Essays on the Determinants of Tax Morale in Developing Countries

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Abstract Governments in developing countries have introduced substantial reforms to their tax systems in recent decades. Many of these countries started to increase their tax base and now most of their public revenues originate from income and consumption taxes. However, the average tax intake of developing countries is still lower than in industrialized countries. The literature on tax compliance in industrialized countries has shown that nonpecuniary factors are important to explain tax compliance. This thesis studies how knowledge on taxes, skills in financial literacy, societal dynamics and reliability of public institutions are related to attitudes on tax payments in developing countries.

Keywords: Tax Morale, Functional Literacy, Institutions, Developing Countries.

Kurzzusammenfassung Regierungen in Entwicklungsländern haben in den letzten Jahrzehnten umfangreiche Reformen ihrer Steuersysteme durchgeführt. Viele dieser Länder haben begonnen ihre Steuerbasis auszuweiten und generieren ihre öffentlichen Einnahmen zunehmend aus Einkommen- und Konsumsteuern. Jedoch sind die Steuereinnahmen immer noch wesentlich geringer als in Industrieländern. Die Literatur über Industrieländer hat gezeigt, dass nicht-monetäre Faktoren wesentlich zur Einhaltung von Steuervorschriften beitragen. Diese Dissertation untersucht, wie das Wissen über Steuern, finanzielle Allgemeinbildung, gesellschaftliche Dynamiken und die Zuverlässigkeit von Institutionen die Einstellungen zu Steuerzahlungen in Entwicklungsländern beeinflussen.

Schlagwörter: Steuermoral, Funktionale Bildung, Institutionen, Entwicklungsländer.

Contents

Chapter 1

Introduction

1.1 Motivation

Taxation is recognized as one of the most important factors for economic development (Martinez-Vasquez and Bird, 2014, pp.1-2). The size of the public budget exercises a decisive influence on the governments' spending on public services to accelerate economic development. Besley and Persson (2013) show that, a century ago, today's high-income countries had similar tax patterns and tax intakes as today's low income countries. The authors argue that high income countries invested substantially in their fiscal capacity. As the top statutory tax rates in today's low-income countries are at the same levels as in high-income countries, Besley and Persson argue that low-income countries need to broaden their tax base by employing income and consumption taxes, investing into better tax administration, and improving the accountability of public institutions.

However, tax compliance is not perfect even in high-income countries. The reasons for imperfect compliance in these countries are under scrutiny in the field of economics and related sciences (see Alm, 2012, for a review), thereby providing a suitable analytical starting point in understanding the challenges faced by low-income countries.

Allingham and Sandmo (1972) marked the beginning of economic analysis of tax evasion, in which they employed an expected utility approach and considered cheating on taxes as a risky decision. The concealed amount of income is negatively related to the audit and penalty structure, assuming the taxpayer to be risk averse. Later studies showed that the actual tax compliance in industrialized countries is much higher than predicted by the approach of Allingham and Sandmo. Alm et al. (1992) demonstrate that the relative risk aversion must be extraordinarily high to explain actual tax com-

pliance, given that actual audit probabilities and costs of detection are very low in industrialized countries.

The differential between predicted and actual tax compliance urged economists to include psychological and sociological factors into their analysis. Besley and Persson (2014) argue that these factors complement governmental deterrence and can provide the *tipping point* for a norm of tax compliance. Luttmer and Singhal (2014) discuss *tax morale*, which captures all "nonpecuniary motivations and deviations from expected utility framework" as one important factor that constraints tax compliance. The authors further define five mechanisms through which tax morale exercises an influence over tax compliance namely, feeling intrinsically motivated, reciprocating the behavior of the government, being influenced by the behavior of other individuals, behaving in accordance with a long-run cultural norm or suffering from information imperfections. While tax morale has gained increasing attention in the literature on high-income countries, it is still in its infancy in the area of developing economies. Many of these countries have levied taxes on income and consumption in order to broaden their tax base. However, these groups of countries are characterized by specific constraints that affect willingness and capabilities of taxpayers.

Firstly, developing countries typically lack executive constraints on their political institutions. Taxpayers only have limited possibilities to control the use of public revenues and evade extortion by corrupt officials. They, thus, may object tax payments to reciprocate faulty governments. Secondly, public authorities typically have insufficient administrative capacities. This puts constraints on the ability to efficiently enforce tax laws and deter subjects from tax evasion. Prevalent tax evasion is further predicted to prompt individual decisions and thus affect tax morale. Thirdly, income and consumption taxes as well as self-assessment systems are relatively new phenomena for taxpayers in developing countries. It is obviously of particular interest to analyze whether the subjects know about these taxes and possess the capabilities to file own tax returns. Because information imperfections can affect tax morale, it is of further interest to determine how these capabilities are related to attitudes on tax payments. The discussed issues do not exclusively describe the constraints of tax morale in developing countries. However, they are of particular importance to disentangle the underlying mechanisms of tax morale in these countries.

1.2   Structure and summary of basic results

This thesis contributes to understand the discussed mechanisms and focuses on different developing countries across the world. It consists of four further chapters. Chapter 2 examines the current capabilities in functional literacy of people in Vietnam and Thailand to comply with their tax liabilities. Functional literacy in this study captures knowledge about the Value Added Tax (VAT) and financial literacy. It is a novelty of the study to analyze these measures of functional literacy in rural areas and relate them to attitudes on tax payments. The analysis in this chapter uses data from the 2013 wave of the survey within the DFG-Project FOR 756 "Vulnerability in Southeast Asia". The survey includes questions about the knowledge on the VAT liabilities and rates of seven consumption goods and queries financial literacy. The first finding is that respondents in Vietnam are financially more literate whereas respondents in Thailand are slightly better informed about the VAT. Secondly, a majority of the respondents in both countries perceive paying taxes as necessary contributions and would be willing to contribute more to the public budget. Both measures of functional literacy are significantly related to positive attitudes on tax payments. In the case of Vietnam, the analysis finds that a combination of positive attitudes on tax payments and higher knowledge on tax liabilities can enhance the acceptance of additional tax payments. Finally, the paper uses a fully interacted probit model to estimate whether the different levels of knowledge in functional literacy are related to different effects on the tax attitudes. The analysis discovers that a better knowledge about the VAT rates in Thailand translates into a significantly higher effect on the acceptance of a tax increase.

Chapter 3 examines how two different types of reciprocities are related to tax morale in Vietnam. The country is of particular interest because its people exhibit a high level of tax morale, as found in earlier studies and in Chapter 2 of this thesis. The study uses data collected in the City of Hue in 2013. The focus is on an urban sample in order to allow for comparisons with the estimated level of tax morale in Chapter 2. The first type, vertical reciprocity, measures how people value their contributions to the governmental budget. People were asked what paying taxes generally meant to them and the answers indicated the relation of taxes to the governmental budget. The framing of the answers intended to estimate whether the respondents trust the government to spend taxes for useful purposes. The second type, horizontal reciprocity, examines the impact of the perceived compliance of other taxpayers. The respondents were asked about their

perceptions of the multitude of their compatriots who cheat on taxes. These questions are based on previous versions of the European and the World Values Survey. The paper estimates lower tax attitudes among urban respondents as compared to the rural sample considered in Chapter 2, which in turn can be related to the perceived magnitude of tax evasion. The results show that both reciprocity measures are significantly correlated with tax morale. A Wald-test shows that the estimation for the vertical reciprocity is significantly more sizable than the horizontal reciprocity estimator and hence outreaches the negative effect from this source.

Chapter 4 examines whether experiences of petty corruption worsen tax morale. The focus is on Sub-Saharan Africa where petty corruption is widespread and economies suffer from a low tax intake. The data are from Wave 5 of the Afrobarometer survey, carried out in 2012-2013, which consisted of nationally representative surveys and included, at that time, 29 countries from the sub-Saharan area. The novelty of the study is to relate personal corruption experiences to tax morale and analyzes different mechanisms through which bribery can affect the willingness to contribute towards the public budget. The study includes corruption experiences related to the access to five different types of public goods during the twelve months before the survey was carried out. The paper finds that experiences of petty corruption have negative effects on tax morale. However, the effects are not significantly higher the more frequently bribes are paid. Experiences with petty corruption are correlated with reduced trust in the tax department. It was analyzed whether this has an indirect effect on tax morale. A mediation analysis shows that 30 percent of the total effect of petty corruption on tax morale results from lower trust in the tax department. An important novelty of the study is to analyze how the impact from corruption experiences on tax morale differs across average national levels of people affected by petty corruption. The study finds an inverse effect on tax morale. Corruption experiences have a significantly higher effect on tax morale in countries where relatively few people need to pay bribes to get access to public goods.

Chapter 5 studies the relationship of institutional reliability and cooperative behavior. The study is a joint work with Martin Fochmann from the University of Cologne and Andreas Wagener from University of Hannover. The analysis is based on a laboratory experiment conducted at the computerized laboratory at Leibniz University Hannover. The main focus is on how different levels of institutional reliability influence cooperative behavior. We varied institutional reliability by informing participants about outside

corruption attempts, which could be either fended off or accepted by the "system". The bribe attempts as well as the decision of the "system" were exogenous events and remained out of control of players. In one scenario a corruption agreement would reduce the return on contributions to the public good. Corruption attempts constituted a break of the social norm of non-corruption that we made salient at the beginning of each round. We observed that the participants contributed more to the public good to offset the loss from corruption. More importantly, they contributed more to the public good if the institution had reinforced their credibility by fending off the corruption attempt. We interpret their behavior in a way through which they value the reliability of the institutions and, thus, we found an evidence of a causal relationship.

Three main conclusions can be derived from this thesis. Firstly, governments need to accompany attempts to broaden their tax bases with specific education on tax rates in order to avoid information imperfections. As the analysis of the functional literacy in Vietnam and Thailand has shown, higher levels of literacy and positive attitudes on taxes can be related to the acceptance of additional tax payments. Secondly, positive effects on tax morale from vertical reciprocity can dominate negative effects from perceived high-level of evasion. Governments thus may exploit the loyalty of their citizens to create a norm of compliance. Thirdly, unreliable institutions, which for example allow public officials to extort money from the public budget, are detrimental to positive attitudes on tax payments. People contribute more to the public budget if the institutions prove their reliability.

Chapter 2

Functional Literacy And Tax Morale in Vietnam And Thailand: Potentials And Limitations Of People In Rural Areas.

2.1 Introduction

Information imperfections are defined as a mechanism that can seriously weaken tax morale. People might fail to pay taxes because they lack the competencies to understand complex tax legislation or the knowledge necessary to comply with it (Andreoni et al., 1998; Luttmer and Singhal, 2014). Reversely, the competencies which are accountable for high levels of tax morale are to be ascertained. This article empirically analyzes specific competencies of taxpayers regarding tax knowledge and financial literacy to derive an indicator of *functional literacy*. The concept is defined as the "ability to use skills in reading, interpreting documents, and carrying out quantitative calculations in real-life situations" (Pryor and Schaffer, 1997). Functional literacy is one crucial component of *tax literacy* which grasps the "ability to fill in the tax form and calculate tax liabilities independently" (Bardai, 1992). Studying the relationship between functional literacy and tax morale is inspired by the findings from the literature on *financial literacy*. This strand of literature has shown that for people to achieve an economically effective lifetime planning, they need explicit knowledge rather than schooling (Lusardi and Mitchell, 2014). This paper, thus, intends to disentangle how specific capabilities of functional literacy and tax knowledge are related to tax morale.

The focus of this study is on Vietnam and Thailand, two countries which are particularly well suited for several reasons. The countries are located in Southeast Asia. Earlier studies have shown that people have high tax morale in most Asian countries (Torgler, 2004; McGee, 2007). Vietnam is typically identified as a country where people have

a particularly high tax morale, whereas people in Thailand show higher tolerance for tax evasion (McGee, 2006). Compared to other emerging economies in the world, both countries have relatively stable public institutions but vary in their political and economic constitutions which provides an interesting starting point for this study. (CIA, 2016a; CIA, 2016b). Both countries introduced the Value Added Tax (VAT) which has become one of the most important revenue sources.

The VAT supplies a good indicator for the analysis of knowledge about taxes in general. In both countries, the VAT was introduced in the late 1990s and is imposed nationwide on all consumption goods with a minimum level of processing (World Bank, 2014; The Revenue Department, 2014c). Both countries have very limited volumes of exempt commodities. Thailand taxes most of the consumption goods at a single rate of 7 percent and Vietnam at the standard rate of 10 percent and a reduced rate of 5 percent (The Revenue Department; World Bank).[1] The VAT, thus, has a simple structure with a slight difference in the number of rates. I employ knowledge about the VAT liability and rates as one component in the framework of functional literacy. The other component is derived from the proficiency in *financial literacy*. This economic concept employs simple calculation tasks, partly related to questions on interest and inflation rates (see Grohmann et al., 2015).

The focus of this study is on individuals who live in rural areas in both countries. The analysis of the nexus between functional literacy and tax morale in these areas is of particular interest, since they encompass significant shares of the population and have undergone a process of economic restructuring. In 2014, 67 percent of the total population in Vietnam and 50.8 percent of the population in Thailand were living in rural areas. Haong et al. (2014) show that private business activities soared after the introduction of market oriented *Doi moi* reforms in Vietnam. The share of rural households engaged in non-farm activities increased from 16.5 percent in 1993 to 34 percent in 2008. Around 40 percent of non-farm activities were based on self-employment. The monthly income per capita, in current prices, quadrupled between the years 2002 and 2010 (General Statistics Office, 2012). Chawanote and Barrett (2013) show significant changes in the employment levels from farming to non-farm undertakings in Thailand during 2005 to 2010. Their study finds that all non-farm occupations were associated with significant remuneration gains, which in turn have significant consequences for

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[1]Both countries also have a list of zero rated products which are restricted for exports or specific government programs (World Bank, 2014; The Revenue Department, 2014c).

the tax systems of both countries. The rising income enables a boost in consumption. The diversification of economic activities, related to a rise in non-farm self-employment, makes individuals subject to taxation. It is, thus, of interest to explore the capabilities of individuals in these areas to declare taxes and analyze their attitudes to pay taxes. The paper uses data from a survey in six rural areas in Vietnam and Thailand that contained two questions to estimate attitudes on tax payments. The first question asked whether the respondents believe that taxes are necessary contributions or that the government only squanders their money. The second question asked for their willingness to pay more taxes in order to increase the supply of public goods and services. The study finds that a majority of the people in both countries consider tax payments as necessary contributions to the public budget and agree to a tax increase. The analysis of the *functional literacy* shows that people in Vietnam exhibit better calculation skills than their counterparts in Thailand. However, this observation does not induce significantly different effects on attitudes towards tax payments among the two countries. A second result is that the respondents in Thailand are better informed about the VAT, which translates into a significantly higher effect on the acceptance of a tax increase.

The remainder of this paper is as follows: Section 2 discusses related literature. Section 3 introduces specific characteristics of the political and economic settings in the two countries, which are important to understand the scope of the study and people's relationship with the government. Section 4 describes the design of the survey and provides an overview of the variables under calculation. Section 5 introduces and identifies correlates of tax knowledge and calculation skills, with a particular focus on the effects of being part of the tax system. Section 6 employs the two measures of functional literacy and analyzes its correlations with attitudes towards tax payments. Section 7 estimates effects of different levels of functional literacy on tax attitudes. Section 8 concludes this research.

2.2 Related literature

There exist only a few studies in the literature on tax morale which have an explicit focus on education. Most of the studies employ education in years of schooling, thereby implicitly co-relating more years of schooling with better fiscal knowledge (see Torgler and Schaltegger, 2005; McGee, 2012). From a theoretical point of view, education can have ambiguous effects on attitudes to pay taxes. Lewis (1982) argues that highly educated

people have better understanding of the tax laws and know more about the relationship between tax payments and public spending. Therefore, these people have a higher motivation to contribute towards the public budget than people with lower educational attainments. However, with better knowledge about the fiscal system, highly educated people might be more aware of waste of public revenues and, thus, be more reluctant to pay taxes (Torgler and Schaltegger). Better educated people can also be more reluctant to pay taxes if they achieve higher incomes, leading to higher tax brackets (McGee).

Education and tax morale. Torgler and Schaltegger (2005) provide a survey of research on tax morale and specifically focus on the impact of socio-demographic characteristics. They find ambiguous and sometimes insignificant effects of education on tax morale. McGee (2012) uses data from the World Values survey to estimate global averages for three different levels of education on tax morale. The study finds that respondents in the group with the lowest level of education have the lowest tolerance for tax evasion. Respondents in the group with middle levels of education showed the highest tolerance for tax evaders. Based on these findings, McGee estimates a curvilinear relationship between education levels and tax morale.

Literacy and taxation. As discussed, school education is only assumed to provide an estimation in the understanding of the tax code. Mutascu and Danuletiu (2013) use a different measure to analyze the relationship between education and tax revenues. Their study uses data from the International Adult Literacy Survey (IALS), which focuses on the understanding of written and printed information (Kirsch, 2001). The authors find a reverse U-shape relationship between literacy levels and tax revenues across 123 countries. However, the IALS data only give limited information about the general understanding of economic issues and has no specific focus on taxation. The IALS data, thus, rather complements existing studies which incorporate education in years of schooling in their analysis.

Fiscal knowledge and tax morale. The literature on the relationship between specific knowledge about taxation and tax morale started with an analysis by Song and Yarbrough (1978). They show that better knowledge about a tax reform in the US is related to better tax ethics. Roberts et al. (1994) analyze how the perceived fairness of the tax system depends on the type of knowledge and understanding about the tax sys-

tem. They find significantly lower preferences for progressive taxes when questions were framed in concrete rather than abstract terms. Eriksen and Fallan (1996) use a quasi-experimental approach to study causality of changes in tax attitudes depending on a betterment in knowledge about taxes. They show that explicit tax knowledge improves the perceived fairness of the tax system. In contrast, Tan and Chin-Fatt (2000) find no significant impact of tax knowledge on perceptions of fairness and tax compliance attitudes in an experimental study conducted with students of taxation in New Zealand.

Tax literacy and tax compliance. Nero et al. (2010) provide the only study that analyzes how people are prepared to draw up their own tax declarations. The study focuses on the event of the introduction of the Self-Assessment System (SAS) in Malaysia. Drawing on the concept of *tax literacy*, they use questions on knowledge about technical language of taxes as well as deductions and reliefs to determine the taxable income. Nero et al. find that the majority of the taxpayers were unable to correctly assess their remittances and that they particularly lack the information about reductions in tax rates through available tax benefits. People over- and under-report tax payments as a result of lack of sufficient knowledge.

The bulk of the discussed literature shows that considering explicit tax knowledge is of more explanatory function than simply focusing on school education. The majority of studies on specific tax knowledge show that fiscal knowledge and tax literacy can enhance tax morale and tax compliance. The following analysis, thus, employs the concept of functional literacy to analyze how this measure is related to people's attitudes on taxes in rural Vietnam and Thailand.

2.3 Characteristics of Vietnam and Thailand

2.3.1 Political and economical conditions

Vietnam and Thailand share similar socio-demographic characteristics. In 2014, Vietnam had a population of 90.7 million people and Thailand of 67.7 million, with life expectancies at birth of 74 years in Thailand and 76 years in Vietnam. The poverty headcount ratios were 13.5 percent in Vietnam and 10.5 percent in Thailand (World Bank, 2016c). Both countries experienced strong economic development in the last four

decades and managed to substantially increase per capita incomes (World Bank, 2016a; World Bank, 2016b). The World Bank now ranks Vietnam among lower-middle-income and Thailand among upper-middle-income economies (World Bank, 2016d).

The two countries vary in their political institutions. Whereas Vietnam is ruled by a socialist government which exerts tight control on the expression of political opinions (CIA, 2016b), the political order in Thailand is based on a constitutional monarchy. In Thailand, competition on parliamentary power induced public tensions over governmental policies and ended up in military coups (CIA, 2016a). Albritton and Bureekul (2008) argue that political turmoils owe their roots to the division between Bangkok and rural areas. The democratically elected Shinawatra governments mobilized political participation of rural dwellers by granting them social support. The rural population opposed the policies by military-backed governments, as they shift power back to interests of middle-class citizens in Bangkok and curtails civic liberties.

The different political orders influenced the economic structures of the countries. Thailand traditionally follows pro-investment policies and is considered as a free-enterprise economy (Shain, 1994), while the Vietnamese economy is characterized by state interferences from central planning. However, the enactment of market oriented *Doi moi* reforms in Vietnam in 1986, induced a process of gradual economic transformation by reducing restrictions on the establishment of private enterprises and encouragement of export-oriented industries (Hoang et al., 2014).

In both countries, economic power is unequally distributed. In Thailand, most of the economic capacity is located in the central areas around the capital of Bangkok (Bhaopichitr and Thitisakmongkol, 2014). In Vietnam, most of the economic capacity is now located in the regions around Hanoi in the North and Hoh-Chi-Minh City in the South (Ishizuka, 2011). However, as argued in the introduction of this paper, economic activities have undergone a distinct change in rural areas. In Vietnam, the share of agriculture to GDP steadily declined from 39 percent in 1990 to 18 percent in 2014. During the same time the value added by the service sector increased from 22.7 to 33.3 percent (UN, 2016). The shift of sectoral activity in Vietnam is also reflected in the employment statistics, with 67 percent of the population aged 15 years and older retaining a main job in agriculture in 2002. In 2010, this share had declined to 52.9 percent. The share of individuals employed in the industrial sector increased from 9.9 to 16.7 percent and in the service sector from 8.4 to 11.3 percent. This development affected the people in all income quintiles, with people in the two lowest income quintiles reducing their

main employment in the agricultural sector by 9 percent, on average, between 2004 and 2010 (General Statistics Office, 2014). In Thailand, the shares of value added by the agricultural and service sector remained fairly stable at around 10 and 50 percent respectively (UN, 2016). The shares of people employed in agriculture declined from 46 to 40.7 percent between 2001 and 2010. During the same time, the proportions of employment in the service sector increased from 39.7 to 45.8 percent (ILO, 2013). Chawanote and Barrett (2013) find that change in economic activities is related to increased revenues from non-farm activities, which stochastically dominate earnings from farming. However, only a few laborers became non-farm employers to achieve highest earnings. Nevertheless, these observations indicate that the economic activity in rural areas does not only focus on agricultural activities but to a great extent involves service and industrial businesses.

