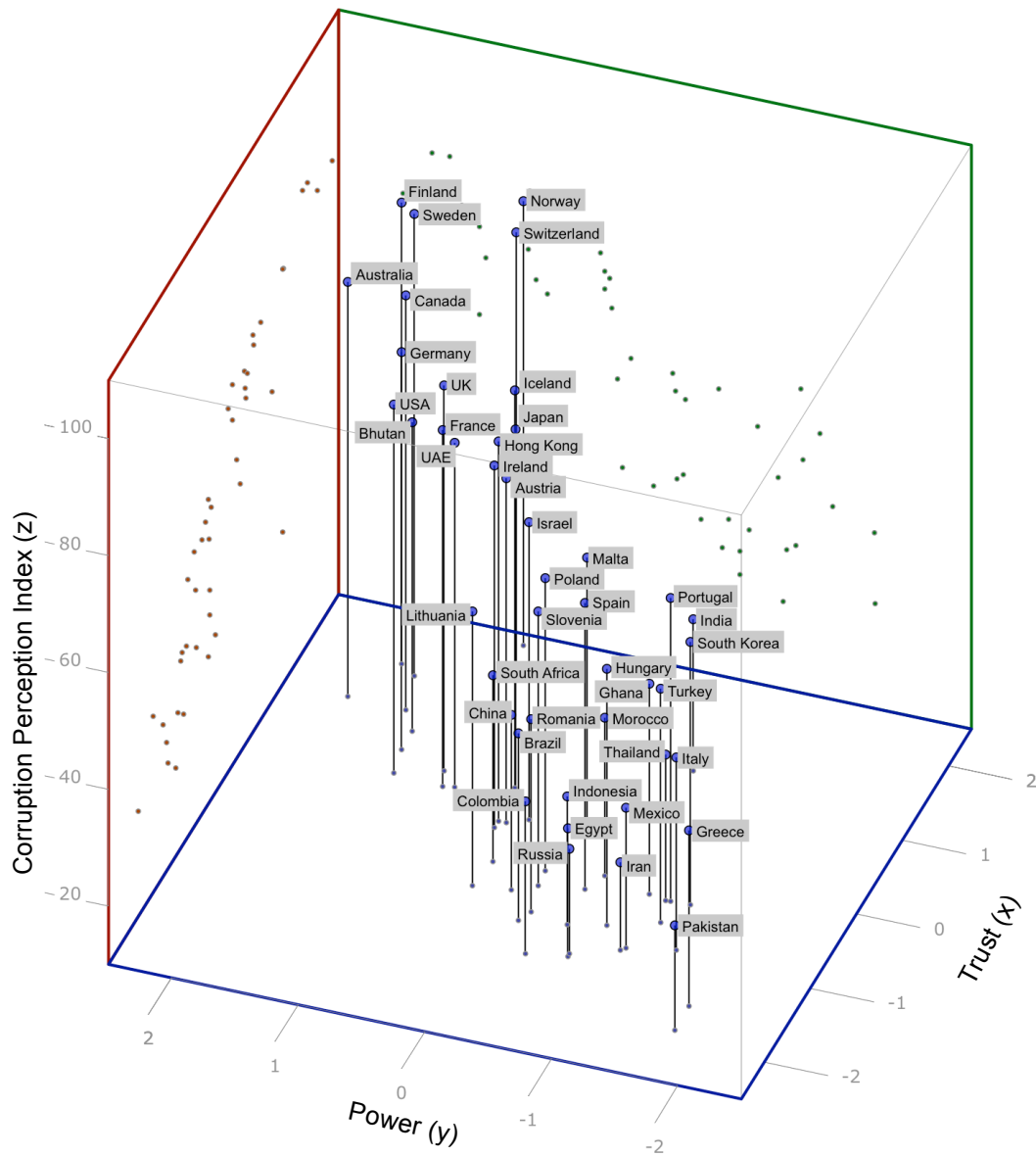


Figure 3: Corruption as a function of trust and power. Z-lines per country indicate the size of corruption. Points on the x-z-plane represent the relationship of trust and corruption. Respectively, points on the y-z-plane indicate the relationship of power and corruption.