2.3.2 Fiscal conditions and the design of the VAT

The fiscal structures of Vietnam and Thailand experienced substantial changes in the last two decades, with both countries starting to decentralize fiscal revenue and spending responsibilities (Vo, 2009). The types of taxes in both countries have been harmonized with the standards known from industrialized countries. Taxes on trade were reduced in order to foster global integration and taxes from consumption gained importance (Warner, 2011). In Vietnam, the VAT has become the biggest revenue source, accounting for one third of the tax revenues in general (General Statistics Office, 2016). The VAT is also among the biggest contributors to the Thai budget (Ministry of Finance, 2016). As discussed in the introduction of this article, the VAT in Vietnam distinguishes three rates: 0, 5 and, 10 percent. Newspapers and magazines, salt products, plant cultivation and husbandry products, animal breeding, as well as waste water and soil management are exempted. In 2013, a reduced VAT rate of 5 percent was imposed *inter alia* on fertilizers, sugar, equipment for agricultural production and feed for animals.[2] All other goods and services are charged with the standard VAT rate of 10 percent (World Bank, 2014). In Thailand, the standard VAT rate is 7 percent. Newspapers, fertilizers, feed for animals and pesticides are exempted (The Revenue Department, 2014c).

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[2]In 2014, the Vietnamese Government *inter alia* eliminated the VAT for fertilizer and animal feed products.(USDA Foreign Agricultural Service, 2015).

The VAT laws in Thailand and Vietnam exclude unprocessed agricultural products. In both countries, only entrepreneurs with an annual turnover of more than 40,000 Euros are required to remit the VAT. Entrepreneurs below this threshold are required to pay turnover tax in Vietnam and the Corporate Income Tax in Thailand (World Bank, 2014; The Revenue Department, 2014b).

The listed exemptions from the VAT mainly affect the agricultural sector in rural areas. However, the discussed changes of economic activities and increases in incomes show that more individuals can be expected to participate in the tax system in the future. With regard to farmers, the World Bank (2014) suggests that all agricultural producers should be able to voluntary register for VAT to deduct VAT liable production inputs and, thus, omit higher prices for domestic agricultural products and competitive disadvantages compared to imported products.

2.4 Data description and summary statistics

2.4.1 Description of data collection

The data set used in the analysis of this paper originates from the project "Impact of shocks on the vulnerability to poverty: Consequences for development of emerging Southeast Asian economies", funded by the German Research Foundation (FOR 756). The data was collected in the provinces Ha Tinh, Thua Thien Hue, and Dak Lak in central Vietnam as well as Buri Ram, Ubon Ratchathani, and Nakhon Phanom in Northeastern Thailand between March and July 2013. Hardeweg and Waibel (2009) argue that the provinces were deliberately chosen because of their comparable levels of economic development and their remoteness from industrial centers. Ten households were chosen from two villages per sub-district, which in turn were selected by weighted samplings (see Hardeweg and Waibel for more information about the sampling). The interviews were conducted by native students under the supervision of german doctoral candidates. The questionnaire was answered by one household member but includes information about the individual as well as the household. Individual information is given if the respondent was asked about the attitudes on tax payments but they also provided household information about taxes paid during the year before the survey was conducted.

The original sample includes 1,994 respondents in Vietnam and 1,985 in Thailand. Because of missing values in the data on VAT knowledge, I restricted the sample and included only those respondents, who answered at least one question about VAT knowledge in the questionnaire.[3] The sample used in the analysis of this paper comprises 1,277 households in Vietnam and 802 in Thailand (see Table 2.1 below).

Tab. 2.1: **Descriptive statistics of socio-economic variables by country**

| | Vietnam | | | | | Thailand | | | | | |
Variable	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max	p-value
Female	1,264	0.4739	0.4995	0	1	796	0.6005	0.4901	0	1	0.0000***
Age	1,269	50.255	13.465	16	90	800	52.028	13.079	15	87	0.0010***
Education (years)	1,164	7.7861	3.1432	1	18	756	5.9603	3.3606	1	18	0.0000***
Married	1,263	0.8321	0.3739	0	1	792	0.8460	0.3612	0	1	0.4090
Non-farm self-employed	1,277	0.1966	0.3975	0	1	802	0.1571	0.3641	0	1	0.0231**
Off-farm employed	1,269	0.2600	0.4388	0	1	800	0.1850	0.3885	0	1	0.0001***
Sum HH-assets (1000 USD-PPP)	1,277	3.6945	6.498	0	133.55	802	11.3606	32.702	0	777.39	0.000***
Applied for a credit	1,265	0.0688	0.0071	0	1	799	0.0501	0.0077	0	1	0.0849*
Received public transfers	1,269	0.4444	0.4971	0	1	800	0.6100	0.4881	0	1	0.0000***
HH paid tax	1,277	0.7427	0.4375	0	1	802	0.8716	0.3348	0	1	0.000***
HH sum of taxes paid (1000 USD-PPP)	1,277	0.0568	0.8967	0	31.17	802	0.2393	5.2661	0	148.81	0.000***

Notes: The differences of the means of the socio-economic variables were tested with the t-test for nominally scaled variables and the Kolmogorov–Smirnov test for continuously scaled variables.
Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

The mean *age* in both countries is about 50 years and more than 80 percent of the respondents are married. The mean values of these two variables are fairly the same amounts even though they are statistically significantly different. The average age indicates a relatively high number of older people in the sample. This phenomena results from out-migration of younger people to industrial centers (Hardeweg and Waibel, 2009). However, I argue that this does not diminish the relevance of the study because the discussed changes of economic activities in the considered areas. I decided to only employ a dummy for being *married* in the analysis because of the high number of married people in the sample.

In contrast, the sample varies in some other variables. For example, Thailand has a 13 percent higher share of *female* respondents, whereas the subjects in Vietnam have

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[3]Table 2.11 in the Appendix presents comparisons of the socio-demographic characteristics of those respondents of whom at least one answer is recorded in the questionnaire and hence could be awarded a taxscore and those who did not. In both countries, the respondents with a taxscore are younger, better educated, more likely to be self-employed, live in households that possess higher asset values, received less public transfers, and are more likely to having paid taxes. The used sub-sample, thus, rather includes those subjects who are either already paying taxes or, due to the differences in the socio-demographic variables, have the perspective to improve living standards and become taxpayers.

two more years of school *education*. The sample allows to distinguish between different employment levels. I used dummies for *non-farm self-employment* or *off-farm employment*. The reference group consists of farmers. In fact, with some 20 and 16 percent, non-farm self-employment is fairly the same in both countries. However, in Vietnam, the number of respondents with a major position in off-farm employment exceed those in Thailand by 7.5 percent.

I used three variables to control for the economic position of the subjects. Subjects in Thailand possess *assets* of significantly higher values than their counterparts in Vietnam. I control for *credit applications* in order to capture potential financial constraints to pay taxes. The third variable indicates that people in Thailand are more likely to have *received public transfers* than their counterparts in Vietnam. This variable can be considered as a proxy for economic neediness and might affect attitudes towards the government, as indicated by De La O (2013) and Manacorda et al. (2011).

Paying taxes is more common in Thailand than in Vietnam. 87 percent of the households in Thailand and 74 percent in Vietnam paid taxes in the period considered. As shown in Table 2.1, this difference is statistically significant.

Table 2.2 gives an overview on the types of taxes paid by the respondents during the year before the survey was conducted. In both countries, the land tax is the most frequently reported type of tax paid, with 696 of 1,277 households, or 54 percent, in Vietnam and 79 percent in Thailand having reported about their tax payments. Secondly, about 18 percent of the respondents in Vietnam and 9 percent in Thailand paid taxes on their houses. In contrast, only a very limited number of respondents reported having paid Corporate and Personal Income Tax. This observation might result from business activities below the threshold of being obliged to pay these taxes. There is a very limited number of people who reported having paid the VAT. These estimations might originate from the nature of the VAT. The VAT is an indirect tax that is included in the prices on purchased products if the incidence of the tax actually falls on the sellers. The amount of tax paid is not salient to the consumers as long as no bill is provided that lists the VAT or the sellers inform the consumers. In contrast, land and house taxes are direct taxes which are typically collected by the village head or personally remitted to the public authorities.

Haughton (2011, p.266) estimates that in Vietnam, the VAT is the largest tax paid by the households. The author finds that VAT is progressive across deciles of household expenditures. It increases from 4.5 percent of household expenditures in the lowest

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decile to 7 percent in the top decile.

Because my article uses the VAT as a proxy for the knowledge about taxes, I use data on the household assets to estimate the propensity of the households having paid this type of tax. The survey distinguishes between farm productive assets, such as tractors and water tanks, and non-farm productive assets, mostly used for private purposes, such as TVs and washing machines. Table 2.3 gives information about purchases of assets during the last year and four years before the survey was conducted. If it can be assumed that the VAT is levied by the sellers and that the tax incidence is on the consumers, it turns out that 1,205 out of 1,277 households in Vietnam and 771 households in Thailand and, thus, almost all households in the sample purchased tangible assets for private use during four years before the survey started and, thus, may have paid VAT.

Tab. 2.2: **Taxes paid by number of households in Vietnam and Thailand, 2012-2013**

Name of tax	Vietnam	Thailand
Land Tax	696	631
House/Building Tax	234	71
Value Added Tax	26	17
Corporate Income Tax	32	7
Personal Income Tax	14	51
Others	114	75
Total number of households in considered sub-sample	1,277	802

Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

Tab. 2.3: **Number of households that bought VAT-liable assets, 2009-2013**

Name of tax	Vietnam	Thailand
Bought farm productive asset during last year	198	143
Bought farm productive asset during last four years	793	455
Bought non-farm productive asset during last year	583	405
Bought non-farm productive asset during last four years	1,205	771
Total number of households in considered sub-sample	1,277	802

Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

2.4.2 VAT knowledge

The survey asks specific questions on the knowledge about the VAT liabilities and rates on certain consumption goods. The goods were selected because of their potential importance in the daily consumption of the respondents, their potential use as inputs in the agricultural production process as well as a variety of tax liability and rates. Table 2.4 shows the chosen products and their VAT classification. The column *tax liability* gives information about an item's liability to the VAT. The second column presents the amount of the *tax rate* if the item is liable to VAT. Rice is taxed at a reduced VAT rate of 5 percent in Vietnam and at a regular rate of 7 percent in Thailand. In both countries, alcoholic drinks and cigarettes are due to additional consumption taxes (the Special Sales Tax in Vietnam and the Excise Tax in Thailand) in addition to the VAT (PWC, 2012; PWC, 2013). The rates of the consumption taxes on alcoholic drinks differ in accordance with the alcoholic content of the good. A similar situation exists for different tobacco products, which makes it difficult to exactly estimate the knowledge about the amount of the charged tax rates. I decided to consider the charged VAT rate as the correct answer and use tolerance intervals around the excise tax rates at these two types of consumption goods. I list the VAT and the additional consumption tax in the column *tax rate*. The column *interval* presents the ranges in which the given answer is considered to be correct.

The knowledge about taxes on the presented consumption goods is measured by two scores. The first score measures the knowledge about the tax liability, with one point being awarded for each correct answer on the *tax liability* of a product. The second score measures the knowledge about the tax rates. Again, one point was granted for each correct answer in line with rates and ranges in the column *interval*. Hence, the two scores are in a range between 0 and 7.

Tab. 2.4: **Tax liability and tax rates of goods in Thailand and Vietnam**

Items	Vietnam			Thailand		
	Tax liability	Tax rate	Interval	Tax liability	Tax rate	Interval
Salt	No	0	0	Yes	7	7
Rice	Yes	5	5	Yes	7	7
Alcoholic drinks	Yes	10 and 25-45	10 and 25-60	Yes	7 and 25-60	7 and 25-70
Cigarettes	Yes	10 and 65	10 and 60-80	Yes	7 and 85	7 and 80-100
Fertilizer	Yes	5	5	Yes	0	0
Electronic devices	Yes	10	10	Yes	7	7
Newspaper	No	0	0	Yes	0	0

Sources: PWC (2012) and PWC (2013).

Figure 2.1 shows that the majority of the respondents know about the existence of a tax on the listed consumption goods. In both countries, the highest frequency of correct answers is 5. However, Vietnam has a higher frequency of respondents with correct answers lower than 5 (47.45 and 36.66 percent, see Table 2.12 in the Appendix). This is also in reflected in the results of the mean values. In Thailand, the average VAT liability score, henceforth *taxscore*, is 4.14, whereas the average value for Vietnam is 3.90. A comparison of the mean values of the taxscores with the Kruskal-Wallis-test for Vietnam and Thailand shows that the difference is of statistical significance (*p-value=0.000*). Figure 2.2 indicates that the respondents in both countries have very limited knowledge about the charged tax rates. The average score of correct answers on the charged tax rates, henceforth *ratescore*, amounted to 1.0 in Vietnam and 0.95 in Thailand.[4] The difference in the mean values of the ratescores is statistically not significantly different (*p-value=0.415*).

Fig. 2.1: Taxscores Vietnam and Thailand (7 items)
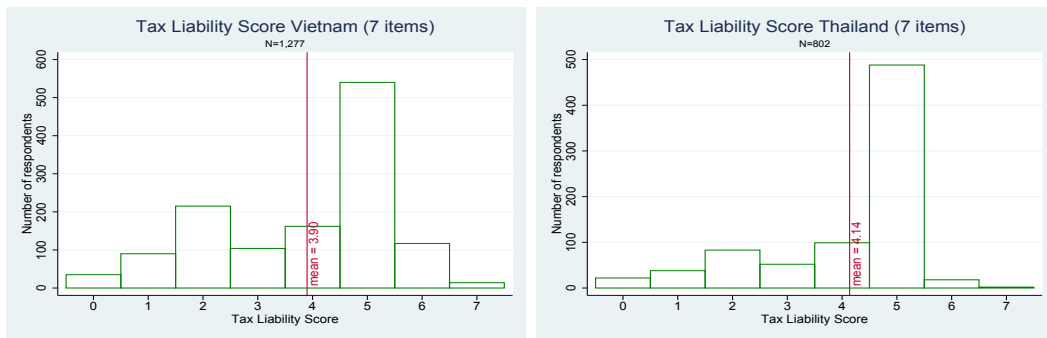
Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

Fig. 2.2: Ratescores Vietnam and Thailand (7 items)
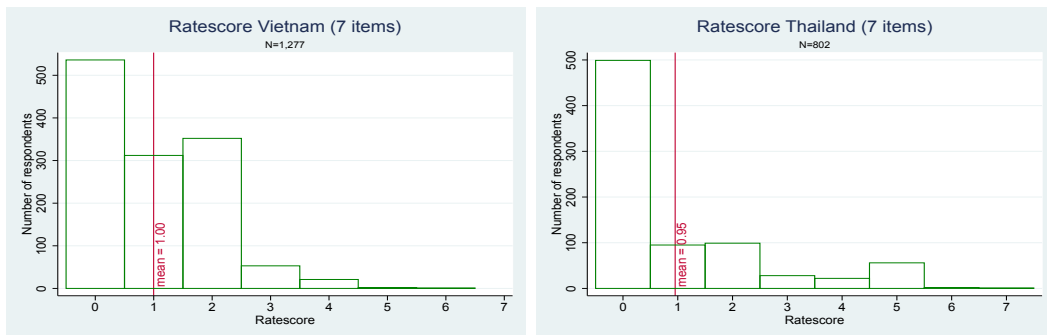
Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

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[4]The descriptive statistics reveals that the VAT rate on alcoholic drinks was most frequently correctly identified in both countries.

When comparing the knowledge about taxes on goods, it seems to be of importance to only consider those items liable to the VAT. This reduces the bias of the mean values from answers of respondents who state that there is no tax on the consumption goods at all. After excluding salt and newspaper in Vietnam and fertilizer and newspaper in Thailand, Figure 2.3 in the Appendix confirms that the respondents in Thailand are better informed than those in Vietnam. On average the Thai interviewees gave correct answers on four products whereas the mean value in Vietnam is 3.19 and thus 3 items. The difference of one item remains of highest statistical significance (*p-value=0.000*). As before, respondents in both countries know little about the exact VAT rates. Figure 2.4 shows that the respondents in Thailand again identify the correct VAT rate on one product whereas the average in Vietnam is 0.27. The Kruskal-Wallis-test reveals that the difference is of highest statistical significance (*p-value=0.001*).

Fig. 2.3: Taxscores Vietnam and Thailand (5 items)

Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

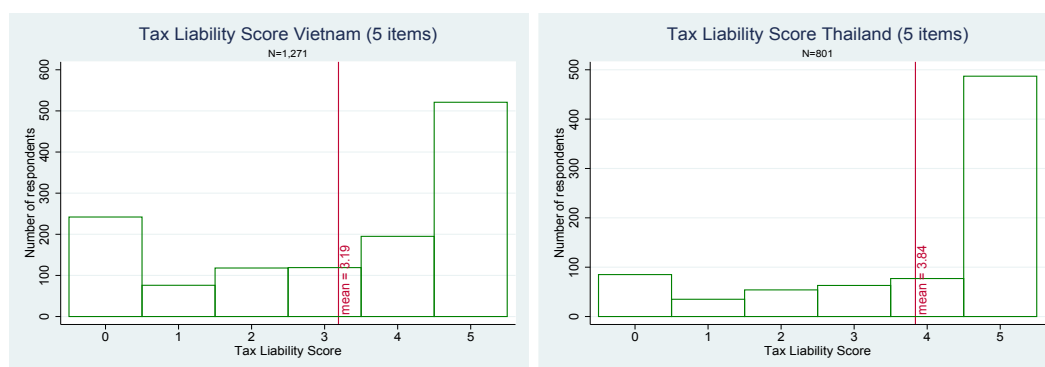Fig. 2.4: Ratescores Vietnam and Thailand (5 items)
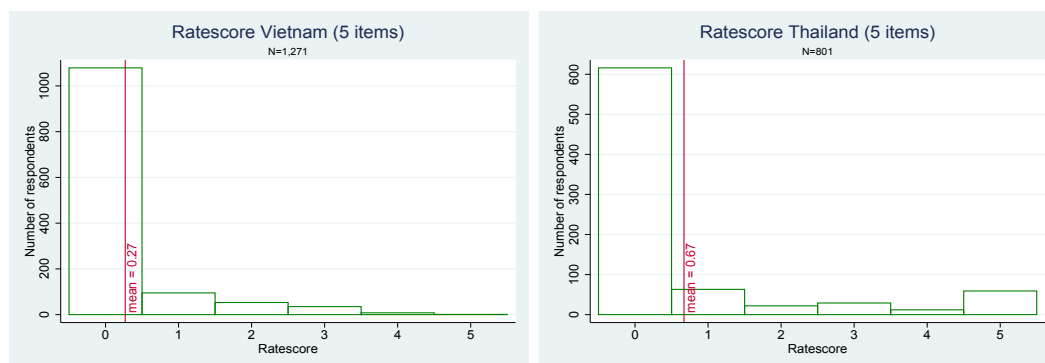
Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

2.4.3 Financial literacy

As discussed in the introduction of this chapter, it is of crucial importance that potential taxpayers have the ability to conduct simple calculation tasks and understand basic economic concepts. This subsection introduces descriptive statistics for the inquired skills in financial literacy, the second component of functional literacy. The financial literacy questions originate from Lusardi and Mitchell (2014). Their approach focuses on the understanding of interest rates, inflation, and risk diversification and integrated in calculation tasks.

I use three standard questions of financial literacy from the survey that focus on calculation of interest rates and inflation and are listed as questions 1 to 3 in Table 2.13 below.[5]

The survey also asks questions on numeracy skills as introduced by Cole et al. (2011), which are listed as questions 4 to 7 in Table 2.13. All seven questions are combined into a financial literacy score.[6] As for the measures of tax knowledge, one point was awarded for each correct answer. Again, the score is in the range between 0 and 7. I employed the Cronbach's alpha to estimate the reliability of the index. With values of 0.74 in Vietnam and 0.70 in Thailand, the estimations are on acceptable levels in both cases (DeVellis, 2012, pp.109-110).

Figure 2.5 gives the average scores in Vietnam and Thailand. People in Vietnam correctly answered five questions while those from Thailand knew four. The difference of one unit is again of highest statistical significance (*p-value=0.0000*).

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[5]The survey includes one additional question regarding risk diversification: *Planting a single crop is riskier than planting multiple crops.* I do not include this question into the analysis because it does not involve calculation activities. More importantly, the answers to this question might not correctly reflect skills in risk diversification as aimed by the original question on the diversification of stock portfolio (see Lusardi and Mitchell, 2014). Cultivating one profitable plant can be more beneficial than having several non profitable plants. The internal consistency of the estimated financial literacy score, estimated by Cronbach's alpha, improves after excluding that question.

[6]I stick to the term *financial literacy* to identify the estimated score. This is because all seven questions included in the analysis originate from the literature on financial literacy (see Cole et al., 2011; Grohmann et al., 2015).

Fig. 2.5: Financial Literacy Scores in Vietnam and Thailand
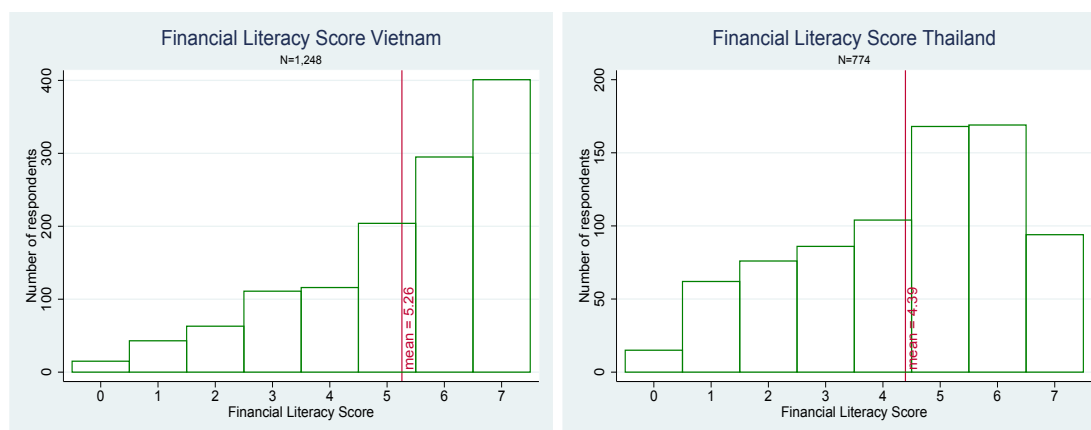
Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

2.5   Correlates of VAT knowledge

The first part of the empirical analysis intends to identify correlates of knowledge on the VAT and financial literacy. The particular focus of this part is on whether the current level of integration into the tax system is related to better general knowledge about taxes or whether information imperfections affect people independent of already being a taxpayer. In the second part, I estimate whether taxpayers have better skills in financial literacy, the second component of functional literacy. Finally, I analyze whether tax knowledge and financial literacy are correlated with each other. An analysis of this relationship in a regression model has the advantage to gather estimations conditioned by country-specific socio-demographic variables and information about paid taxes.

Table 2.5 presents the estimations for Vietnam. The dependent variable of each regression model is listed in the heading line and the number of the regression model is listed in parenthesis below. All estimations result from OLS regressions. In Model 1, I use a dummy that takes a value of one if the respondent self-identified as taxpayer, as introduced in Table 2.2. The dummy is statistically significant at the 5 percent level. Being a taxpayer improves the score on the knowledge about the VAT liability by 0.22 points, e.g., from a score of 3 to 3.22.

Secondly, knowledge about the VAT liability does not vary with the amount of taxes paid. However, Model 4 reveals that the amount of taxes paid is significantly positively, but diminishingly related to the knowledge about the VAT rates. Taxpayers living in households that pay higher total amounts of taxes seem to be better informed about specific tax rates on consumption goods.

Models 5 and 6 focus on the correlates of financial literacy. Having paid a tax during the year before the survey was conducted is significantly positively correlated with the score on financial literacy (Model 5). Thus, taxpayers seem to achieve higher values on both components of functional literacy. Model 7 shows that financial literacy has more power to explain the knowledge about tax liabilities of the selected products than the identification as a taxpayer. The dummy used to identify a taxpayer turns insignificant if financial literacy is included into this regression. However, the sum of taxes remains statistically significantly correlated with better knowledge about the tax rate (Model 10).

Among the socio-demographic covariates, it can be observed that female interviewees exhibit a significantly worse knowledge about the VAT than males. The results are ambiguous for non-farm self-employed subjects. They know significantly more about the VAT liabilities but less about the exact rates as compared to the farmers. School education is significantly positively correlated with scores on tax liability and financial literacy. This lends support for the hypothesis that more schooling is related to better fiscal knowledge (Lewis, 1982). Among the covariates that intend to measure the economic position, it turns out that wealthier respondents, living in households with assets of higher values, achieve higher scores. In contrast, those who receive public transfers, and are thus likely to be in a worse economic position, know less about VAT liability and are significantly less financially literate.

Different results can be found for Thailand (see Table 2.6). Being a taxpayer is not related to better knowledge about the VAT. Only the score on *financial literacy* has explanatory power among the functional literacy measures. The correlation is significant at the 5 percent confidence level for the taxscore and at the 1 percent confidence level for the ratescore. One additional correct answer on financial literacy questions is related to an increase of the ratescore by 0.15 points. As in Vietnam, school education is significantly positively related to financial literacy and the knowledge about taxes.

The analysis of the functional literacy shows that in both countries higher scores in financial literacy are associated with higher scores on knowledge about the VAT. Being a taxpayer is related to better knowledge about the VAT only in Vietnam. The lack of statistical significance in Thailand implies that information imperfections affect all respondents independent on individual taxpayer status.

Tab. 2.5: **Correlates of Tax Knowledge and Financial Literacy in Vietnam**

OLS regression models	Taxscore (1)	Taxscore (2)	Ratescore (3)	Ratescore (4)	Financial Literacy (5)	Financial Literacy (6)	Taxscore (7)	Taxscore (8)	Ratescore (9)	Ratescore (10)
Taxpayer	0.2183** (0.1107)		-0.0792 (0.0794)		0.2833** (0.1361)		0.1658 (0.1090)		-0.0771 (0.0808)	
Amount of taxes paid		0.0027 (0.0024)		0.0034** (0.0015)		0.0006 (0.0021)		0.0025 (0.0024)		0.0034** (0.0015)
Amount of taxes paid - squared		-0.000001 (0.000001)		-0.00001** (0.000004)		-0.000006 (0.0000006)		-0.000001 (0.0000008)		-0.00001** (0.000004)
Financial Literacy							0.1213*** (0.0293)	0.1271*** (0.0295)	0.0291 (0.0182)	0.0251 (0.0179)
Female	-0.4168*** (0.0983)	-0.3941*** (0.0996)	0.0081 (0.0725)	0.0155 (0.0722)	-0.2183** (0.1045)	-0.2045* (0.1066)	-0.3825*** (0.0976)	-0.3615*** (0.0988)	0.0122 (0.0722)	0.0191 (0.0719)
Age 30-44	0.0268 (0.2911)	-0.0642 (0.2746)	-0.2476 (0.1809)	-0.2724 (0.1858)	0.5802** (0.2768)	0.6302** (0.2812)	-0.0399 (0.2897)	-0.1436 (0.2711)	-0.2858 (0.1843)	-0.3099 (0.1890)
Age 45-59	-0.0659 (0.2833)	-0.1505 (0.2623)	-0.1871 (0.1734)	-0.2193 (0.1780)	0.5739** (0.2737)	0.6455** (0.2749)	-0.1405 (0.2811)	-0.2422 (0.2583)	-0.2167 (0.1775)	-0.2480 (0.1820)
Age 60+	0.1716 (0.2828)	0.0953 (0.2710)	-0.1660 (0.1779)	-0.2173 (0.1811)	0.4908* (0.2978)	0.5470* (0.2980)	0.1179 (0.2846)	0.0262 (0.2715)	-0.1957 (0.1822)	-0.2465 (0.1855)
Education (years)	0.0577*** (0.0149)	0.0610*** (0.0152)	-0.0049 (0.0104)	-0.0034 (0.0097)	0.1096*** (0.0213)	0.1161*** (0.0206)	0.0434*** (0.0146)	0.0450*** (0.0149)	-0.0079 (0.0110)	-0.0060 (0.0101)
Married	-0.0291 (0.1552)	-0.0065 (0.1563)	-0.0729 (0.0891)	-0.0691 (0.0907)	0.1607 (0.1631)	0.1608 (0.1641)	-0.0451 (0.1557)	-0.0233 (0.1566)	-0.0825 (0.0905)	-0.0787 (0.0920)
Non-farm self-employed	0.3529*** (0.1231)	0.3681*** (0.1215)	-0.1747** (0.0813)	-0.1892** (0.0817)	0.3443*** (0.1333)	0.3596*** (0.1338)	0.3197*** (0.1234)	0.3311*** (0.1216)	-0.1844** (0.0808)	-0.1974** (0.0813)
Off-farm employed	0.1317 (0.1243)	0.1304 (0.1251)	0.1497** (0.0749)	0.1612** (0.0764)	-0.1514 (0.1226)	-0.1396 (0.1244)	0.1625 (0.1235)	0.1615 (0.1239)	0.1450* (0.0748)	0.1551** (0.0764)
Log assets (per hh)	0.1461*** (0.0394)	0.1606*** (0.0403)	-0.0166 (0.0293)	-0.0381 (0.0283)	0.2103*** (0.0459)	0.2200*** (0.0477)	0.1190*** (0.0397)	0.1297*** (0.0406)	-0.0187 (0.0302)	-0.0387 (0.0297)
Applied for a credit	-0.0302 (0.2228)	-0.0642 (0.2234)	-0.0800 (0.1263)	0.0225 (0.1209)	-0.3198 (0.2052)	-0.3078 (0.2123)	0.0013 (0.2207)	-0.0346 (0.2206)	0.0953 (0.1274)	0.0374 (0.1222)
Received social transfers	-0.1678* (0.0990)	-0.1982** (0.0981)	0.0375 (0.0677)	0.0543 (0.0658)	-0.2220** (0.1060)	-0.2563*** (0.1100)	-0.1300 (0.0984)	-0.1516 (0.0973)	0.0419 (0.0675)	0.0572 (0.0660)
Constant	2.2498*** (0.4248)	2.323*** (0.4236)	1.4438*** (0.2912)	1.5020*** (0.2886)	2.2101*** (0.4553)	2.2532*** (0.4613)	2.002*** (0.4343)	2.0582*** (0.4331)	1.3626*** (0.3046)	1.4300*** (0.3013)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,160	1,147	1,160	1,147	1,149	1,136	1,149	1,136	1,149	1,136
Prob > F	0.0000	0.0000	0.0062	0.0097	0.0000	0.0000	0.0000	0.0000	0.0119	0.0141
R^2	0.0804	0.0817	0.0218	0.0249	0.1364	0.1345	0.0918	0.0953	0.0230	0.0259

Notes: (I.)Significantly different from zero at 10% (*), 5% (**), and 1% (***) confidence level. (II.)Standard errors, clustered at village level, in parentheses.
Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

Tab. 2.6: Correlates of Tax Knowledge and Financial Literacy in Thailand

OLS regression models	Taxscore (1)	Taxscore (2)	Ratescore (3)	Ratescore (4)	Financial Literacy (5)	Financial Literacy (6)	Taxscore (7)	Taxscore (8)	Ratescore (9)	Ratescore (10)
Taxpayer	-0.0880 (0.1545)		0.1804 (0.1694)		0.1192 (0.2545)		-0.0525 (0.1576)		0.1806 (0.1681)	
Amount of taxes paid		0.00003 (0.0013)		0.0010 (0.0018)		0.0026 (0.0018)		-0.0003 (0.0014)		0.0008 (0.0018)
Amount of taxes paid - squared		-0.0000005 (0.000002)		-0.0000004 (0.000002)		-0.000003 (0.000003)		-0.000001 (0.0000002)		-0.0000001 (0.000002)
Financial Literacy							0.0568** (0.0286)	0.0563*** (0.0289)	0.1504*** (0.0322)	0.1453*** (0.0319)
Female	-0.1903* (0.1097)	-0.1999* (0.1104)	-0.1573 (0.1248)	-0.1615 (0.1240)	-0.2857** (0.1454)	-0.2838* (0.1493)	-0.1421 (0.1120)	-0.1515 (0.1127)	-0.1170 (0.1257)	-0.1233 (0.1251)
Age 30-44	-0.0973 (0.3295)	-0.1481 (0.3319)	-0.0841 (0.3164)	-0.1182 (0.3068)	-0.0799 (0.3601)	-0.0844 (0.3568)	-0.0586 (0.3397)	-0.0950 (0.3405)	-0.0829 (0.3264)	-0.1160 (0.3171)
Age 45-59	0.0132 (0.3259)	-0.0702 (0.3227)	-0.1639 (0.3288)	-0.2553 (0.3191)	-0.2925 (0.3736)	-0.3163 (0.3684)	0.0653 (0.3335)	0.0023 (0.3276)	-0.1208 (0.3358)	-0.2071 (0.3253)
Age 60+	-0.1761 (0.3429)	-0.2473 (0.3400)	-0.1573 (0.3358)	-0.2600 (0.3257)	-0.7898* (0.4184)	-0.8399** (0.4127)	-0.0674 (0.3506)	-0.1167 (0.3446)	-0.0403 (0.3478)	-0.1379 (0.3361)
Education (years)	0.0272* (0.0158)	0.0191 (0.0174)	0.0726*** (0.0231)	0.0525** (0.0246)	0.0757*** (0.0240)	0.0669*** (0.0260)	0.0202 (0.0160)	0.0135 (0.0174)	0.0631*** (0.0235)	0.0444* (0.0248)
Married	0.1216 (0.1769)	0.1262 (0.1823)	0.3646** (0.1459)	0.3805*** (0.1403)	-0.0636 (0.1998)	-0.0554 (0.2032)	0.1440 (0.1867)	0.1490 (0.1930)	0.3722** (0.1481)	0.3877*** (0.1439)
Non-farm self-employed	-0.2894** (0.1480)	-0.2771* (0.1488)	0.0393 (0.1515)	0.0369 (0.1526)	0.2876 (0.1791)	0.2746 (0.1816)	0.2732* (0.1460)	-0.2575* (0.1461)	0.0020 (0.1474)	0.0006 (0.1494)
Off-farm employed	-0.2401** (0.1326)	-0.2573* (0.1329)	0.0048 (0.1357)	-0.0415 (0.1337)	-0.1806 (0.1984)	-0.2076 (0.2022)	-0.1785 (0.1290)	-0.1941 (0.1291)	0.0325 (0.1402)	-0.0134 (0.1376)
Log assets (per hh)	-0.0033 (0.0422)	-0.0108 (0.0434)	0.0194 (0.0429)	0.0119 (0.0414)	0.0968** (0.0491)	0.0888* (0.0505)	-0.0183 (0.0412)	-0.0227 (0.0432)	0.0035 (0.0428)	0.0035 (0.0419)
Applied for a credit	0.2080 (0.1423)	0.2235 (0.1439)	0.0509 (0.2243)	0.0755 (0.2246)	-0.2498 (0.3921)	-0.2316 (0.3883)	0.1735 (0.1485)	0.1843 (0.1496)	0.1189 (0.2251)	0.1469 (0.2240)
Received social transfers	-0.0355 (0.1126)	-0.0448 (0.1159)	-0.1578 (0.1214)	-0.1552 (0.1191)	0.2739 (0.1702)	0.2910* (0.1723)	-0.0343 (0.1148)	-0.0417 (0.1185)	-0.1903 (0.1259)	-0.1901 (0.1247)
Constant	4.8391*** (0.4698)	4.9419*** (0.4893)	-0.2027 (0.5237)	0.1930 (0.5035)	3.4494*** (0.5674)	3.662*** (0.6000)	4.6032*** (0.4832)	4.6883*** (0.5007)	-0.7359 (0.5295)	-0.3281 (0.5073)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	752	745	752	745	728	721	728	721	728	721
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R^2	0.1456	0.1452	0.1472	0.1366	0.1244	0.1227	0.1478	0.1476	0.1709	0.1590

Notes: (I.)Significantly different from zero at 10% (*), 5% (**), and 1% (***) confidence level. (II.)Standard errors, clustered at village level, in parentheses.
Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

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2.6 Functional literacy and tax morale

2.6.1 General attitudes on tax payments

This section analyzes the relationship between the components of functional literacy and tax morale. Tax morale is typically measured by survey data asking people about their attitudes on the justifiability of tax evasion (Torgler, 2003a, pp.8-12). As discussed in the introduction of this paper, earlier studies referring to the perception of tax evasion show high tax morale among people in Vietnam and lower values for people in Thailand (McGee, 2006). The analysis of tax morale in this paper uses a different approach because the conventional approach to measure tax morale gives no information about reasons to evade taxes and people's motivation to comply. As discussed in section 2.3.1, the governments in both countries can be repressive on their citizens, use coercive instruments and curtail expression of opinions. Martin et al. (2009) indicate that studying taxation can bring light to grievances. People might express their unwillingness or refuse to pay taxes as a punishment to the government for its unfair politics. The related literature has shown that more literate people are better informed about fiscal policies which influences their motivations to pay taxes.

Based on these considerations and the focus on functional literacy as explanatory concept, I decided to employ two questions which capture attitudes of the respondents on tax payments in relation to trust in governmental activities and consider both questions as indicators of the tax morale of the respondents in Vietnam and Thailand. This approach allows to check the robustness of tax morale from earlier estimations based on data from the World Values Survey by McGee (2006). The first question is:

Most of the citizens in your country have to pay taxes. What does paying taxes most likely mean to you?

The respondents could choose one out of three options read out by the interviewer: (1) *"Taxes are necessary contributions"*, (2) *"The government takes away my money"* and (3) *"I don't care about taxes"*. The first and second options present contrasting views on tax payments towards the government.

The first option implies that tax payments have useful purposes and are a civic duty. In contrast, the second option provides the opportunity to express distrust of the government in relation to tax payments. It implies that the government cannot be trusted to spend money in efficient ways. The third option intends to identify the respondents

who are not interested in tax related issues. This is of particular importance in rural areas where not all people already pay taxes. One may otherwise argue that people were forced to give opinions on a topic that is of no interest to them.

Figure 2.6 shows that 94 percent of the respondents in Vietnam and 90 percent in Thailand agreed that taxes were necessary contributions. The results indicate that the respondents exhibit positive attitudes towards paying taxes, even though the estimated values are statistically significantly different at the 5 percent confidence level (*p-value 0.0023*). The estimates do not reflect dissenting opinions regarding the government because of different political institutions. The overly positive attitudes an tax payments in Thailand may also reflect the beneficial relationship between the rural population and the Shinawatra government that was in power when the survey was conducted (Hewsion, 2014). Only 4 percent in both countries answered that the respondents do not care about taxes which demonstrates that this topic is of interest for people in rural areas.

In the next step, the underlying factors of the positive attitude on taxes is analyzed. The particular focus in this analysis is on the components of functional literacy, which are employed as explanatory variables. I add all three measures for functional literacy into the regression. Potential multicollinearity between these control variables was tested and can be neglected (see Table 2.14 in the Appendix). The same socio-demographic variables are employed as in Tables 2.5 and 2.6. Table 2.7 presents the results of probit regressions, using the answer *"Taxes are necessary contributions"* as the dependent variable.

In both countries, positive tax attitudes are significantly correlated with the score on financial literacy whereas both measures of tax knowledge are insignificant.[7] In the next step, I analyze whether positive attitudes on tax payments can translate into higher tax compliance and how functional literacy is related to this nexus.

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[7]These results hold if tax knowledge and financial literacy are included in separate regressions.

Tab. 2.7: **Correlates of Positive Tax Attitude in Vietnam and Thailand**

Probit regression models	(1)Vietnam		(2)Thailand	
	Coefficients	Marginal Effects	Coefficients	Marginal Effects
Taxscore	0.0449	0.0033	-0.0055	-0.0009
	(0.0411)	(0.0030)	(0.0475)	(0.0078)
Ratescore	-0.0631	-0.0046	0.0298	0.0049
	(0.0619)	(0.0046)	(0.0453)	(0.0074)
Financial Literacy	0.1385***	0.0102***	0.0697**	0.0114**
	(0.0349)	(0.0027)	(0.0344)	(0.0055)
Female	−0.2659*	−0.0195*	0.0295	0.0048
	(0.1523)	(0.0114)	(0.1465)	(0.0239)
Age 30-44	0.2940	0.0216	0.3154	0.0515
	(0.2882)	(0.0209)	(0.3429)	(0.0557)
Age 45-59	0.4562	0.0335	0.2568	0.0419
	(0.2934)	(0.0214)	(0.3390)	(0.0551)
Age 60+	0.6105*	0.0449*	0.3717	0.0607
	(0.3389)	(0.0250)	(0.3676)	(0.0598)
Education (years)	0.0160	0.0012	0.0291	0.0048
	(0.0273)	(0.0020)	(0.0231)	(0.0038)
Married	-0.1090	-0.0080	-0.2304	-0.0376
	(0.2233)	(0.0163)	(0.2048)	(0.0336)
Non-farm self-employed	-0.2658	-0.0195	0.0379	0.0062
	(0.1651)	(0.0123)	(0.1832)	(0.0300)
Off-farm employed	-0.1106	-0.0081	-0.2324	-0.0380
	(0.1740)	(0.0128)	(0.1918)	(0.0318)
Log Assets (per hh)	-0.0297	-0.0022	-0.0043	-0.0007
	(0.0679)	(0.0050)	(0.0514)	(0.0084)
Applied for credit	-0.1984	-0.0146	0.3898	-0.0637
	(0.2489)	(0.0181)	(0.2872)	(0.0479)
Received social transfers	-0.0210	-0.0015	0.1349	0.0220
	(0.1484)	(0.0109)	(0.1527)	(0.0247)
Constant	0.6429		0.8161	
	(0.5764)		(0.6943)	
Province FE	Yes		Yes	
N	1,146		725	
Prob > chi2	0.0000		0.0638	
Pseudo R^2	0.1264		0.0395	

Notes: (I.) Dependent variable: Taxes are necessary contributions. (II.) Significantly different from zero at 10% (*), 5% (**), and 1% (***) confidence level. (III.) Standard errors, clustered at village-level, in parentheses.
Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

Fig. 2.6: General attitudes on tax payments
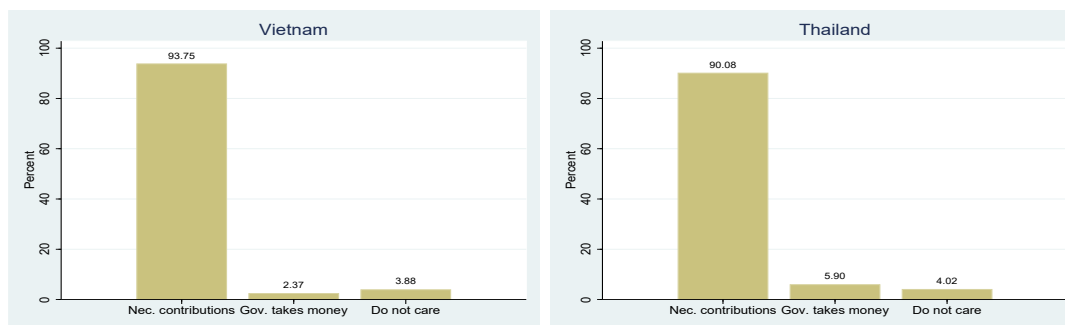
Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

2.6.2 Correlates of accepting a tax increase

The second question on tax morale focuses on the willingness of the individuals to contribute more taxes to the public budget if the money is spent for useful purposes. The framing of the question again induces a relationship between taxes paid to the government and their trustworthiness to spend the money in efficient ways. In contrast to the first question, the second question asks not only for general attitudes on tax payments but on the willingness to contribute money to fiscal budget. In combination with the first question it allows to put positive attitudes in context with a behavioral activity. Even though, I cannot disentangle causality in this study, the analysis of tax attitudes and behavior contributes to recent literature which provides evidence for a relationship between tax morale and tax compliance (Cummings et al., 2009; Halla, 2010; Dwenger et al., 2016). The wording of the second question is:

Would you agree to a tax increase if the extra money is used to finance more and better public goods and services?