4. Discussion

This study aimed at validating the main assumptions of the SSF in a cross-cultural context with external data and to extent its predictive value to general counterproductive behavior. Validating the implications of the SSF with external data sources in terms of shadow economy estimates was successful. Trust and power were both significant predictor variables of shadow economy, while power had a slightly higher impact. Furthermore, the results indicate that

the SSF is a suitable model for explaining counterproductive societal behavior cross-culturally. In the context of corruption, trust in authorities and the perceived power of authorities were both significant. In this case, a higher amount of variance of the size of corruption was explained by trust in authorities. Overall the regression-model of corruption was stronger than the shadow economy model.

The differences in variance explained between the two models could be partly explained by the underlying operationalizations of the two external data sources. The CPI captures perceived levels of the abuse of power for each country from a set of different sources, which resembles the behavioral approach of this scenario study from a methodological perspective, while the shadow economy estimates are based on economic indicators exclusively and include payments of social security, labor market factors, and administrative procedures in addition to the topic of tax evasion, representing a broader type of behavior. Thus, it is not surprising that the variance explained by trust and power is larger for the specific behavior of abusing power than for the broader type of behavior, which is constituted by the shadow economy estimates.

Another explanation for the differences between the two regression-models with regard to the total variance explained might be the time difference between data collection for this study and data collection for the external data sources. Shadow economy estimates were published in 2010 for the year 2007, while the data collection of the CPI sources for the year 2013 was conducted mainly in the year 2012, which is the time of data collection for this study. Therefore, the time difference was roughly five years for shadow economy estimates and inexistent for the CPI data. This point is especially important when considering societal and political events in the countries that are represented in this study. For instance the effects of the financial crisis in Greece or the effects of the political revolution in Egypt may have strong effects on the indicated levels of trust in authorities and the perceived power of authorities, while the effects of these events on the external data sources are only given for the CPI scores, not for the shadow economy estimates.

The interaction of trust and power was not addressed in this study. As a general effect, trust and power both increase tax compliance (Kirchler et al., 2008). However, as described in the introductory section, trust and power are

assumed to influence two different types of motivation for complying with tax laws: voluntary and enforced tax compliance. While trust increases voluntary compliance, power enhances enforced compliance. Wahl et al. (2010) have found that different interaction effects of trust and power on the two compliance forms can be expected. However in this study, the proxy for tax compliance and the CPI do not constitute clearly separate compliance types, neither voluntary nor enforced. Therefore, no clear effect of the interaction could be hypothesized.⁶ Another argument against including the interaction is the fact that both indices were extracted from one joint data source and were not operationalized independently.

A point of possible criticism concerns the sample of this study, which consisted of university students from single cities per country⁷, predominantly from the field of economics, not constituting a representative sample for the countries. Although the sample size is very large in total, these three characteristics of the sample – students, single city, and field of economics – lead to limitations for the interpretation of the results. Student samples are often criticized, especially in the context of tax research, because even if they do draw a taxable income, their experience of declaring taxes is usually low (e.g., Marriott, 2013). However, comparing data from a student sample filling taxes in the laboratory with a group of self-employed taxpayers who reported their reaction to a tax scenario in an online questionnaire, Wahl et al. (2010) could show that basic patterns of tax behavior were the same for both samples. Additionally, the dependent variable used for this study was the indicated similarity between a scenario and participants' home country. As Alm and McKee (1998) state, "there is also no reason to believe that the cognitive processes of students are different from those of 'real' people" (p. 266). Nevertheless, the country indices of trust and power should be regarded as country trends and not as irrevocable.

The uniqueness of the approach of predicting a macroeconomic outcome on country level on the basis of individual data also entails a point of limitation. It is not possible to test for the causality of the proposed models and, for

⁶ Exploratory analyses indicated no interaction effect on the dependent variables.