The question was termed in a positive way in accordance with its original version from the 1999/2000 European Values Study (EVS, 2016).[1] The advantage of positive wording is the reduction in bias from individual assessments on the utilization of additional public finances. The question could be answered with either (1) *"Yes"* or (2) *"No"*. The results show that 77 percent of the respondents in Vietnam and 63 percent in Thailand are willing to contribute more to the public budget (see Figure 2.7). As one might expect, asking for higher tax payments leads to lower estimations as compared to the first question on tax attitudes. However, particularly in Vietnam, it seems to confirm

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[1]The original of this question is: *"I would agree to an increase in taxes if the extra money is used to prevent environmental pollution"* (European Values Study, 2016, p.25).

the overly positive tax attitudes as estimated from the question before. The results of the two questions on tax attitudes confirm the findings by McGee (2007; 2006) that people in Vietnam have very positive attitudes on taxes and an higher tax morale than people in Thailand.

Fig. 2.7: Acceptance of Tax Increase Vietnam and Thailand
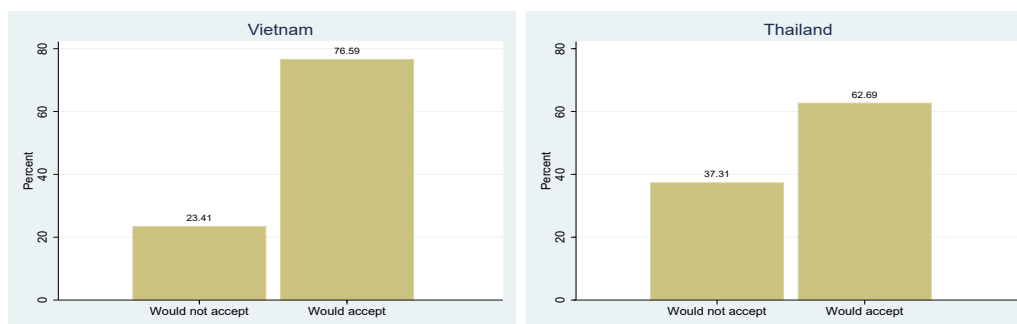
Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

The results of the analysis for the respondents in Vietnam are presented in Table 2.8. A better knowledge about VAT liabilities has a significantly positive effect on the acceptance of a tax increase while being financially literate has no significant effect on the acceptance of a tax increase. Model 2 shows that the positive tax attitude estimated by the first question on general attitudes on tax payments has a positive effect on the acceptance of a tax increase. I use interactions between positive attitudes and the components of functional literacy to estimate the effects of that relationship on the acceptance of a tax increase. Model 3 finds that the interaction between VAT liability and considering taxes as necessary contributions has a significantly positive effect on the acceptance of a tax increase. It also finds that the positive tax attitude is of no statistical significance if the score on the tax liability is zero and *vice versa*. Because of limited explanatory power of estimated coefficients from interaction in non-linear model, I estimate and plot marginal effects of the interaction in the range of the taxscore. This allows to estimate a minimum level of knowledge on VAT liabilities in order to enhance the acceptance of a tax increase. Figure 2.8 shows that in Vietnam, positive tax attitude has a significantly positive effect on the acceptance of a tax increase if the score for the tax liability is larger than four. The observation is confirmed if a linear probability model (LPM) is used to test for robustness (see Figure 2.9). Figure 2.10 shows that the interaction between financial literacy and positive tax attitudes does not significantly improve the acceptance of a tax increase.

Table 2.9 presents the results for Thailand. As in Vietnam, the knowledge about taxes

Tab. 2.8: **Correlates of Accepting a Tax Increase in Vietnam**

Probit regression models	(1) Coefficients	(1) Marginal Effects	(2) Coefficients	(2) Marginal Effects	(3) Coefficients	(4) Coefficients	(5) Coefficients
Taxscore	0.0522**	0.0155**			-0.1270		
	(0.0235)	(0.0070)			(0.0974)		
Ratescore	-0.0281	-0.0083				-0.0350	
	(0.0386)	(0.0114)				(0.1766)	
Financial literacy	0.0210	0.0062					-0.0190
	(0.0259)	(0.0077)					(0.0854)
Necessary contributions			0.3154*	0.0940*	-0.4053	0.3062	0.1118
			(0.1793)	(0.0538)	(0.4218)	(0.2665)	(0.4285)
Taxscore*Nec. contribution					0.1962*		
					(0.1031)		
Ratescore*Nec. contribution						0.0062	
						(0.1825)	
Fin. Lit.*Nec. contribution							0.0425
							(0.0886)
Female	−0.1975**	−0.0586**	−0.2046**	−0.0610**	−0.1847**	−0.2049**	−0.2098**
	(0.0888)	(0.0263)	(0.0898)	(0.0267)	(0.0903)	(0.0896)	(0.0895)
Age 30-44	-0.3749	-0.1113	-0.3613	-0.1077	−0.3869**	−0.3676*	-0.3694
	(0.2286)	(0.0677)	(0.2251)	(0.0671)	(0.2301)	(0.2233)	(0.2265)
Age 45-59	-0.2022	-0.0600	-0.2019	-0.0602	-0.2173	-0.2067	-0.2083
	(0.2351)	(0.0697)	(0.2302)	(0.0686)	(0.2349)	(0.2279)	(0.2321)
Age 60+	-0.1745	-0.0518	-0.1667	-0.0497	-0.1857	-0.1693	-0.1809
	(0.2567)	(0.0762)	(0.2529)	(0.0754)	(0.2563)	(0.2508)	(0.2542)
Education (years)	-0.0123	-0.0037	-0.0051	-0.0015	-0.0091	-0.0052	-0.0087
	(0.0161)	(0.0048)	(0.0154)	(0.0046)	(0.0155)	(0.0154)	(0.0160)
Married	0.1059	0.0314	0.0702	0.0209	0.0753	0.0688	0.0932
	(0.1262)	(0.0374)	(0.1275)	(0.0380)	(0.1281)	(0.1278)	(0.1269)
Non-farm self-employed	-0.1928	-0.0572	-0.1546	-0.0461	-0.1749	-0.1592	-0.1609
	(0.1200)	(0.0355)	(0.1195)	(0.0355)	(0.1195)	(0.1197)	(0.1196)
Off-farm employed	-0.1500	-0.0445	-0.1386	-0.0413	-0.1462	-0.1337	-0.1306
	(0.1084)	(0.0323)	(0.1075)	(0.0322)	(0.1071)	(0.1077)	(0.1081)
Log Assets (per hh)	0.0159	0.0047	0.0389	0.0116	0.0364	0.0383	0.0226
	(0.0394)	(0.0117)	(0.0389)	(0.0116)	(0.0395)	(0.0388)	(0.0393)
Applied for credit	-0.0136	-0.0040	-0.0208	-0.0062	-0.0095	-0.0178	-0.0241
	(0.1645)	(0.0488)	(0.1647)	(0.0491)	(0.1673)	(0.1646)	(0.1638)
Received social transfers	0.0545	0.0162	0.0363	0.0108	0.0446	0.0383	0.0515
	(0.0946)	(0.0281)	(0.0930)	(0.0277)	(0.0931)	(0.0925)	(0.0937)
Constant	0.8113**		0.5941		1.110**	0.6423	0.8043
	(0.3853)		(0.4113)		(0.5511)	(0.4502)	(0.5653)
Province FE	Yes		Yes		Yes	Yes	Yes
N	1,128		1,133		1,133	1,133	1,125
Prob > chi2	0.0202		0.0189		0.0061	0.0326	0.0320
Pseudo R^2	0.0262		0.0229		0.0299	0.0233	0.0241

Notes: (I.)Dependent variable: Taxes are necessary contributions. (II.) Significantly different from zero at 10% (*), 5% (**), and 1% (***) confidence level. (III.) Standard errors, clustered at village-level, in parentheses.

Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

significantly improves the acceptance of a tax increase. The effect in Thailand results from a better knowledge on the VAT rates instead of the VAT liability. In contrast to Vietnam, a positive tax attitude is not correlated with the acceptance of a tax increase. The interaction between positive tax attitude and knowledge about the VAT rate, as well as the other components of functional literacy, remains insignificant for all levels of knowledge on the VAT and financial literacy.

Tab. 2.9: **Correlates of Accepting a Tax Increase in Thailand**

Probit regression models	(1)		(2)		(3)		(4)
	Coefficients	Marginal Effects	Coefficients	Marginal Effects	Coefficients	Marginal Effects	Coefficients
Taxscore	0.0298	0.0113					
	(0.0335)	(0.0126)					
Ratescore	0.1088***	0.0411***					0.0224
	(0.0374)	(0.0141)					(0.1066)
Financial literacy	-0.0187	-0.0071					
	(0.0297)	(0.0112)					
Necessary contributions			0.1999	0.0757	0.1851	0.0700	0.0930
			(0.1528)	(0.0579)	(0.1584)	(0.0599)	(0.1838)
Ratescore*Nec. contribution							0.0921
							(0.1059)
Female	-0.0192	-0.0073			-0.0307	-0.0116	-0.0161
	(0.1040)	(0.0393)			(0.1038)	(0.0392)	(0.1023)
Age 30-44	0.4176*	0.1577*			0.3943	0.1491	0.3809
	(0.2444)	(0.0923)			(0.2442)	(0.0924)	(0.2493)
Age 45-59	0.4044	0.1527			0.3837	0.1451	0.3720
	(0.2578)	(0.0974)			(0.2566)	(0.0971)	(0.2627)
Age 60+	0.5007*	0.1891*			0.4860*	0.1838*	0.4721
	(0.2842)	(0.1074)			(0.2781)	(0.1053)	(0.2877)
Education (years)	0.0157	0.0059			0.0210	0.0079	0.0128
	(0.0182)	(0.0069)			(0.0176)	(0.0067)	(0.0184)
Married	−0.2922**	−0.1103**			−0.2288*	−0.0866*	−0.2753**
	(0.1278)	(0.0483)			(0.1285)	(0.0486)	(0.1297)
Non-farm self-employed	0.1257	0.0475			0.1180	0.0446	0.1143
	(0.1369)	(0.0518)			(0.1355)	(0.0513)	(0.1376)
Off-farm employed	0.2487*	0.0939*			0.2597*	0.0982*	0.2495*
	(0.1345)	(0.0508)			(0.1317)	(0.0498)	(0.1349)
Assets (per hh)	0.0017	0.0006			0.0010	0.0004	-0.0004
	(0.0378)	(0.0143)			(0.0378)	(0.0143)	(0.0377)
Applied for a credit	0.1872	0.0707			0.2046	0.0774	0.1953
	(0.2701)	(0.1019)			(0.2717)	(0.1027)	(0.2691)
Received social transfers	-0.0638	-0.0241			-0.0888	-0.0336	-0.0777
	(0.2701)	(0.0425)			(0.1131)	(0.0428)	(0.1139)
Constant	0.1249		0.3334**		0.0272		0.1514
	(0.4804)		(0.1496)		(0.4359)		(0.4570)
Province FE	Yes		Yes		Yes		Yes
N	715		715		715		715
Prob > chi2	0.0012		0.0037		0.0191		0.0010
Pseudo R^2	0.0393		0.0163		0.0294		0.0400

Notes: (I.) Significantly different from zero at 10% (*), 5% (**), and 1% (***) confidence level.
(II.) Standard errors, clustered at household-level, in parentheses.
Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

Fig. 2.8: Average Marginal Effects of Taxscore with 90%CIs (Probit)
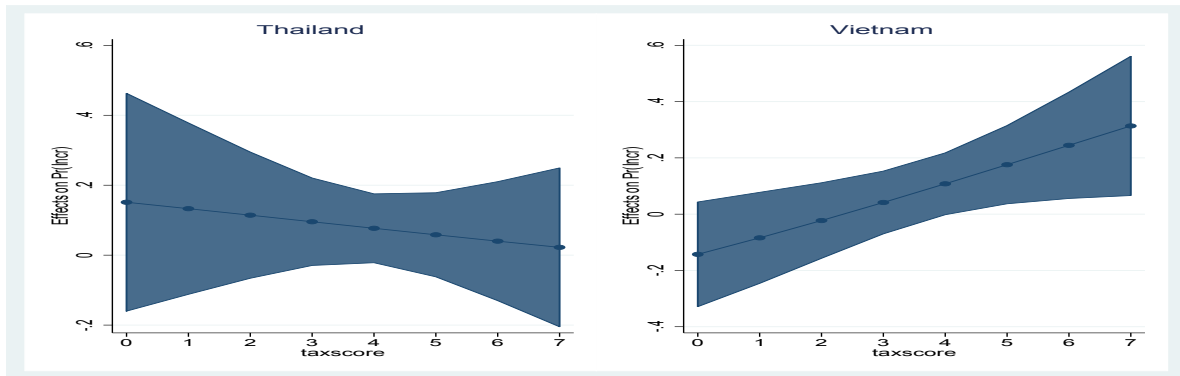
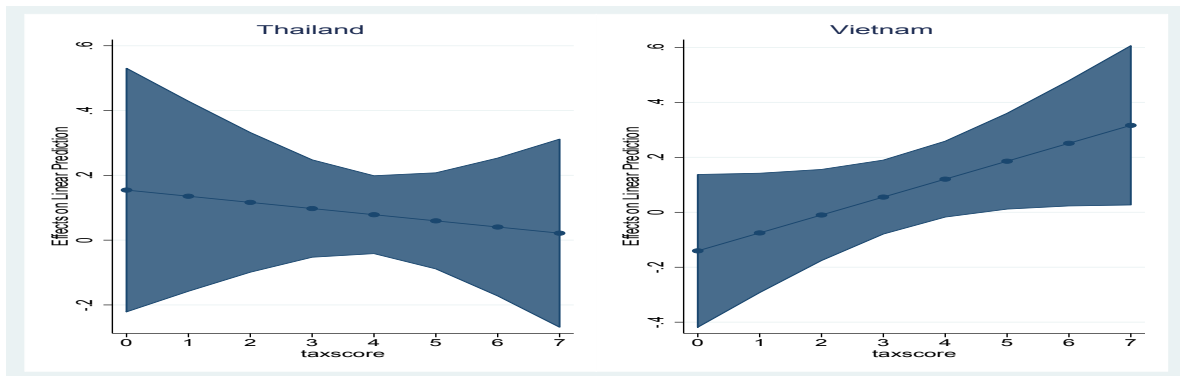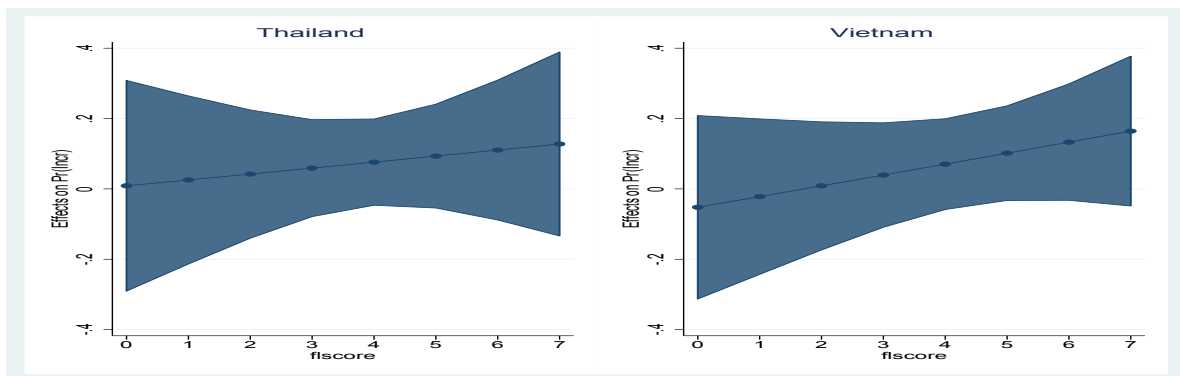Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

Fig. 2.9: Average Marginal Effects of Taxscore with 90%CIs (LPM)

Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

Fig. 2.10: Average Marginal Effects of Financial Literacy Score with 90%CIs (Probit)

Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

2.7 Comparison of level effects between Vietnam and Thailand

This section intends to study whether dissimilarities in the estimates on functional literacy induce any statistically significant differences between the two countries. The analysis so far focused on the relations between functional literacy and tax attitudes within Vietnam and Thailand.

I employ two fully interacted regression models to control for significance in the differences between the two countries. The advantage of this approach is that all data from both countries can be included in one regression. In a post-estimation procedure, the statistical difference of the marginal effects of each covariate between the two countries can be assessed.

Table 2.10 presents the results. It shows the marginal effects and the standard errors in the columns below the country names. The third column in each model gives the *p-values* for the comparison of the sizes of the marginal effects. Model 1 uses the positive tax attitude from the first question on the perception of tax payments as dependent variable. The estimations show that financial literacy has a significantly positive effect in both countries. The *p-value* of 0.5743 indicates that the sizes of the marginal effects are not significantly different from each other. Thus, the higher score in financial literacy in Vietnam is not related to a significantly more positive tax attitude than in Thailand.

Model 2 employs the acceptance of a tax increase as the dependent variable. The knowledge about the tax liability is significantly related to the acceptance of a tax increase in both countries. Again, the size of the effect is not significantly different. In contrast, in Thailand, the ratescore is significantly positively related to the acceptance of a tax increase. The *p-value* of 0.0585 indicates that the size of the marginal effect is significantly different from the estimation for Vietnam. Thus, better specific knowledge about the tax rates in Thailand has a significantly higher effect on the acceptance of a tax increase.

Tab. 2.10: **Level differences of Functional Literacy in Vietnam and Thailand**

	(1) Necessary Contributions			(2) Tax Increase		
	Vietnam	Thailand	Δ Marg. Effects (p-value)	Vietnam	Thailand	Δ Marg. Effects (p-value)
Taxscore	0.0053	0.0021	0.6991	0.0149**	0.0292**	0.2965
	(0.0043)	(0.0068)		(0.0070)	(0.0118)	
Ratescore	-0.0036	0.0003	0.4816	-0.0059	0.0279**	0.0585
	(0.0062)	(0.0066)		(0.0114)	(0.0137)	
Financial Literacy	0.0158***	0.0121***	0.5743	0.0063	-0.0062	0.3455
	(0.0045)	(0.0048)		(0.0078)	(0.0108)	
Female	−0.0328**	0.0111	0.0094	−0.0603**	-0.0017	0.0000
	(0.0162)	(0.0220)		(0.0258)	(0.0396)	
Age (years)	0.0002	0.0011	0.4487	0.0010	0.0009	0.9909
	(0.0006)	(0.0010)		(0.0012)	(0.0020)	
Education (years)	0.0009	0.0054	0.3032	-0.000006	0.0042	0.6112
	(0.0026)	(0.0035)		(0.0046)	(0.0069)	
Married	-0.0162	-0.0258	0.4163	0.0198	−0.0842*	0.2745
	(0.0187)	(0.0250)		(0.0369)	(0.0451)	
Non-farm self-employed	−0.0363*	0.0087	0.0164	−0.0781**	0.0505	0.0000
	(0.0216)	(0.0268)		(0.0373)	(0.0501)	
Off-farm employed	-0.0137	-0.0338	0.0860	−0.0591*	0.1011**	0.0000
	(0.0192)	(0.0338)		(0.0345)	(0.0455)	
Log Assets (per hh)	-0.0002	-0.0006	0.9645	0.0033	0.0037	0.9831
	(0.0068)	(0.0078)		(0.0112)	(0.0139)	
Applied for a credit	0.0163	0.0508**	0.0254	0.0053	0.0695	0.0000
	(0.0194)	(0.0257)		(0.0489)	(0.0941)	
Received public transfers	-0.0059	0.0316	0.0274	0.0012	0.0299	0.0000
	(0.0140)	(0.0233)		(0.0272)	(0.0383)	
Constant	1.0164*			0.3711		
	(0.5827)			(0.3834)		
N	1,871			1,846		
Prob > chi2	0.0000			0.0000		
Pseudo R^2	0.0646			0.0408		

Notes: (I.) Probit regression. Fully interacted model. (II.) Dependent variable: see first row. (III.) Marginal effects reported. (IV.) Significantly different from zero at 10% (*), 5% (**), and 1% (***) confidence level. (V.) Standard errors, clustered at village-level, in parentheses. Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

2.8 Conclusions

Tax morale is influenced by information imperfections. People may be unwilling or simply fail to comply adequately if they have incomplete information about the taxes they owe. With the help of functional literacy, this paper shows that more literate people in rural Vietnam and Thailand can be expected to have higher tax attitudes. The nexus is of particular importance in developing countries where rising incomes and new types occupations bring more people in the position to pay taxes. The finding that people who already pay local taxes in Vietnam know more about other taxes as the VAT can be exploited by the government. It could predominantly start to tax those business owners with federal taxes who already pay local taxes. In Thailand, the government would need to educate all individuals that become subject to file own tax returns irrespective of whether they already pay taxes.

The observed lack of knowledge about tax rates indicates that information imperfections exist in both countries. This observation implies that both countries need to make salient specific regulations on taxes and cannot expect people to familiarize with detailed tax rates, even if they have such a simple structure as the VAT. However, the observation that people in Thailand are better informed than their counterparts in Vietnam might result from the single rate structure of the VAT in the former country. Hence, information imperfections should be reduced by further simplification of tax legislation in Vietnam. The significant relationship between knowledge on tax rates and the acceptance of a tax increase in Thailand indicates that even marginal better information can be related to higher tax morale.

The paper confirms earlier findings on an high tax morale among people in Vietnam. An innovative result is that the combination of high tax morale and good knowledge on tax liabilities is related to a higher probability of accepting additional tax payments. This could pave the way for future research on whether the result is robust to other, more complex, tax legislation and to the inclusion of other underlying mechanism of tax morale, e.g., reciprocal relationships.

Appendix 2.A

Tab. 2.11: **Tests on taxscore sub-samples**

	Vietnam			Thailand		
	Taxscore	No Taxscore	p-value.	Taxscore	No Taxscore	p-value
Female	0.474	0.526	0.025	0.601	0.632	0.159
Age	50.26	51.45	0.115	52.03	56.07	0.000***
Education	7.79	6.73	0.000	5.96	5.24	0.003***
Married	0.832	0.786	0.012	0.846	0.782	0.000***
Non-farm self-employed	0.197	0.113	0.000	0.157	0.098	0.000***
Off-farm employed	0.260	0.275	0.483	0.185	0.174	0.524
Log HH-Assets	7.53	7.06	0.000	8.31	7.87	0.000***
Applied for credit	0.069	0.043	0.019	0.050	0.041	0.323
Received public transfers	0.444	0.537	0.000	0.610	0.666	0.011**
Taxpayer	0.742	0.577	0.000	0.872	0.837	0.036**
Log Sum of taxes paid	17.90	11.62	0.000	23.81	8.70	0.000***

Notes: The differences of the means of the socio-economic variables were tested with the t-test for nominally scaled variables and the Kolmogorov–Smirnov test for continuously scaled variables. Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

Tab. 2.12: **Distributions of taxscores in Vietnam and Thailand**

	Vietnam			Thailand		
	Frequency	Percent	Cum.	Frequency	Percent	Cum.
0	35	2.74	2.74	22	2.74	2.74
1	90	7.05	9.79	38	4.74	7.48
2	215	16.84	26.62	83	10.35	17.83
3	104	8.14	34.77	52	6.48	24.31
4	162	12.69	47.45	99	12.34	36.66
5	540	42.29	89.74	488	60.85	97.51
6	117	9.16	98.90	18	2.24	99.75
7	14	1.10	100.00	2	0.25	100.00
Total	1,277	100.00		802	100.00	

Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

Tab. 2.13: **Financial literacy questions in Thailand (and Vietnam)**

Question 1	If you borrow 10 000 Baht, at and interest rate of 2% a month, after 3 months how much do you owe? a) Less than 10,200 Bhat b) More than 10,200 Bhat c) Exactly 10,200 Bhat
Question 2	If you have 10 000 Baht in an account, the interest rate is 1 % per year, and the price of goods and services rises by 2 % per year. After one year you can buy more, less or the same as today? a) Less than today b) More than today c) Exactly the same as today
Question 3	Suppose you need to borrow 50 000 Baht. Two people offer you a loan, the first loan you have to pay back 60 000 Baht in one month, with the second loan you have to pay back 50 000 Baht plus 15% in the month. Which is the better option? a) The first loan b) The second loan
Question 4	What is 35+82?
Question 5	Imagine you have a friend and you would like to give each of them 4 sweets, how many sweets do you need?
Question 6	What is 10% of 400?
Question 7	Suppose you want to buy a bag of rice that costs 370 Baht. You only have one 1000 Baht note. How much change will you get?

Source: DFG FOR 756 Rural Household Survey (2013).

Tab. 2.14: **Factor correlations**

Vietnam	Financial literacy	Taxscore	Ratescore
Financial literacy	1.0000		
Taxscore	0.2118	1.0000	
Ratescore	-0.0093	-0.0194	1.0000

Thailand	Financial literacy	Taxscore	Ratescore
Financial literacy	1.0000		
Taxscore	0.0440	1.0000	
Ratescore	0.2671	0.0822	1.0000

Source: Author's calculation based on DFG FOR 756 Rural Household Survey (2013).

Chapter 3

Tax Morale And Reciprocity: A Case Study For Vietnam[1]

3.1 Introduction

People's behavior is largely shaped by how they experience their environment. They positively reciprocate to the actions of others as long as they feel well treated and retaliate if not (Sobel, 2005). This behavioral regularity is counted among the non-pecuniary factors that shape the motivation of individuals to pay taxes - their *tax morale* (Luttmer and Singhal, 2014). The determinants of tax morale have gained increasing importance in recent literature on tax compliance. After considering tax compliance as a result of state deterrence, economists realized the influence of moral convictions on the decisions regarding tax compliance (Baldry, 1986). Several scholars began to explore how experiences from mutual exchange within a society shape the intrinsic motivation of taxpayers (Fehr and Falk, 2002; Alm and Torgler, 2006). In this strand of literature, the concept of reciprocity has emerged as a promising tool in two ways. First, on the horizontal basis, taxpayers may be more willing to comply if other contributors do so. Second, on the vertical basis, taxpayers may align their compliance decisions on how they feel treated by the fiscal policy of the government. While most of the literature analyzes these two determinants of tax morale separately, Bazart and Bonein (2014) conducted a laboratory experiment including simulations of both types of reciprocity. Following the theoretical approach by Schnellenbach (2010), they implemented different tax rates to simulate vertical inequity in their tax game. For the horizontal reciprocity,

they informed the subjects about the mean income reported by other participants at the end of each round. They conclude that the effects from horizontal reciprocity are more important than those from vertical reciprocity if the inequities occur simultaneously. Subjects are more likely to respond towards the observed behavior of other individuals as compared to experienced vertical inequities. Their experiment supplies important evidence for the relevance of two types of reciprocity. However, the artificial setting of an experiment in general as well as the sample of undergraduate students, most of them not older than 20 years of age and unlikely to have any experiences with tax-related issues, might challenge the robustness of the results. The experimental study might further suffer from the reflection problem because the average behavior of the reference group influences the individuals' decision making (Manski, 1993).

This paper analyzes how both types of reciprocity affect tax morale in a real-world scenario. Since most of the industrialized countries have long standing credible institutions to enforce controls on tax payments, it seems suitable to look at a developing country in the process of industrialization. It is of further importance to consider a case where people have close relations with each other and with the state. Across the developing world, Vietnam seems to fit best. People in the country have a high tax morale, as identified by McGee (2006) as well as in the second chapter of this thesis, which provides an interesting starting point to learn more about its robustness across different population groups and its underlying mechanisms. The Vietnamese government introduced types of taxes known from the industrialized world (e.g., the Personal Income Tax and the Value Added Tax) and obliges every citizen to pay taxes but lacks sufficient capacities for the tax department to monitor tax compliance (Rama et al., 2011, pp. 23-25).

With regards to vertical reciprocity, the Vietnamese government achieved a significant reduction in the poverty and supplied basic infrastructure to the citizens during the last three decades (World Bank, 2016a). Thus, Vietnamese people may feel motivated to cooperate with the government and contribute to the public budget. The socialist system can be expected to make people submissive to the government (Feld et al., 2008; Streiff, 2013; Feld et al., 2013). On the horizontal level, Gorodnichenko and Roland (2015) find a highly collectivist culture in the socialist country. Thus, individuals can be expected to adapt their own behavior with regard to others. The Hofstede Center (2014) confirms these hypotheses and lists Vietnam as a country with a high level of state obedience and collectivism.

The empirical analysis of this paper uses data from a tax survey in the City of Hue,

located in central Vietnam. It combines and extends questions from earlier versions of the European and the World Values Survey which address the relationship between tax morale and horizontal and vertical reciprocity and are not included in these surveys anymore.

The main finding is that tax morale of people in Vietnam is more affected by the vertical reciprocity than by the horizontal. People who perceive tax payments as a big financial burden are more likely to justify cheating on taxes than others.

The remainder of this article is as follows: Section 2 gives an overview on the related literature about tax compliance and reciprocity. Section 3 provides an introduction to the construction of the sample and summarizes the socio-economic characteristics of the sample. Section 4 introduces the tax related questions and informs about their descriptive statistics. Section 5 empirically tests the impact of horizontal and vertical reciprocity on tax morale. Section 6 reports some robustness checks. Section 7 explores interactions between socio-economic variables and the two reciprocity measures. Section 8 discusses the results and gives implications for tax policy and future research.

3.2 Related literature

This study is based on the concepts of tax morale as well as horizontal and vertical reciprocity which were analyzed separately in earlier studies.

Tax morale. The concept of tax morale evolved from the economic analysis of tax compliance and tax evasion. Baldry (1986) conducted two experiments and invited participants to consider tax evasion as a gamble. Many players did not evade taxes despite the invitation. Baldry argues that taxpayer incur moral costs from feelings of guilt or shame, which shape the intrinsic motivation of taxpayers to comply. Smith (1992) argues that tax compliance is not only shaped by intrinsic motivation but also by extrinsic factors. He argues that the perceived fairness of the tax system and the reliability of the political system affect the motivation to comply. Blaufus et al. (2016) provide evidence that governments can influence moral sentiments by defining the scope of illegal tax evasion activities in countries in which people have high tax morale. As discussed in the introduction of this thesis, Luttmer and Singhal (2014) exemplify five underlying mechanisms, which affect tax morale: intrinsic motivation, reciprocity, peer effects and social influences, cultural factors, and information imperfections.

Reciprocity. Reciprocity is defined as responsive behavior to experienced fairness or unfairness by other individuals or groups. It does not depend on material gains (Fehr and Gächter, 2000). Luttmer and Singhal, under the term of reciprocity, include all factors that affect the relationship between taxpayers and the state. Tax payments are considered as a part of a social contract but cannot directly be related to a certain public good or service. The motivation of taxpayers depends on how they feel treated by the tax schedule, their satisfaction with supplied public services and the quality of public institutions. Taxpayers can be expected to reciprocate perceived fairness by the government. As a prominent example, Besley, Jensen, and Persson (2015) show that people in Great Britain felt unfairly treated by the poll tax. After three years of massive protests and widespread tax evasion, the government decided to substitute this type of tax by a property-value tax. The example indicates the importance of the perceived unfairness of the tax schedule. It further shows that taxpayers orient themselves with the behavior of other people in the society. Luttmer and Singhal capture this mechanism as peer effects and social influences. However, it seems more suitable to integrate this mechanism in a broader definition in the term of reciprocity.

Schnellenbach (2010) supplies a theory of how both types of reciprocity interact with each other and influence tax compliance. Perceived evasion of other taxpayers reduces feelings of guilt and encourage evasion if the tax system is perceived as unfair. The effect among taxpayers is considered as *horizontal* reciprocity while the relation with the state is considered as *vertical* reciprocity. The two types of reciprocity are based on the earlier work of other scholars.[2]

Horizontal reciprocity. This type of reciprocity draws on the theoretical predictions by Bordignon (1993) and Myles and Naylor (1996) and was recently amended by Traxler (2010). According to their models, taxpayers align their evasion decisions as per the behavior of other taxpayers. The existence of conditional cooperation based on the contributions of other individuals was tested in several laboratory experiments. Fis-

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[2]In contrast to reciprocity some scholars argue in favor of conformity as explanation for why people contribute more than predicted by expected utility calculation. They argue that people donate to a public good even though they have no benefit but just because they want to comply with a societal norm (Henrich, 2004; Bardsley and Sausgruber, 2006). However, it is questionable whether paying taxes is already a societal norm in Vietnam. Many people have grown out of poverty in recent years and hence can be expected to have benefited from governmental spending directly or indirectly, and therefore support its politics.

chbacher et al. (2001), Alm and McKee (2004) and Falk et al. (2013) find that subjects increase their contributions with rising group cooperation. In contrast, Lefebvre et al. (2011) find no decrease in tax evasion if other group members increase their contributions. Frey and Torgler (2007) show in an empirical study that tax morale decreases if more people in an economy are assumed to cheat on taxes.

Vertical reciprocity. Cowell (1992) and Falkinger (1995) pioneered reserch on the relationship between the perceived fairness of the fiscal system and the behavior of the taxpayers. Frey (1997) argues that taxpayers exhibit civic virtues and comply because they feel obliged as society members. Oversized state deterrence can be hostile to tax compliance. Feld and Frey (2007) argue in favor of a psychological contract between taxpayers as well as taxpayers and the state authorities. Kirchler, Hoelzl, and Wahl (2008) provide a model which considers power of the authorities and trust in political institutions as the most important determinants of tax compliance. In laboratory experiments, economists employ either different tax rates (Spicer and Becker, 1980; Alm et al., 1992) or vary the return from public goods (e.g., Alm et al., 1993; Weimann et al., 2012). These fiscal inequities lead to increased evasion. Torgler et al. (2008) find that higher trust in governmental officials and obedience lead to increased tax morale. Cummings et al. (2009) find that cross-country differences in tax morale result from citizens' assessment of the quality of governance and tax administration. Drawing on the examples of Botswana and South Africa, they argue that the quality of political institutions has a significant effect on tax compliance in developing countries.

The literature shows the relevance of horizontal and vertical reciprocity for an understanding of tax morale. The perceived treatment by the government has an important impact on the motivations of taxpayers to comply. Taxpayers can be expected to be more compliant if they feel fairly treated by the government or reject cooperation if they sense unfair treated. This effect can become more severe if people observe non-compliance by other taxpayers. It is straightforward to analyze the two types of reciprocity in a developing country that managed to significantly reduce poverty and increase the supply of public services but is still an authoritarian regime and lacks an efficient tax administration to enforce tax compliance.

3.3 Sample construction and summary statistics

The data used in this paper stem from a consumer survey conducted in the City of Hue, Vietnam, in Spring 2013. Hue has a population of 300,000 inhabitants and is the fourth largest city of the South East Asian country. The construction of the sample refers to the random sampling approach. The respondents were randomly selected at the exit of three supermarkets.[3] The supermarkets were selected because they charge the Value Added Tax (VAT) on the purchased products. We only chose subjects who came out of the markets and carried a bag with a supermarket logo. This selection made sure that the subjects in the sample bought consumption goods, which are charged by the VAT and, thus, contribute to the tax system. However, the fact that subjects bought VAT liable products does not guarantee for their reflection of the VAT because it is an indirect tax. Only two of the three supermarkets listed the VAT on their receipts. The survey asked the respondents about the VAT liability of ten consumption goods. Among them, only salt was exempt from the VAT (2012). As shown in Table 3.4 in the Appendix, the majority of the respondents were aware that the VAT is charged on the purchased consumption goods.

The survey was carried out on one day per supermarket. To allow for a homogenous sample the survey was conducted on a Saturday as well as on two consecutive statutory holidays.[4] The interviewer stopped after 100 individuals per supermarket answered the questionnaire. The interviews were carried out by two Vietnamese students. The questionnaire was in Vietnamese and was pre-tested three days prior to the survey at the first supermarket. The questionnaire was re-translated into English prior to the survey in order to check for mistakes from the initial translation into Vietnamese.

The sample includes 300 interviewees - 100 per supermarket. The average age in this sample is 36 years and about 39 percent are males (Table 3.1). On average, the respondents spent three-quarters of their lifetime in the City of Hue, 62 percent of them their whole lifetime. Hence the sample mainly comprises people from that urban area.[5]

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[3]The first individual to come out of the supermarket after the interviewer finished with the previous respondent was invariably asked to be interviewed next. In case couples came out together, the interviewers were supposed to alternate between male and female interviewees but stick to one respondent during the interview.

[4]Hence, during each survey day most of the public employees were not supposed to work but could be expected spending time for shopping.

[5]The respondents were asked about the number of years they have been living in the City of Hue in order to identify whether the sample really includes people from that urban area. The absolute number of years the respondents lived in the City of Hue was divided by their age to estimate the relative share.

Tab. 3.1: **Summary statistics**

Variable	Description	Sample mean	Stand. dev.
Age		36.12	12.58
Male	Respondent is male	0.395	0.49
Urban	Share of lifetime spent in the City of Hue	0.738	0.38
Education	Highest degree of education		
University		0.473	0.50
Vocational		0.223	0.42
High Sch.		0.173	0.38
Secondary		0.097	0.30
Primary		0.027	0.16
None		0.007	0.08
Occupation	Current professional status matched with a subgroup		
White-collar		0.373	0.48
Blue-collar		0.100	0.30
Service		0.183	0.39
Civil servants		0.087	0.28
Students		0.110	0.31
Retired		0.060	0.24
Others		0.087	0.28

Source: Calculation based on author's survey in Hue (2013).

About 47 percent of the respondents hold a university degree, which implies that the sample mainly draws on higher educated respondents. One explanation is that these people can more likely afford shopping in VAT charging markets. The charged VAT induces higher prices for the products sold in supermarkets as compared to grocery stores where VAT is not levied. All in all, seven occupational groups can be distinguished. Most of the interviewees can be defined as white-collar (37.3 percent) or service sector workers (18.3 percent). Only 8.7 percent of the respondents work as farmers, fishermen, housewives or are unemployed and hence treated as *Others*.

3.4 Questionnaire

The dependent variable *tax morale* was captured by the following question:

*In general, what do you think about cheating on taxes?*

This question was developed on the basis of the European Value Survey (EVS) version 2008 and typically used to estimate tax morale in empirical studies (e.g., see Frey and Torgler; 2007, McGee, 2008a and 2008b; Feld et al. 2013). To get responses as intuitive

as possible, the original statement was transformed into a question.[6] The original ten-point scale for the possible responses was reduced to a three-point scale, ranging from (1) *"Is always justified"*, (2) *"Is sometimes justified"* to (3) *"Is never justified"*. A lack of variance in the response scale between 4 and 10 on a 10-point scale in the EVS, ranging from tax evasion is *"never"* to is *"always"* justified, as observed by Frey and Torgler (2007) and Streiff (2013), implores the selection of a 3-point scale. I, thus, decided to provide the two extremes and one option in the middle.

Elffers et al. (1987) express their doubts since people might not articulate their honest opinion in a survey. In contrast, Halla (2012) provides evidence for a causal relationship between tax morale and tax compliance. Owing to a lack of actual data of tax payments of participants in the street interviews and no alternative measure of tax morale, I decided to conform with the common approach of asking for the justifiability of cheating on taxes, although the question might have slightly deterring effects.

As shown in Figure 3.1 in the Appendix, 63 percent of the respondents state that tax evasion is not justifiable. 35 percent consider cheating on taxes as at least sometimes justifiable and 2 percent believe that cheating on taxes is always justified. I would argue that these estimations do not confirm the very high tax morale of people in Vietnam found by McGee (2006; 2008a). However, the estimations by McGee were based on the discussed 10-point scale and, hence, may not be fully comparable to the results from 3-point scale, which I employed.

Fig. 3.1: Tax morale
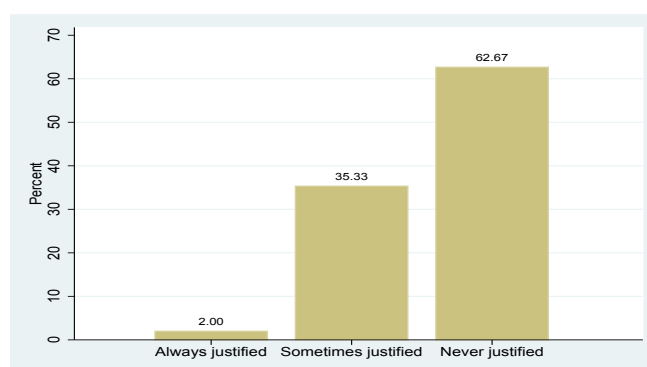
Source: Calculation based on author's survey in Hue (2013).

To assess the impact of horizontal reciprocity on the tax morale, the respondents were

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[6]The EVS version of the statement is: *"Please tell me for each of the following statements whether you think it can always be justified, it can never be justified, or it falls something in between[...]: Cheating on tax payments if you get the chance."*.

asked about their opinion about the number of their compatriots who cheat on taxes. This approach is also typically used in empirical studies (e.g., see Frey and Torgler, 2007).[7] The formulation of the question in this survey was:

What do you think, how many people are cheating on taxes in your country?

To answer this question they could choose from a four-point scale, ranging from (1) *"Almost none"* to (4) *"Almost everybody"*. In general the respondents seem to be quite skeptical about tax honesty of their compatriots. Roughly two thirds of them believe that many people or even fairly everybody in Vietnam evades taxes (Figure 3.2). This results indicate that horizontal reciprocity can be a mechanism that discourages people to comply.

Fig. 3.2: Perceived share of others cheating on taxes
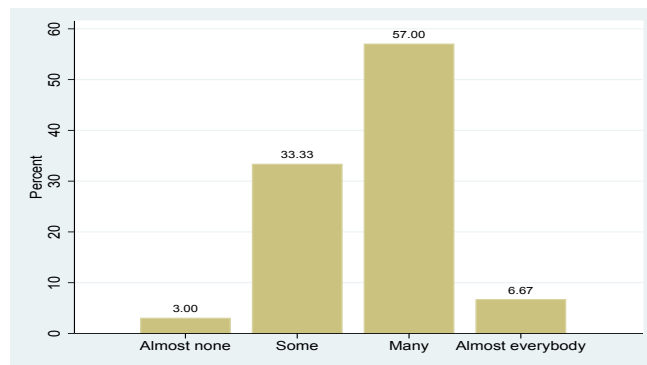
Source: Calculation based on author's survey in Hue (2013).