⁷ Except for South Africa and the UK. In South Africa data were collected in two cities because two universities were willing to collaborate. The majority of data from the UK were collected in one city, however two further universities were asked to collaborate due to a small sample size from the first source.

instance, it stays unclear whether trust leads to lower levels of corruption, or if a decrease in perceived corruption leads to an increase of trust. The literature on this question is rather contradictory, which is why an experimental study on the effects of institutional trust as well as perceived power of authorities on societal counterproductive behavior is suggested. Despite this methodological point of limitation, governmental authorities are recommended to aim at increasing their trustworthiness and at implementing powerful measures against members of society who abuse public goods.

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Appendix A

A.1. Scenarios

Please read the following description of a country:

In the last census of population in April 2009 Varosia had [number of inhabitants in each participating country] inhabitants and the territory of Varosia occupies [area of each participating country]. The unemployment rate is at an average.

Followed by information concerning the manipulation of trust ([low] high):

*Since Varosia's autonomy it has been marked with a **[low] high political stability** and an **[oligarchic (authority of few)] democratic government**. **[Seldom] Regularly referenda** are held, in which the citizens of Varosia can co-decide in the legislation.*

*The government enjoys a [bad] good reputation in the population. It can be concluded from opinion polls that **70%** of the citizens are **[not] satisfied with the current government**.*

*Varosia's **legislation** is **[not] transparent** and the government offers [no] the opportunity of free counseling on judicial subjects and tax issues in information centers. Furthermore, Varosia's public authorities are **[little] very service-oriented** and [not] interested in supporting Varosia's citizens.*

*The **budget expenditures** of the state are **[not] traceable** for Varosia's citizens, because they are [not] regularly informed about the use of tax money. In an opinion poll in October 2010 **78%** of Varosia's citizens indicated to **have the impression** that their tax money is **[not] used reasonable**.*

*Besides [a lot of] little tax money is embezzled by politicians. According to an international corruption index (CPI), Varosia is one of the countries with the **[highest] lowest perceived corruption**.*

All these factors cause that the citizens of Varosia trust their country a [little] lot.

Followed by information concerning the manipulation of power ([low] high):

The prosecution of tax evaders is [not] very effective. Because of the tax legislation it is [difficult] easy for the government to conduct audits on its citizens and therewith to chase tax evaders.

The government assigns a [low] high budget to the tax office to punish tax evasion. With the means at hand it is [not] possible for the tax office to employ qualified tax inspectors. In addition the members of the tax office of Varosia are perceived as [little] very present.

The chance to be audited for self-employed people is very [low] high. This is to say that self-employed are [not] audited very often. Therefore, [not] very many of the committed tax offences can be detected. Moreover, the fines for tax evasion are [not] very severe in Varosia. When tax evaders are detected, they do [not] have to anticipate severe fines. The tax office does [not] exercise benignity.

All these factors cause that the citizens of Varosia assess their government as [little] very powerful.

A.2. Questionnaire

Imagine that you are living, working and paying taxes in Varosia. You are working as a self-employee and your business is running good. Your tax declaration is due and you have to pay taxes.

Followed by tax related items that are not relevant to this study and not reported here (i.e. different tax compliance measures).

A.2.1. Manipulation check trust

The governmental authorities in Varosia act fair towards their citizens.

In Varosia the interests of a few are considered stronger than the interests of the community. (reversed)

The governmental institutions of Varosia act upon their citizens' interests.

A.2.2. Manipulation check power

Chances that tax evasion will be detected in Varosia are high.

It is easy to evade taxes in Varosia. (reversed)

The governmental institutions in Varosia are very effective in the suppression of tax criminality.

A.2.3. Perceived similarity of Varosia and the home country

How similar do you perceive the country of Varosia in comparison to your own country?

How similar do you perceive the power of authorities in the country of Varosia in comparison to your own country?

How similar do you perceive the trust in authorities in the country of Varosia in comparison to your own country?