Two questions focused on vertical reciprocity. Although preceding studies did not develop an explicit measure to estimate vertical reciprocity, several of them use variables asking for the perceived quality of political institutions (e.g., see Cummings et al., 2009). The relation between taxpayers and the state can be considered as a contract where people pay and the government supplies public goods and services (Feld and Frey, 2005). Both aspects can be considered crucial in understanding the mechanisms of tax morale. The survey contains two questions relating to each aspect. The first question deals with trust in government as a political institution. The second question targets the fiscal aspect of the social contract between a citizen and the government.

The first question was:

Most of the citizens in your country have to pay taxes. What does paying taxes most

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[7]This question was slightly modified. The original question stems from the EVS version 1999/2000.The EVS version of the question is: *"According to you, how many of your compatriots do the following: Cheating on taxes if they have the chance?"*.

likely mean to you?

This question intended to estimate how the respondents generally perceive paying their taxes. The possible answers to this question provide an association with whether the respondents consider paying taxes as civic duty and believe in gainful employment of their tax payments. In fact, they could decide between an answer with a positive notion: (1) *"Taxes are necessary contributions"* or a negative wording: (2) *"The government takes away my money"*. The option (3) was *"I don't care about taxes"* in order to identify those who are not interested in tax related issues. As presented in Figure 3.2, more than 75 percent of the respondents agreed that taxes are necessary contributions. Only 7 percent felt that the government is just taking the money away from them, while 18 percent did not care about taxes at all.

The second question again targeted at the tax payments and the willingness of the respondents to comply. They were asked:

Would you agree to a tax increase if the extra money is used to finance more and better public goods and services?[8]

This question could be answered by (1) *"Yes"* or (2) *"No"*. The results show that 50 percent of the respondents are willing to contribute more to the public budget (Figure 3.3). Unfortunately, the survey does not allow to further disentangle whether the unwillingness to pay more taxes originates from a satisfaction with the current level of provided public goods and, thus, a proceeding with the amount of taxes currently paid or implies a general objection of tax payments. However, compared with the estimations for the rural population in chapter two of this thesis, people in this urban sample have less positive attitudes on tax payments.
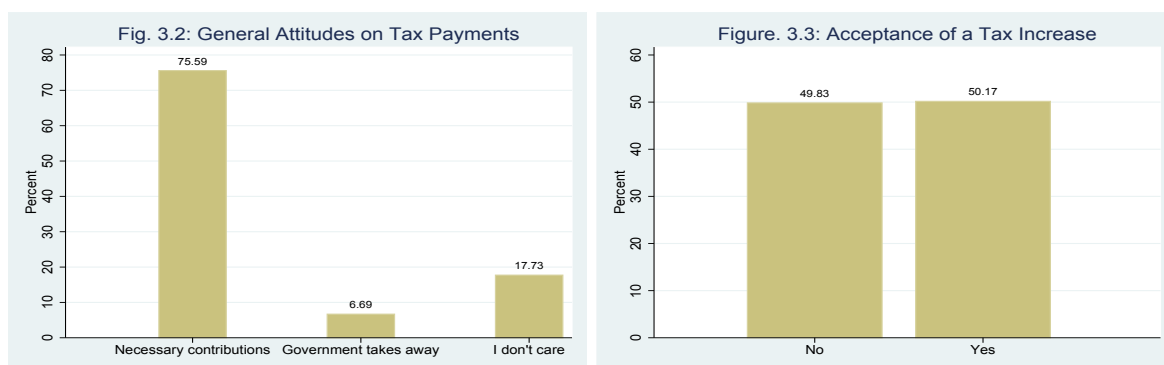
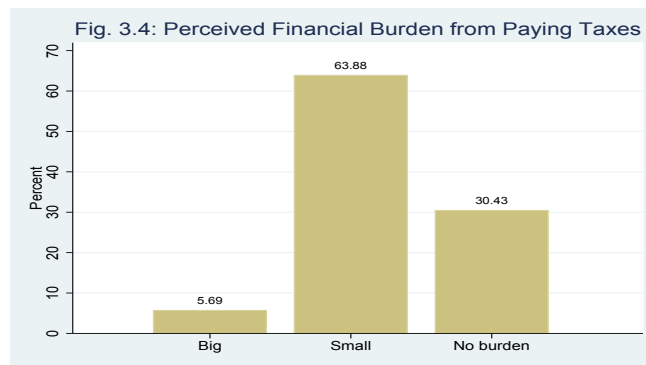Source: Calculation based on author's survey in Hue (2013).

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[8]This question was formulated on the basis of the EVS 1999/2000 statement: *"I would agree to an increase in taxes if the extra money is used to prevent environmental pollution"*.

Finally, the respondents were asked about the perceived impact of taxes on their budget. Asking for the perceived burden from taxation instead of the actual income is inspired by the argument of Torgler (2006), who suggests that it is not clear how income affects tax morale. Interviewees were asked:

Is paying taxes a big, small or no financial problem for you?

and could choose between the three options: (1) *"Big"*, (2) *"Small"* and (3) *"No burden"*. Figure 3.4 shows that most of the respondents, amounting to 64 percent, perceive paying taxes as a small or even no burden (30 percent). Only 6 percent of them feel heavily charged.

Source: Calculation based on author's survey in Hue (2013).

3.5 Analysis of tax morale and reciprocity

This section presents the estimated impact of horizontal and vertical reciprocity on tax morale and identifies the dominant effect. Because of the scaled dependent variable *tax morale* and the concentration of the data around the mean value, an ordered probit model was employed. The marginal effects were calculated in order to estimate the quantitative size of the effects of the explanatory variables on tax morale.

As model 1 in Table 3.2 indicates, there is a significant negative correlation between tax morale and the perceived number of compatriots who cheat on taxes. An increase in the scale of the perceived number of tax-cheating compatriots by one unit, e.g., from almost none to some, decreases the probability of considering cheating on taxes as never justifiable by 11.9 percentage points. This result supports the importance of horizontal reciprocity to analyze tax morale as empirically estimated by Frey and Torgler (2007) about the European countries.

Models 2 and 3 in Table 3.2 focus on vertical reciprocity. Model 2 includes two possible answers towards the question of how the respondents generally perceive paying taxes. Considering tax payments as necessary contributions increases the probability of reporting the unjustification of tax evasion by 13.9 percentage points compared to those who do not care about taxes. This result is statistically significant at the 10 percent confidence level. In contrast, the acceptance of a tax increase has no statistically significant effect on tax morale.

Model 4 presents the impact of both reciprocity measures on tax morale. As in Model 1, the perceived tax evasion of other taxpayers and hence the horizontal reciprocity has a statistically significant negative impact on tax morale. An increase in the scale of the perceived number of tax-evading compatriots by one unit results in a 14.3 percentage points decrease in upholding the highest level of tax morale, what is now statistically significant at the 5 percent confidence level. Considering taxes as necessary contributions increases the probability of considering tax evasion as never justifiable by 16 percentage points.

The estimated results suggest that both reciprocity measures significantly contribute to the impact of conditional cooperation on tax morale. The marginal effect of the significant vertical reciprocity question exceeds the marginal effect of the question towards the horizontal reciprocity. However, it has to be tested whether these two measures are significantly different in order to validate whether the difference is of any statistical significance. I employ the Wald test to adjust this difference. A p-value of 0.002 indicates that vertical reciprocity is significantly different from horizontal reciprocity. Thus, tax morale of people in Vietnam in this study is significantly more affected by vertical than by horizontal reciprocity.

Among the control variables, people between 30 and 49 years find cheating on taxes significantly less justifiable than younger respondents. This result changes for older individuals but is only of statistical significance for those with 70 years of age or older. Perceiving tax payments as financial problem increases the probability of having a lower tax morale. Stating that paying taxes is a big financial problem decreases the probability of having the highest level of tax morale by 47 percentage points. I include a dummy, *Urban*, with a value of 1 if people spent their whole lifetime in the City of Hue. Interestingly, the dummy is related to a significantly lower tax morale. This observation helps to understand why the estimated tax morale is lower within this sample from an urban area as compared to the considered rural area in chapter 2 of this thesis. The

differences in the tax attitudes between the two samples seem to not originate from levels of education, which are statistically not significantly different in this study, based on a sample with 47 percent of the respondents reporting to have a university degree.

Tab. 3.2: **Tax Morale and Reciprocity**

Ordered Probit Estimations	Model 1			Model 2			Model 3			Model 4		
Tax Morale	Coeff.	z-Stat.	Marginal Effects	Coeff.	z-Stat.	Marginal Effects	Coeff.	z-Stat.	Marginal Effects	Coeff.	z-Stat.	Marginal Effects
Horizontal reciprocity												
Perceived tax evasion	−0.316**	−2.55	−0.119							−0.382***	−2.98	−0.143
Vertical reciprocity												
(Q1) Necessary contributions				0.370*	1.81	0.139				0.426**	2.02	0.160
(Q1) Gov. takes money away				0.324	0.91	0.122				0.413	1.14	0.155
(Q2) Accept tax increase							0.031	0.20	0.012	0.063	0.41	0.024
(1)Demographic factors												
Age 30-39	0.396**	1.98	0.149	0.456**	2.25	0.172	0.425**	2.12	0.159	0.476**	2.32	0.178
Age 40-49	0.806***	2.98	0.303	0.767***	2.85	0.289	0.807***	3.02	0.303	0.761***	2.78	0.285
Age 50-59	−0.095	−0.35	−0.036	−0.013	−0.05	−0.005	−0.036	−0.13	−0.014	−0.092	−0.33	−0.034
Age 60-69	0.349	0.68	0.131	0.470	0.89	0.177	0.293	0.58	0.110	0.526	0.99	0.197
Age 70+	−1.241*	−1.87	−0.466	−1.174*	−1.77	−0.442	−1.209	−1.83	−0.454	−1.224*	−1.84	−0.459
Male	0.178	1.12	0.067	0.137	0.86	0.052	0.131	0.83	0.049	0.161	1.00	0.060
Urban	−0.226	−1.37	−0.085	−0.288*	−1.74	−0.109	−0.282*	−1.70	−0.106	−0.283*	−1.69	−0.106
(2)Perceived tax burden												
Big	−1.151***	−3.55	−0.433	−1.269***	−3.69	−0.478	−1.161***	−3.58	−0.436	−1.254***	−3.60	−0.470
(3)Education												
University	−0.253	−0.76	−0.095	−0.438	−1.32	−0.165	−0.330	−1.01	−0.124	−0.358	−1.06	−0.134
Vocational	−0.299	−0.91	−0.112	−0.378	−1.15	−0.142	−0.321	−0.99	−0.121	−0.370	−1.11	−0.139
High School	−0.436	−1.46	−0.164	−0.546*	−1.80	−0.205	−0.391	−1.31	−0.147	−0.536*	−1.73	−0.201
(4)Occupational status												
Blue-collar	0.047	0.15	0.017	−0.029	−0.10	−0.011	−0.049	−0.16	−0.018	−0.021	−0.07	−0.008
White-collar	−0.109	−0.43	−0.041	−0.148	−0.58	−0.056	−0.145	−0.57	−0.055	−0.202	−0.78	−0.076
Civil servants	−0.003	−0.01	−0.001	−0.000	−0.00	−0.000	0.036	0.11	0.014	−0.108	−0.31	−0.040
Student	0.188	0.60	0.071	0.166	0.53	0.063	0.158	0.50	0.059	0.094	0.29	0.035
Retired	0.574	1.26	0.216	0.442	0.97	0.166	0.498	1.10	0.187	0.476	1.03	0.178
Others	0.302	0.89	0.114	0.343	0.99	0.129	0.339	0.99	0.127	0.202	0.57	0.076
Cut1	−3.306			−2.325			−2.498			−3.324		
Cut2	−1.322			−0.354			−0.562			−1.303		
N	297			296			296			295		
Pseudo R²	0.093			0.088			0.080			0.109		

Notes: (I.) Dependent Variable: Acceptance of cheating on taxes (tax morale) that consists on a scale from 1 to 3. (II.) The marginal effects of the highest level of tax morale (3) are reported. (III.) The reference group is given by females under 30 years of age, with an educational degree less than high school, who are employed in the service sector, perceive their tax payments as small or no financial problem, did not spent their total lifetime in the City of Hue and do not care about taxes. (IV.) Significantly different from zero at 10% (*), 5% (**), and 1% (***) confidence level.

Source: Calculation based on author's survey in Hue (2013).

3.6 Robustness checks

As presented in Table 3.3 in the Appendix, dummy variables in the type of fixed effects for the supermarkets were included into regression model 4 from Table 3.2. The sizes of the marginal effects change slightly but no change in the levels of significance in the explained variables can be observed. I also used ordered logit regression models to test the robustness of the estimations but no significant differences in the estimations from the ordered probit models have been observed. The Variance Inflation Factors were estimated in order to test the existence of multicollinearity among the independent variables. However, no multicollinearity was found.

3.7 Test of interactions

Finally, the effects from interactions between the reciprocity measures and socio-economic indicators on tax morale were tested. For that the *inteff* command in *Stata* was employed. Because this command only works with dichotomous models, the initial dependent variable *tax morale* was collapsed into either considering cheating on taxes as never justifiable at one side or as sometimes and always justifiable at the other. I used a dummy variable for the perceived extent of tax evasion or the horizontal reciprocity. This dummy distinguishes between believing that many or almost everybody cheats on taxes at one extreme and thinking that only some or almost no one cheat at the other. In the following only the results for which statistical significance could be found have been discussed.

Figure 3.3 analyzes the effects of the vertical reciprocity on tax morale for people with a high school degree. The left graph depicts the distribution of the marginal effects of the interaction between respondents who hold a university degree and consider taxes as necessary contributions. The marginal effects are always positive. Having a university degree and considering taxes as necessary contributions increases the probability of considering cheating on taxes as not justifiable by 10 to 30 percent. The right graph gives the distribution of the z-statistics for the estimated marginal effects. The upper and lower lines mark the boundaries of statistical significance. The estimations of the z-statistics indicate that the marginal effects are on the verge of being considered statistically significant.

Figure 3.4 focuses on the horizontal reciprocity. The belief that almost everybody in

Vietnam cheats on taxes has a negative effect on the tax morale of people with a high school degree. For the group of people whose predicted probability of having a high tax morale is between 0.4 and 0.9, the interaction effects are mostly significant.

Figure 3.5, shows that the tax morale is significantly worse for those respondents who spent their whole lifetime in the City of Hue and believe that many or almost everybody of their compatriots cheat on taxes. In the framework of the analysis in this paper, this observation indicates that social interactions are particularly important for the tax morale of people in urban areas. The lower tax morale estimated in this sample as compared to the rural sample in chapter 2 can be explained by negative effects from horizontal reciprocity.

3.8   Conclusions

Non-pecuniary factors are important to understand tax compliance behavior. This paper provides an empirical approach on how to analyze the interaction of vertical and horizontal reciprocity in one setting. The paper finds that wide-spread tax evasion triggers a social signal that worsens tax morale. Perceived reliability of the government motivates people to pay taxes, which is significantly more sizable.

The results allow to make inferences in the case of Vietnam and other socialist transition countries with high levels of collectivism and obedience to the state. The government should exploit positive effects from the vertical reciprocity. Communicating useful spending of public revenues can be expected to encourage the people to pay their taxes. The negative effect from horizontal reciprocity calls for careful treatment of tax evasion. The government should avoid open discussions on tax evasion, as it can be expected to worsen tax morale of the people.

Much work remains to be done to fully understand how reciprocity influences tax morale. Firstly, it is important to analyze the mechanisms of the horizontal reciprocity. What are the focal points for people in urban areas to condition their compliance behavior? Are there specific reference groups or do people orient their behavior towards the majority of the society? Are taxpayers discouraged to comply with taxes because they perceive horizontal inequities induced by free-riders or do they rather follow other people to object unfair treatment by the government? The finding that tax morale varies between urban and rural respondents provides a starting point to analyze, which factors other than the perceived number of tax evaders drive the results and whether optimal

taxation should consider different approaches in the two areas. Secondly, it is necessary to estimate which experiences with the government shape the vertical reciprocity. In the environment of an undemocratic but rapidly developing country, the question arises whether people value improvements in the living standards more than the emergence of accountable public institutions and the possibility of political pluralism.

Appendix

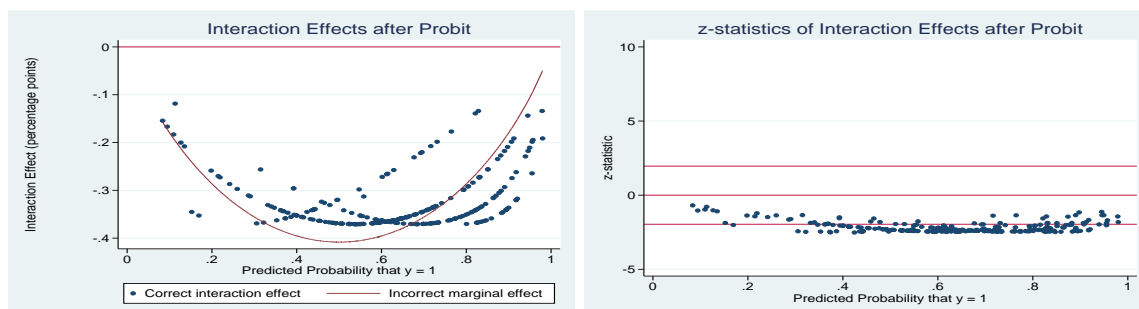Fig. 3.3: Taxes are necessary contributions and university degree
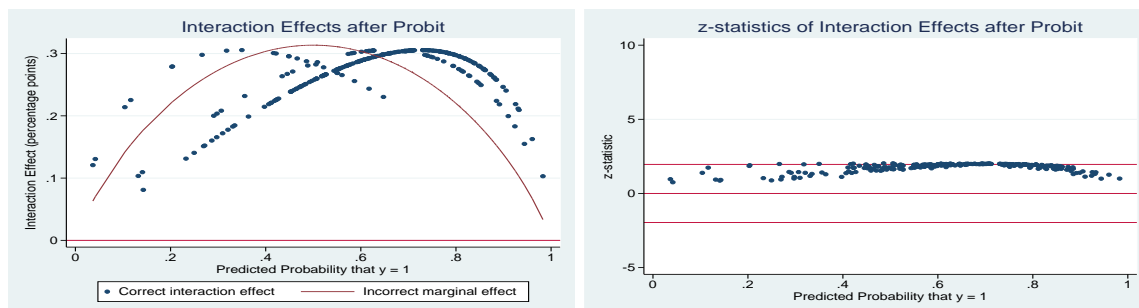
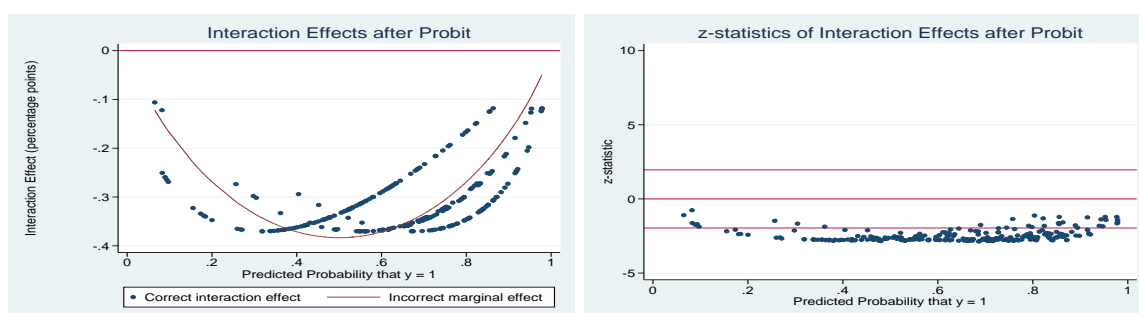Source: Calculations based on author's survey in Hue (2013).

Fig. 3.4: Many or almost everbody cheat on taxes and high school degree

Source: Calculations based on author's survey in Hue (2013).

Fig. 3.5: Many or almost everbody cheat on taxes and lifetime spent in Hue

Source: Calculations based on author's survey in Hue (2013).

Tab. 3.3: **Tax Morale and Reciprocity**

Ordered Probit Estimation

Tax Morale	Coeff.	z-Stat.	Marginal Effects
Horizontal reciprocity			
Perceived tax evasion	−0.365***	-2.83	-0.137
Vertical reciprocity			
Necessary contributions	0.439**	2.07	0.164
Gov. takes money away	0.470	1.28	0.176
Accept tax increase	0.130	0.81	0.049
(1)Demographic factors			
Age 30-39	0.516**	2.44	0.193
Age 40-49	0.836***	3.00	0.313
Age 50-59	0.016	0.05	0.006
Age 60-69	0.676	1.25	0.253
Age 70+	-1.040	-1.54	-0.389
Male	0.121	0.74	0.045
Urban	−0.311*	-1.84	-0.117
(2)Perceived tax burden			
Big	−1.263***	-3.61	-0.473
(3)Education			
University	-0.366	-1.07	-0.137
Vocational	-0.403	-1.20	-0.151
High School	-0.558	-1.78	-0.209
(4)Occupational status			
Blue-collar	-0.061	-0.20	-0.023
White-collar	-0.203	-0.78	-0.076
Civil servants	-0.067	-0.19	-0.025
Student	0.188	0.58	0.070
Retired	0.418	0.90	0.156
Others	0.126	0.35	0.047
(5)Markets			
Market 1	0.371*	-1.82	-0.139
Market 2	-0.223	-1.05	-0.083
Cut1	-3.450		
Cut2	-1.415		
N	295		
Pseudo R^2	0.117		

Notes: (I.) Dependent Variable: Acceptance of cheating on taxes (tax morale) that consists on a scale from 1 to 3. (II.) The marginal effects of the highest level of tax morale (3) are reported. (III.) The reference group is given by females under 30 years of age, with an educational degree less than high school, who are employed in the service sector, perceive their tax payments as small or no financial problem and did not spent their total lifetime in the City of Hue. (IV.) Significantly different from zero at 10% (*), 5% (**), and 1% (***) confidence level.
Source: Calculation based on author's survey in Hue (2013).

Tab. 3.4: **Knowledge on VAT liabilities**

Variable	VAT	No VAT	Don't know
Salt	40	113	146
Rice	111	80	109
Beer	218	2	76
Liquor	212	6	82
Electric appliance	218	6	75
Cosmetics	198	10	92
Fruits	83	105	111
Children's toys	160	37	103
Milk	201	20	79
Cigarettes	207	7	84

Source: Calculation based on author's survey in Hue (2013).

Chapter 4

How Does Petty Corruption Affect Tax Morale in Sub-Saharan Africa? An Empirical Analysis.[1,2]

4.1 Introduction

Tax morale has gained importance in the context of recent reforms in tax systems in many sub-Saharan African countries as they attempt to improve their fiscal capacity. Declarations of taxable income increasingly depend on voluntary compliance and self-assessment by the taxpayers (Fossat and Bua, 2013; Moore, 2014). This shift implies a significant change in the relationship between taxpayers and the state. Increased autonomy of the taxpayers enhances the relevance of their motivation to cooperate with the government and pay taxes.

As discussed in the introduction of this thesis, the relationship of individuals with the government is defined as a mechanism that shapes *tax morale* - the underlying motivation to pay taxes (Luttmer and Singhal, 2014). Besley and Persson (2013) argue that corruption is one obstacle to the emergence of tax compliance norms in develop-

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ing countries and, thus, provide a reason as to why developing countries have lower tax revenues. Corruption can have different forms. One form is petty corruption, defined as the *"everyday abuse of entrusted power by low- and mid-level public officials in their interactions with ordinary citizens, who often are trying to access basic goods or services"* (Transparency International, 2016). Petty corruption is pervasive in many sub-Saharan African countries and related to reduced trust in public institutions (Lavallée et al., 2008). Petty corruption, thus, can undermine the attempts to increase fiscal capacities in sub-Saharan African countries. However, petty corruption can come into effect through different ways. It can be related to different types of public goods, occur more or less frequently, have external effects on the perception of other institutions, and affect more or less people across countries.

This article analyzes in which of these ways petty corruption affects tax morale in sub-Saharan Africa. The paper employs personal corruption experiences related to the access to public goods as well as perceived corruption among tax authorities based on data from the Afrobarometer 5. The article shows that petty corruption payments are related with lower tax morale. The event of encountering bribe payments as such is more important than the frequency of corruption experiences. A mediation analysis identifies that petty corruption experiences directly reduce tax morale and affect it indirectly by reducing trust in the tax department. Different levels of petty corruption across countries have an inverse effect on tax morale. Bribe payments in order to get access to public goods have significantly more severe effects on tax morale of people in sub-Saharan countries with relatively lower average shares of people who encounter experiences with petty corruption.

The remainder of this article is organized as follows: Section 2 discusses related literature. Section 3 provides an overview about the data and gives descriptive statistics. Section 4 analyzes the relationship between petty corruption and tax morale. Section 5 explores how confidence in the tax department influences tax morale. Section 6 discusses the problem of reverse causation and introduces the mediation analysis as an approach to disaggregate the total effect of petty corruption on tax morale. Section 7 identifies that petty corruption has an inverse effect on tax morale of people across countries. Section 8 concludes.

4.2 Related literature

Corruption and economic development. Corruption affects economic development in different dimensions. Bayley (1967) and Becquart-Leclerq (1989) argue that bribe payments reduce red-tape and bureaucratic burden. Corruption, thus, increases the efficiency of the economy and leads to better economic development. This approach is known as *efficient grease hypothesis*. However, no convincing evidence has been provided for this hypothesis. Mauro (1995) and Méon and Sekkat (2005) show investments and economic growth are lower in economies with higher corruption. Dreher and Herzfeld (2005) estimate that higher levels of corruption are related to lower GDP growth and human development. Tanzi and Davoodi (2000), Bird et al. (2008), and Besley and Persson (2014) demonstrate that corruption is related to lower shares of taxation in GDP. Low-income countries lack resources to finance economic development. More recent literature, thus, emphasizes the importance of the absence of corruption as fundamental prerequisite for sustainable development (Aidt, 2011) and compliant taxpayers (Rothstein, 2013).

Corruption in tax departments. Corruption in tax departments plays an important role to explain lower tax intakes. Tax officials are in a position to extort bribes, collude with taxpayers, and embezzle public revenues (see Martini, 2014, for an overview). Transparency International (2013) estimates that bribe payments to tax officials is particularly prevalent in the African countries. More than 60 percent of the individuals in Sierra Leone and Liberia reported having paid bribes to tax officials in 2013 as opposed to the global average of 15 percent. Aiko and Logan (2014) provide evidence that people are aware of widespread corruption in tax departments. 35 percent of the respondents to the Afrobarometer believe that the majority of tax officials are involved in corruption. However, the perceived extent of corruption in tax departments varies across countries depending on the average dispersion of corruption. Alm et al. (2016) focus on the impact of corrupt tax officials and tax payments by firms. They use data from the World Enterprise Survey and the Business Environment and Enterprise Performance Survey to show that corruption payments - either voluntarily offered to or extorted by corrupt officials - significantly reduce reported sales and hence tax payments of firms. Experiences with the tax department shape the intrinsic motivation of taxpayers to cooperate. Kasper (2016) provides evidence that positive experiences with

tax departments in 14 Eastern European countries improve the intrinsic motivation to comply and in some cases, even report past non-compliance.

Corruption and tax morale. Perception of public officials is an important determinant to measure the impact of vertical reciprocity on tax morale. From a theoretical point of view, corruption can discourage people to comply because of perceived unfairness in the relationships in the exchange between taxpayers and the state (Feld and Frey, 2007) and induce vertical inequities from additional monetary burdening (Fortin et al. 2007). Torgler (2003b) shows that taxpayers are more likely to comply if they feel fairly treated by the government. Torgler (2006) argues that countries with high levels of corruption lack the social norm of paying taxes to the government. He finds that the Corruption Perception Index (Transparency International) is negatively correlated with tax morale. Ali et al. (2014) analyze the impact of satisfaction with public services on tax morale of people in the sub-Saharan African countries Kenya, Tanzania, Uganda, and South Africa. The authors employ the perceived number of corrupt tax officials to control for the satisfaction of people with the tax administration in the four countries. Their study finds significantly negative effects on tax morale of people in Uganda and South Africa. However, the perceived number of corrupt tax officials only provides a vague measure of actual corruption in tax administration and gives no explanation on how corruption affects tax morale. Their study furthermore gives no satisfactory explanation for the selection of the four countries.

Petty corruption and trust in public institutions. While the influence and extent of perceived corruption has been widely studied in the literature, there are only few studies that focus on the impact of petty corruption payments. Cho and Kirwin (2007) use data from the Afrobarometer to show that petty corruption reduces trust in public institutions. They further find that petty corruption can induce a vicious circle. Prevalent corruption increases the expectations of bribe offers and thus increases the frequency of petty corruption experiences. Clausen et al. (2011) use data from the Gallup World Poll to prove the causality of petty corruption experiences for reduced trust in institutions. They estimate that effects from reduced trust in institutions need to be very high in order to reverse the direction of the effects from petty corruption. Lavallée et al. (2008) use data from the Afrobarometer to analyze the *efficient grease hypothesis*. The study finds that higher corruption never increases trust in public institutions.

Lavallée et al. further find different effects of perceived and experienced corruption on trust in public institutions. First, the negative effect from *perceived* corruption is more severe the higher the satisfaction with public services. Second, the negative effect from *experienced* corruption decreases the higher satisfaction with public services. However, Lavallée et al. argue that people are more concerned about petty corruption if it is an obstacle to get access to public services.

Corruption and social norms. The specific effects of corruption on people's behavior is discussed in the literature on social norms. Hauk and Saez-Marti (2001) argue that small scale corruption is not necessarily considered as negative in public opinion. Banuri and Eckel (2012) state that corruption norms constitute specific types of social norms and determine the expectations of individuals on the extent of corruption. Cameron et al. (2009) analyze corruption behavior and attitudes of students from the low-corruption countries, Australia and Singapore, and from high-corruption countries, India and Indonesia. The study finds that more tolerant attitudes of the students towards corruption can be explained by more prevalent corruption in their countries of origin. Byrne et al. (2010) argue that everyday corruption can become normalized. The authors highlight the role of the media to make people aware of injustice and mobilize opposition. Case studies on Uganda and Tanzania show that institutionalization and normalization of corruption can be observed in the sub-Saharan Africa region (Panth, 2011; Heilman and Ndumbaro, 2002).

The different forms of corruption, thus, lead to a different perception of fairness in the vertical relationship between individuals and the state. Perceived corruption in the tax administration can severely worsen the motivation to contribute to the public budget if people are more satisfied with public services. Institutionalization and normalization of corruption makes people more tolerant towards corruption. However, experiences with corruption payments for public goods raise concerns on ill-functioning institutions, particularly among people who were affected by corruption. This might weaken their motivations to pay taxes. The question being explored is how petty corruption and perceived corruption affect the tax morale of people in sub-Saharan Africa.

4.3 Descriptive statistics of main variables

The data used in the empirical analysis are taken from round 5 of the Afrobarometer, which was carried out during the years 2011-2013 in 33 African countries, 29 from the sub-Saharan region. The survey consists of nationally representative samples, varying between either 1,200 or 2,400 respondents who are at least 18 years old. The baseline sample of the included sub-Saharan countries encompasses 45,599 persons but is smaller in most of the regressions because of missing data. The countries included in this paper are Benin, Botswana, Burkina Faso, Burundi, Cameroon, Côte d'Ivoire, Cape Verde, Ghana, Guinea, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritius, Mozambique, Namibia, Niger, Nigeria, Senegal, Sierra Leone, South Africa, Swaziland, Tanzania, Togo, Uganda, Zambia, and Zimbabwe. The data set provides demographic information about the employment status of the respondents, their education level, and whether they live in urban or rural areas. Since the survey does not provide information about the income of the respondents, a wealth indicator was constructed by employing principal component analysis. The indicator consists of information as to whether the respondents possess a radio, television, motor vehicle, mobile phone, have access to water and toilet and the type of roof material in their homes (see Tables 4.6 and 4.7 in the Appendix for descriptive statistics of all variables).

The questions on taxation, perceived and personal corruption experiences were identically asked in all countries considered in this paper. The main dependent variable is *tax morale*. The variable is taken from question 76B (Q76B) from the Afrobarometer:

I am now going to ask you about a range of different actions that some people take. For each of the following, please tell me whether you think the action is not wrong at all, wrong but understandable, or wrong and punishable: Not paying the taxes they owe on their income.

As in other studies, a binary dependent variable is employed in most of the regressions. A value of 1 captures that the respondents consider not paying taxes as *wrong and punishable*, and 0 if they consider it as *wrong but understandable* or *not wrong at all*. As presented in Table 4.9 in the Appendix, tax morale varies between the sub-Saharan countries. Respondents in Malawi and Lesotho exhibit the highest tolerance for non-compliant taxpayers while two-thirds of the respondents in Cameroon, Ghana, Liberia,

and Burundi answered that cheating on taxes is wrong and should be punished.
Employing an indirect question to estimate the personal tax morale has become standard in the literature on tax morale (see Ali et al., 2014; Frey and Torgler, 2007; McGee, 2008c). Some scholars questioned the reliability of this proxy and argued that it might not reflect actual behavior (e.g., Elffers et al., 1987). Recent studies give evidence of a causal relationship. Torgler et al. (2010) shows a robust correlation between the indirectly measured tax morale and the actual level of tax evasion. Halla (2010) provides evidence for a causal link between tax morale and actual tax compliance.

The survey includes several questions about corruption. The main explanatory variable of interest captures the actual bribery experience of the respondents. Question 61 from the Afrobarometer asks whether the respondents

had to pay a bribe, give a gift, or do a favor to government officials in order to get a document or a permit, water or sanitation services, treatment at a local health clinic or hospital, avoid problems with the police, place in primary school.

The survey offers four possible answers, ranging from *never, once or twice, a few times* to *often* and thus captures the frequencies of bribe experiences. As presented in Table 4.10 in the Appendix, corruption experiences are quite prevalent in sub-Saharan Africa. In particular, paying bribes or offering gifts is necessary to get documents, health services or to avoid problems with the police. Corruption in these categories is most prevalent in Kenya and Sierra Leone. In contrast, people from Botswana and Namibia have very little experience with bribing.

4.4 Tax morale and corruption experiences

Table 4.1 presents the estimates of the impact of petty corruption experiences on tax morale. All regression models include country dummies and standard errors clustered at the country level. The first model employs a probit regression model with a binarily coded explanatory variable taking the value of 1 if the respondent has experienced corruption in at least one type of petty corruption during the last year. The marginal effect indicates that corruption experiences have a significantly negative effect at the 1 percent confidence level. Corruption experiences during the last year reduce the probability of exhibiting the highest level of tax morale by some 5 percent. The significantly

negative effect persists if other estimation models are employed. Only if the full scale of tax morale is employed in the OLS model, do the magnitude of the estimations deviate substantially from the other results. In contrast to other studies (Ali et al. 2014; Frey and Torgler, 2007) females exhibit lower tax morale than males. Moreover, wealthier people and those with high education attainments have a higher tax morale while those who are self-employed are significantly less likely of upholding the highest level of tax morale.

Tab. 4.1: **Tax morale and corruption experiences**

Model	Probit		Orderd Probit		OLS(binary)	OLS(full scale)
Dependent variable:	Coefficient	Marginal	Coefficient	Marginal	Coefficient	Coefficient
Tax morale		Effects		Effects		
(1) Corruption Experience						
Bribe paid to government officials	−0.1109***	−0.0442***	−0.1297***	−0.0518***	−0.0424***	−0.0758***
	(0.0272)	(0.0109)	(0.0243)	(0.0097)	(0.0104)	(0.0138)
(2) Demographic factors						
Male	0.0670***	0.0267***	0.0605***	0.0241***	−0.0257***	0.0341***
	(0.0145)	(0.0058)	(0.0140)	(0.0056)	(0.0056)	(0.0082)
Age	0.0022***	0.0009***	0.0018***	0.0007***	0.0008***	0.0010***
	(0.0007)	(0.0003)	(0.0006)	(0.0003)	(0.0026)	(0.0004)
High Education	0.1016**	0.0405**	0.1076**	0.0429**	0.0386**	0.0573**
	(0.0467)	(0.0186)	(0.0440)	(0.0176)	(0.0179)	(0.0237)
Self-employed	−0.0918**	−0.0366**	−0.0771**	−0.0307**	−0.0352**	−0.0431**
	(0.0363)	(0.0145)	(0.0339)	(0.0135)	(0.0139)	(0.0192)
Urban	0.0419	0.0167	0.0473*	0.0189*	0.0162	0.0282*
	(0.0302)	(0.0121)	(0.0273)	(0.0109)	(0.0116)	(0.0157)
Wealth	0.0374***	0.0149***	0.0439***	0.0175***	0.0144***	0.0251***
	(0.0196)	(0.0038)	(0.0082)	(0.0033)	(0.0037)	(0.0047)
(3) Country dummies included	Yes		Yes		Yes	Yes
N	37,043		37,043		37,043	37,043
Pseudo R^2	0.0398		0.0358			
R^2					0.0540	0.0691

Notes: (I.) Dependent Variable: Tax morale. Binarily coded in probit and OLS (binary) regressions. 1 gives: wrong, and punishable and 0 all else. (II.) Standard errors, clustered at country level, are reported in parentheses. (III.) The reference group is given by females with post-secondary qualifications or lower who do live in rural areas and are not self-employed and made no experiences with corruption during the last year. (IV.) Significantly different from zero at 10% (*),5% (**), and 1% (***) confidence level.
Source: Author's calculation based on Afrobarometer Round 5 (2011-2013).

To estimate whether the corruption frequency influences tax morale, a set of dummy variables was created. The variables consists of the sum of corruption experiences per individual in the sample. A value of 0 indicates that the respondent has no experience with corruption. A value of 1 indicates that the respondent experienced corruption once or twice in one or two of the listed types of corruption or a few times in one type. A value of 2 indicates that the respondents often encountered instances of bribery in one of the groups or once or a few times in at least two groups. A value of 3 indicates more corruption experiences. Table 4.2 indicates that tax morale negatively depends

on the bribe frequency. All three frequency dummies included in the regression are of statistical significance. Even though the marginal effects increase with the higher frequencies the differences are of no statistical significance. I employed the Wald test post estimation methodology and found (*p-values* of 0.1259 between bribe frequency measures 2 and 1 and 0.3514 between frequency measures 3 and 2).

Tab. 4.2: **Tax morale and bribe frequency**

Probit Estimation	Model (1)	
Tax morale	Coefficients	Marginal Effects
Bribe experience (1)		
One or two times	−0.0666**	−0.0266**
	(0.0327)	(0.0130)
Bribe experience (2)		
Often in one group or once or	−0.1330***	−0.0531***
a few times in two groups	(0.0428)	(0.0171)
Bribe experience (3)		
More experiences	−0.1798***	−0.0718***
	(0.0503)	(0.0201)
(4) Demographic factors		
Male	0.0680***	0.0271***
	(0.0145)	(0.0058)
Age	0.0022***	0.0009***
	(0.0007)	(0.0003)
High Education	0.1024**	0.0408**
	(0.0465)	(0.0185)
Self-employed	−0.0915**	−0.0365**
	(0.0362)	(0.0145)
Urban	0.0419	0.0167
	(0.0302)	(0.0121)
Wealth	0.0377***	0.0150***
	(0.0097)	(0.0393)
(5) Country dummies included	Yes	
N	37,043	
Pseudo R^2	0.0401	

Notes: (I.) Dependent Variable: Tax morale. Binarily coded. 1 gives: wrong, and punishable and 0 all else. (II.) Standard errors, clustered at country level, are reported in parentheses. (III.) The reference group is given by females with post-secondary qualifications or lower who do live in rural areas and are not self-employed and encountered no experiences with corruption during the last year. (IV.) Significantly different from zero at 10% (*),5% (**), and 1% (***) confidence level.
Source: Author's calculation based on Afrobarometer Round 5 (2011-2013).

Table 4.8 in the Appendix presents the individual types of bribe experiences. Models 1-5 analyze each type of corruption in single regressions. All types of petty corruption have statistically significant effects on tax morale. Bribes paid to circumvent problems with the police reduce the probability of reporting the highest level of tax morale by 5.3 percent. Bribes paid to get access to the water or sewage system reduce tax morale by 6.6 percent and hence has the largest effect. The difference between the marginal effects between water or sanitation access and bribes paid to police officers is of statistical significance as a *p-value* of 0.0256 indicates on employing the Wald test to compare the individual regressions. No significant difference was found when comparing the estimations for bribes paid to police officers and bribes paid to get documents.

4.5 Tax morale and trust in the tax administration

This section intends to take a closer look at the influence of the perception of the tax administration on tax morale. The survey provides no information about the actual bribe experiences of individuals with tax officials. However, the survey asks questions regarding trust in several governmental institutions. Among them, the survey asks how much the respondents *trust in the tax department* (Q59D). They could choose between *not at all, just a little, somewhat* or *a lot.* To allow for more intuitive interpretation of the regression results, the scale was recoded meaning that no trust in the tax department receives the highest *value* of four. Additionally, the survey asks the respondents on *what they think how many tax officials are involved in corruption* (Q60F) and provides the answers: *none, some of them, most of them, all of them.* I employ these questions as proxies to estimate the effect of corruption by the tax authorities on tax morale. This information is not included in the questions regarding the actual bribe experiences.

The estimations presented in Table 4.3 indicate that the two proxies for the impact of the performance of the tax administration on tax morale are of highest statistical significance. A decrease of trust in the tax department by one unit, e.g., from trusting the tax department a lot to somewhat, reduces the probability of having the highest level of tax morale by 3.6 percent. A one unit increase in the perception of the number of tax officials who might be involved in corruption, e.g., from none to some of them, decreases the probability of having the highest tax morale by 3.4 percent.

Tab. 4.3: **Tax morale and trust in tax department**

Model	(1)		(2)	
Tax morale	Coefficients	Marginal Effects	Coefficients	Marginal Effects
(1) Trust in institutions				
Tax department	−0.0914***	−0.0364***		
	(0.0127)	(0.0051)		
(2) Perceived corruption involvement				
Tax officials			−0.0853***	−0.0340***
			(0.0164)	(0.0065)
(3) Demographic factors				
Male	0.0602***	0.0240***	0.0597***	0.0238***
	(0.0142)	(0.0057)	(0.0143)	(0.0057)
Age	0.0021***	0.0008***	0.0024***	0.0010***
	(0.0007)	(0.0003)	(0.0007)	(0.0003)
High Education	0.0955**	0.0381**	0.1066**	0.0425**
	(0.0442)	(0.0176)	(0.0472)	(0.0188)
Self-employed	−0.0906**	−0.0361**	−0.1010***	−0.0403***
	(0.0355)	(0.0142)	(0.0363)	(0.0144)
Urban	0.0433	0.0173	0.0462	0.0184
	(0.0324)	(0.0129)	(0.0316)	(0.0126)
Wealth	0.0352***	0.0141***	0.0346***	0.0138***
	(0.0087)	(0.0035)	(0.0087)	(0.0035)
Country dummies included	Yes		Yes	
N	33,767		32,529	
Pseudo R^2	0.0419		0.0405	

Notes: (I.) Dependent Variable: Attitudes towards the legitimacy of not paying taxes. The variable is binarily coded. 1 gives: wrong, and punishable. 0 all else. (II.) Standard errors, clustered at country level, are reported in parentheses. (III.) The reference group is given by males with post-secondary qualifications or lower who do live in rural areas and are not self-employed. (IV.) Significantly different from zero at 10% (*), 5% (**), and 1% (***) confidence level.
Source: Author's calculation based on Afrobarometer Round 5 (2011-2013).