Appendix B

B. Sources of Transparency International Corruption Perception Index

1. African Development Bank Governance Ratings 2012
2. Bertelsmann Foundation Sustainable Governance Indicators 2014
3. Bertelsmann Foundation Transformation Index 2014
4. Economist Intelligence Unit Country Risk Ratings
5. Freedom House Nations in Transit 2013
6. Global Insight Country Risk Ratings
7. IMD World Competitiveness Yearbook 2013
8. Political and Economic Risk Consultancy Asian Intelligence 2013
9. Political Risk Services International Country Risk Guide
10. Transparency International Bribe Payers Survey 2011
11. World Bank Country Policy and Institutional Assessment 2012
12. World Economic Forum Executive Opinion Survey 2013
13. World Justice Project Rule of Law Index 2013

Zusammenfassung

Das „Slippery Slope Framework“ (SSF) postuliert zwei Determinanten von Steuerehrlichkeit: (1) das Vertrauen von BürgerInnen in die Behörden und (2) die wahrgenommene Macht der Behörden. Eine Steigerung der Steuerehrlichkeit kann daher durch vertrauensfördernde als auch durch machtausbauende Maßnahmen erreicht werden. Während ein hohes Vertrauen zu freiwilliger Steuerehrlichkeit führt und durch Wohlwollen, wahrgenommene Fairness und Transparenz gekennzeichnet ist, führt eine hohe wahrgenommene Macht der Behörden zu erzwungener Steuerehrlichkeit, die vor allem von der Höhe angedrohter Strafen und der Kontrollwahrscheinlichkeit abhängt. Diese Annahmen wurden bereits vielfach experimentell und in Fragebogenstudien bestätigt. Ziel dieser Studie ist es zunächst die Implikationen des SSF mit extern erhobenen Daten zur Steuerehrlichkeit zu überprüfen und darüber hinaus Verhalten, welches generell der Gemeinschaft schadet, über das Ausmaß von Vertrauen und Macht vorherzusagen. Als abhängige Variablen werden Daten zum Anteil der Schattenwirtschaft an der Wirtschaftsleistung sowie zum Ausmaß der Korruption in insgesamt 44 Nationen herangezogen. In Szenarien werden Vertrauen und Macht als jeweils niedrig und hoch manipuliert, sodass vier Gruppen entstehen (Vertrauen hoch/niedrig x Macht hoch/niedrig). Wahrgenommene Ähnlichkeiten zwischen den Szenarien und der Herkunftsnation dienen als Basis für die Berechnung von Indizes, welche das wahrgenommene Ausmaß von Vertrauen und Macht der Behörden in der jeweiligen Nation darstellen. Diese Indizes werden schließlich als Prädiktoren von Schattenwirtschaft und Korruption genutzt. Die Ergebnisse betonen die Relevanz von Vertrauen in sowie wahrgenommener Macht der staatlichen Behörden als Determinanten gesellschaftlich kontraproduktiven Verhaltens.

Curriculum Vitae

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Education

- 10 / 2008 – 06 / 2014 **Psychology** (Diploma Study Course)
University of Vienna
Main focus: Economic Psychology
Title of thesis: “Trust and power as determinants of corruption and shadow economy: A cross-cultural study in 44 countries.”
- 06 / 2008 **General qualification for university admission** (Abitur)
Gymnasium Schwertstraße Solingen, Germany
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Grade: 2,0
- 07 / 2005 – 07 / 2006 **US-High-School**
Morgan County High School, Kentucky, USA
Graduation as honors student

Work Experience

- 10 / 2012 – 08 / 2014 **University of Vienna, Faculty of Psychology**
Department of Applied Psychology: Work, Education and Economy
Teaching Assistant (Economic Psychology)
 - Support of courses
 - PST Projektstudium Wirtschaftspsychologie
 - VO Arbeits-, Organisations- und Wirtschaftspsychologie
 - VO Wirtschaftspsychologie II
 - Assistance in scientific research
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- 09 / 2012 – 10 / 2012 **Niedersächsisches Institut für frühkindliche Bildung und Entwicklung**, Osnabrück
Research center for giftedness
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- 01 / 2010 – 12 / 2012 **Stefan Heinen und Jerome Olsen GbR**, Solingen
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