4.6 Mediated and direct effects

To understand the ways in which petty corruption affects tax morale, it is important to identify the extent to which specific channels determine this relationship. The regression results presented so far indicate that corruption experiences and trust in the tax administration are significantly correlated with tax morale. The underlying assumption behind the second finding is that corruption experiences with public goods affect the trust in other public institutions and in this paper the tax administration. Corruption experiences, thus, not only have direct effects on tax morale but also have indirect effects on tax morale because they are mediated through reduced trust in the tax administration. However, the estimated correlation gives no information about the extent of the indirect effects of petty corruption. It is unclear whether petty corruption causes the effects or whether reduced trust in public institutions drive corruption experiences. The latter situation can come into effect, if people with lower trust in public institutions experience more bribe extortions by corrupt officials.

The literature on the effects of petty corruption on trust in institutions discusses the direction of causality. Cho and Kirwin (2007) and Lavallée et al. (2008) use instrumental variables to provide evidence that corruption experiences cause reduced trust in public institutions. The exclusion restriction requires that reliable instruments need to predict experiences of petty corruption but are unrelated with trust in public institutions. Neither the instruments employed by Cho and Kirwin (2007) - i) respondents' overall trust in others and ii) perceptions of the political influence of ethnic groups - nor those used by Lavallée et al. (2008) - iii) chief of household is respondent to the survey and iv) the respondent is willing to pay a bribe - convincingly fulfill the exclusion restriction for reliable instruments. The experiences from Cho and Kirwin (2007) and Lavallée et al. (2008) rather indicate that cross section data from the Aforbarometer cannot provide convincing instruments.

Clausen et al. (2011) take a different approach. The authors argue that it is very unlikely for governmental officials to know about perceived trust in institutions of each individual and, thus, petty corruption experiences are less prone to reverse causation than to perceived corruption. The authors show that petty corruption experiences have smaller effects and are of lower significance as compared to the effects from perceived corruption. They estimate that the effects from reduced trust in institutions need to be extremely high in order to reverse the direction of the effects from petty corruption.

Based on the findings by Clausen et al., I consider petty corruption as an exogenous experience that can directly and indirectly influence tax morale. I use mediation analysis to estimate the effects. A mediation analysis facilitates the partitioning of a total effect into direct and indirect effects. Figure 4.1 in the Appendix below illustrates the underlying scheme of the employed mediation analysis. I analyze the composition of the total effect, c, that results from the effect of the petty corruption experience *(X)*, on tax morale *(Y)*. Petty corruption has a direct effect, c', on tax morale and an indirect effect via the mediator *(M)*, trust on the tax department. The impact from both measures of trust in the tax administration is captured in the indirect effect. The mediation analysis focuses on four single equations which are interrelated in the form of a Structural Estimation Model (SEM):

$$Y = i_1 + cX + e_1 \tag{4.1}$$

$$Y = i_2 + c'X + b_1M_1 + b_2M_2 + e_2 \tag{4.2}$$

$$M_1 = i_3 + a_1X + e_3 \tag{4.3}$$

$$M_2 = i_4 + a_2X + e_4 \tag{4.4}$$

Equation 4.1 provides the total effect. Equation 4.2 estimates the direct effect and the indirect effects from the mediators on tax morale. Equations 4.3 and 4.4 give the effects from petty corruption on the mediators. I use the *binary_mediation* program in Stata to estimate the equations from the SEM. Table 4.4 presents the results. Model 1 and 2 refer to equations 4.3 and 4.4. Petty corruption has significant effects on both variables in the mediator. Having paid bribes for public goods increases the perceived number of corrupt tax officials and reduces trust in the tax department. Model 3 gives the total effect as formalized in equation 4.1. Having paid bribes reduces the probability of having the highest level of tax morale by 10.9 percent. Model 4, based on equation 4.2, shows that corruption experiences have a lower effect on tax morale if the mediator variables are included. The corruption experiences directly reduce the probability of

having a high tax morale by 7.57 percent. This indicates that 30.6 percent of the total effect is transmitted through the mediator variables, as estimated by the *proportion of total effect mediated* below.[3]

Tab. 4.4: **Mediation analysis**

Binary mediation model	Coefficient	Std. Err.
(1) Trust in tax department		
Petty corruption experience	−0.2643***	(0.0118)
Constant	1.5550***	(0.0068)
(2) Corrupt tax officials		
Petty corruption experience	0.3047***	(0.0096)
Constant	1.3372***	(0.0055)
(3) Tax morale		
Petty corruption experience	−0.1087***	(0.0142)
Constant	0.0527***	(0.0082)
N	35,173	
Pseudo R^2	0.0012	
(4) Tax morale		
Trust in tax department	0.0718***	(0.0068)
Corrupt tax officials	−0.0473***	(0.0084)
Bribe payment experience	−0.0757***	(0.0145)
Constant	0.0047	(0.0195)
N	35,173	
Pseudo R^2	0.0054	

Estimation of single effects

Effect from trust in tax department = -0.0089

Effect from perceived number of = −0.0089

corrupt tax officials

Total indirect = −0.0156

Direct effect = −0.0354

Total effect = −0.0511

c_path = −0.0512

Proportion of total effect mediated = 0.3060

Ratio of indirect to direct effect = 0.4409

Ratio of total to direct effect = 1.4409

Notes: (I.) Significantly different from zero at 10% (*), 5% (**), and 1% (***) confidence level.
Source: Author's calculation based on Afrobarometer Round 5 (2011-2013).

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[3]The estimation of 30 percent for the share of the indirect effect is confirmed when using the seemingly unrelated regression method with multiple mediators as indicated by Preacher and Hayes (2008). However, this methodology is applicable only in the case of a continuous dependent variable. I employed it as a robustness check because of the similarity of the probit and OLS model estimations with binary dependent variables in Table 4.1.

4.7 Inverse effect of petty corruption

As demonstrated, petty corruption worsens tax morale. People who need to pay bribes for public services show higher tolerance for non-compliant taxpayers. From a theoretical point of view, this observation is in line with the arguments on the exchange process between taxpayers and the state by Torgler (2003b) and Feld and Frey (2007). Bribe payments go into the pocket of corrupt officials but are not related to costs of public services. This induces vertical inequities and thus harms the perceived fairness in the relationship between the government and the taxpayers.

Table 4.10 in the Appendix shows that the share of people with corruption experiences varies across the considered countries. 63 percent of the people in Sierra Leone and 56 percent in Kenya had to pay a bribe for at least one of the five public goods during the year before the survey started. At the other extreme, only 4 percent of the respondents from Botswana and 6 percent in Namibia reported to having paid a bribe.

The analysis in section 4.4 has shown that increased frequencies of bribe payments per individual do not lead to significantly higher effects on the morale. However, the discussed literature in section 4.2 indicates that corruption levels can have different effects across countries. One strand of literature argues that corruption can be normalized in highly corrupt countries and make people more tolerant towards paying bribes. The perceived fairness in the relationship with the government, thus, can be less affected by everyday experiences with petty corruption. Another strand of literature finds that people are more concerned about bribe payments if it is an obstacle to get access to public services.

This section analyzes whether the differences in national shares of people with corruption experiences are related to different effects on tax morale. The analysis consists of two parts where each respondent received a variable with a value of the national shares of people who encountered instances of petty corruption in their own country. In the first part, three groups of corruption levels were defined - high, medium, and low. Countries were assigned to one of the three groups. In the second part, the national shares of corruption experiences are employed in a continuous variable. It is to be determined whether the effect from corruption experiences on tax morale varies between groups of countries and across the total sample.

4.7.1 Analysis of country groups

Table 4.10 in the Appendix shows that on average, 30 percent of the individuals in each country encountered corruption experiences during the year before the survey was conducted. I use a deviation of 10 percent to identify three levels of corruption and assign each country into one group in accordance with their national shares of people encountering instances of corruption. The group of countries with higher levels of corruption, where more than 40 percent encountered bribe experiences, comprises six countries (Cameroon, Guinea, Kenya, Liberia, Sierra Leone, and Uganda). The group of countries with lower levels of corruption, where less than 20 percent encountered experiences, comprise seven countries (Botswana, Cape Verde, Mauritius, Malawi, Namibia, South Africa, and Swaziland). The remaining 16 countries are grouped as medium level corruption countries. The defined groups of countries do not systematically vary in their overall economic performance, with Cameroon and Kenya among the countries with a high rate of corruption and Botswana and South Africa in the group with lower levels of corruption. An interesting observation from the descriptive statistics is that the average tax morale in the three groups of countries is fairly at the same level. 52.38 percent of the people in countries with lower levels of corruption, 50.2 in countries with medium levels and 54.39 percent in countries with higher levels of corruption answer that withholding taxes is wrong and punishable. This observation indicates that the effects from petty corruption are estimated on equally distributed levels of tax morale. I include dummies for the low and medium levels of corruption in the first analysis and use the high corruption groups as default. I assume that institutional differences with an effect on the tax morale are reflected in the estimations of the dummies for the corruption levels and do not include country fixed effects. As the analysis in section 4.4 has shown, there is a significant overall effect from petty corruption on tax morale across all countries, if the country fixed effects are included.

The estimations of country differences are presented in Model 1 in Table 4.5 below. The corruption levels have significantly negative effects on the morale. The defined medium and low corruption country dummies are related to significantly more sizable effects on tax morale. The estimations of the coefficients for the interactions indicate that corruption experiences have more negative effects on the tax morale in countries with low and medium corruption levels than in countries with higher corruption levels. One may argue that the identification of low, medium and high corruption countries

based on ten percent deviations from the regional average is an arbitrary choice. As robustness check, I use a quadratic function of the national corruption levels and consider the differences between subjects who encountered corruption experiences and those who did not. I employ country fixed effects to absorb institutional differences which might affect tax morale, e.g., tax rates or tax auditing. The results are presented in Model 2 in Table 4.5. The interaction between no bribe experience and the national corruption level is significantly positive. It indicates that it makes a significant difference if people encountered corruption experiences. The second interaction gives the direction of the effect from different national corruption levels. The coefficient is statistically significant and has a negative value. This is indicative of the effect that having no corruption remains positive but decreases with higher levels of corruption across countries.

Finally, I analyze how the decreasing effect from petty corruption on tax morale evolves across national corruption levels. I estimate the marginal effects for the interaction between corruption levels and the dummy for having experiences with bribe payments. Figure 4.2 shows that the effect of petty corruption experiences on tax morale varies between 10 and 0 percent and steadily decreases the higher the national corruption level. The effect is significantly higher for countries where up to 15 percent of the respondents, on average report corruption experiences as compared to the countries where more than 45 percent of the respondents reported corruption experiences. This inferences originates from the observation that the confidence intervals for the estimated marginal effects do not overlap at the horizontal line included at the -0.05 percent effect level. This observation allows to infer that petty corruption has significantly more severe effects on tax morale of people in countries where corruption is less prevalent, Botswana, Cape Verde, Mauritius, Malawi, Namibia, and South Africa than in Cameroon, Guinea, Kenya, Liberia, Sierra Leone and Uganda and, thus, supports the identification of three countries levels of corruption from the beginning of this section.

Tab. 4.5: **Effects of petty corruption in different country groups**

Probit models	(1)		(2)
Dependent variable:	Coefficient	Marginal	Coefficient
Tax morale		Effects	
(1) Corruption Experience			
Bribe paid to government officials	−0.0694**	−0.0572**	
	(0.0280)	(0.0061)	
(2) Group of corruption level			
(High corruption level is default)			
Low corruption level	−0.1658***	−0.0790***	
	(0.0263)	(0.0093)	
Medium corruption level	−0.0807***	−0.0440***	
	(0.0230)	(0.0070)	
(3) Interaction with country groups			
Bribe experience x Low corruption	−0.1016*		
	(0.0533)		
Bribe experience x Medium corruption	−0.0931***		
	(0.0336)		
(4) Continuous corruption level			
No bribe experience x Corruption level			0.6618***
			(0.1503)
(5) Quadratic increase of corruption level			
No bribe experience x Corruption level x Corruption level			−0.8783***
			(0.3251)
(6) Demographic factors			
Male	0.0592***	0.0236***	0.0668***
	(0.0133)	(0.0053)	(0.0135)
Age	0.0031***	0.0012***	0.0022***
	(0.0005)	(0.0002)	(0.0005)
High Education	0.1212***	0.0483***	0.1016***
	(0.0295)	(0.0117)	(0.0301)
Self-employed	−0.1061***	−0.0423***	−0.0920***
	(0.0135)	(0.0054)	(0.0146)
Urban	0.0895***	0.0357***	0.0420***
	(0.0155)	(0.0062)	(0.0160)
Wealth	0.0485***	0.0194***	0.0374***
	(0.0051)	(0.0020)	(0.0054)
Constant	-0.0256		0.1730***
	(0.0290)		(0.0444)
Country dummies included	No		Yes
N	37,043		37,043
Pseudo R^2	0.0102		0.0398

Notes: (I.) Dependent Variable: Attitudes towards the legitimacy of not paying taxes. The variable is binarily coded 1 gives: wrong, and punishable and 0 all else. (II.) Robust standard errors are presented in parenthesis. (III.) The reference group is given by females with post-secondary qualifications or lower who do live in rural areas and are not self-employed and encountered no experiences with corruption during the last year. (IV.) Group of countries with high corruption is used as default. (V.) Significantly different from zero at 10% (*), 5% (**), and 1% (***) confidence level.
Source: Author's calculation based on Afrobarometer Round 5 (2011-2013).

Fig. 4.2: Average Marginal Effects of Bribe Experiences with 90% CIs
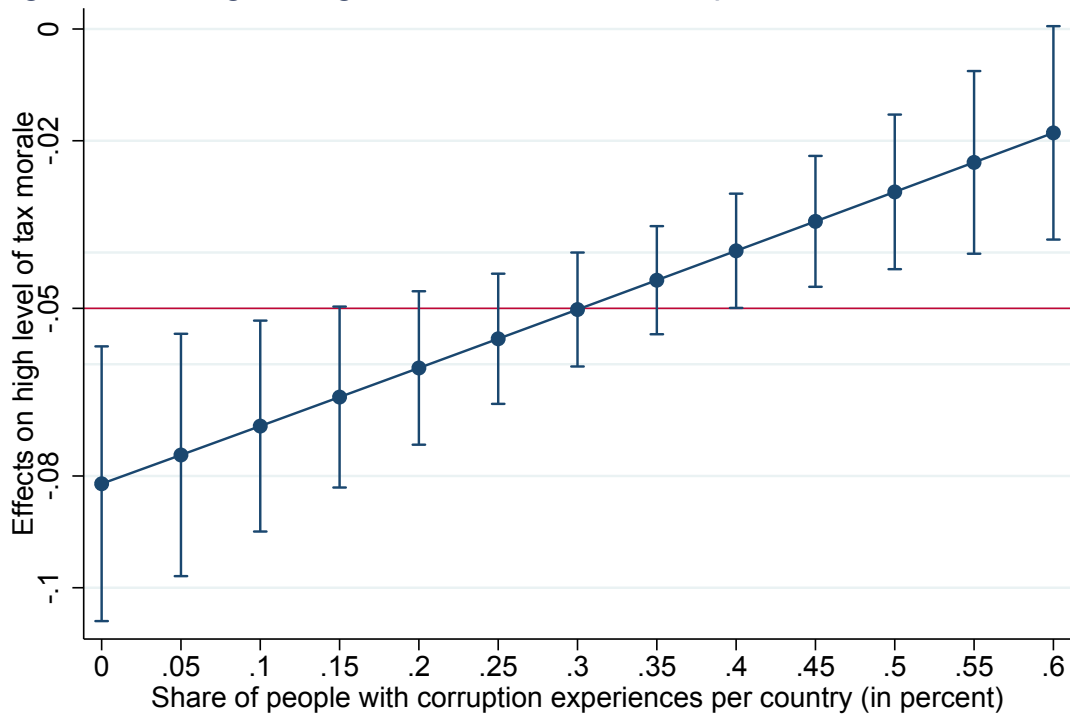
Source: Author's calculation based on Afrobarometer Round 5 (2011-2013).

4.8 Conclusions

Fair treatment by the government is an important mechanism to motivate people to contribute towards the public budget. The extortion of bribes induces vertical inequities that make people more tolerant for tax evasion. This paper delivers evidence that petty corruption payments significantly reduce tax morale of people in sub-Saharan Africa. The frequency with which the people are extorted per year is not as important as the instances of it happening. Corruption instances do not only contribute directly towards a reduction in tax morale but also result in an indirect reduction in the reduced trust on the tax administration. The negative effects from extorted bribes are more severe the less prevalent is petty corruption in a country. The paper, thus, finds support for the hypothesis that higher corruption prevalence leads to normalization of corruption and has less severe effects on people's perception of everyday corruption.

The findings have important implications for the goal of national governments to make people pay taxes. The inverse effect from petty corruption on tax morale indicates that individual experiences with corruption make people highly vulnerable to refuse to pay taxes in countries where corruption levels are less prevalent. These countries need to

accompany tax reforms with explicit policies which keep the levels of corruption low. They need to carefully focus on keeping corruption out of more powerful and independent tax administrations. Those countries where petty corruption can be currently considered as normalized need to treat the information about the actual extent of corruption carefully because it can raise attention to the everyday phenomena and make salient existing unfairness. However, the high prevalence of corruption in these countries can be expected to rip people's resources, which they need to pay taxes. These countries, thus, have a clear need to reduce the extent of petty corruption. They could focus on the incentives of public officials to extort bribes for access to public services and increase their salaries or improve checks and balances in public administrations. These more *"silent"* reforms seem to be more promising than increasing the overall public awareness about corruption.

The importance of petty corruption for people's attitudes on tax payments urge more research in this direction. It would be interesting to accompany the analysis with information about the amount of money spent on bribes and accounts of tax payments of the respondents. The Afrobarometer wave 5 only covers five different types of public services. The actual extent of people being required to pay bribes can be expected to be higher than the estimated national average of 30 percent. It would be interesting to analyze how the effects change if a more complete estimation of petty corruption experiences could be employed. Finally, it would be useful to have an estimator that clearly focuses on the effects of the experienced bribe extortions on the perception of the public institutions, in particular the tax administration.

Appendix 4.A

Tab. 4.6: **Descriptive statistics**

Variable	Mean	Min	Max	Observations
(1) Socio-economic characteristics				
Female	0.50	0	1	45,599
Age	37.09	18	105	45,184
Education High	0.11	0	1	45,599
Education Medium	0.50	0	1	45,599
Education Low	0.38	0	1	45,599
Self-employed	0.49	0	1	43,560
Urban	0.37	0	1	44,904
Wealth	0.00	-2.86	2.86	41,592
(2) Corruption experiences				
Bribe experiences	1.33	0	18	45,599
(3) Trust in institutions				
Tax department	2.49	1	4	40,376
(4) Perceived corruption involvement				
Tax officials	2.43	1	4	38,365

Source: Author's calculation based on Afrobarometer Round 5 (2011-2013).

Tab. 4.7: **Variables included in wealth index**

| Variable	Unit	Unit
Personally owns a radio	1 = Yes	0 = No
Personally owns a TV	1 = Yes	0 = No
Personally owns a motor vehicle, car or motorcycle	1 = Yes	0 = No
Personally owns a mobile phone	1 = Yes	0 = No
Source of water	1 = Inside the house or the compound	0 = Outside the compound
Toilet or latrine	1 = Inside the house or the compound	0 = Outside the compound or not available
Roof material	1 = Metal, tin or zinc, tiles, shingles	0 = Tatch or grass, plastic sheets, asbestos, multiple materials

Source: Afrobarometer Round 5 (2011-2013).

Tab. 4.8: **Tax morale and specific corruption experiences**

Model	(1)		(2)		(3)		(4)		(5)	
Tax morale	Coefficients	Marginal Effects	Coefficients	Marginal Effects	Coefficients	Marginal Effects	Coefficients	Marginal Effects	Coefficients	Marginal Effects
(1) Bureaucratic corruption										
Bribe paid to get documents	−0.0802** (0.0331)	−0.0320** (0.0131)								
Bribe paid to police offer			−0.1331*** (0.0354)	−0.0531*** (0.0141)						
(2) Service corruption										
Bribe paid to get water or sanitation					−0.1661*** (0.0484)	−0.0663*** (0.0193)				
Bribe paid to get health treatment							−0.1165*** (0.0382)	−0.0465*** (0.0153)		
Bribe paid for place in prim. school									−0.1361*** (0.0467)	−0.0543*** (0.0186)
(3) Socio-demographic variables included	Yes		Yes		Yes		Yes		Yes	
(4) Country dummies included	Yes		Yes		Yes		Yes		Yes	
N	36,907		36,831		36,831		36,923		36,902	
Pseudo R²	0.0391		0.0395		0.0396		0.0394		0.0395	

Notes: (I.) Dependent Variable: Attitudes towards the legitimacy of not paying taxes. The variable is binarily coded. 1 gives: wrong, and punishable. 0 all else. (II.) Standard errors, clustered at the country level, are reported in parentheses. (III.) The reference group is given by males with post-secondary qualifications or lower who do live in rural areas and are not self-employed. (IV.) Significantly different from zero at 10% (*), 5% (**), and 1% (***) confidence interval.

Source: Author's calculation based on Afrobarometer Round 5 (2011-2013).

Figure A1: Structure of Mediation Analysis
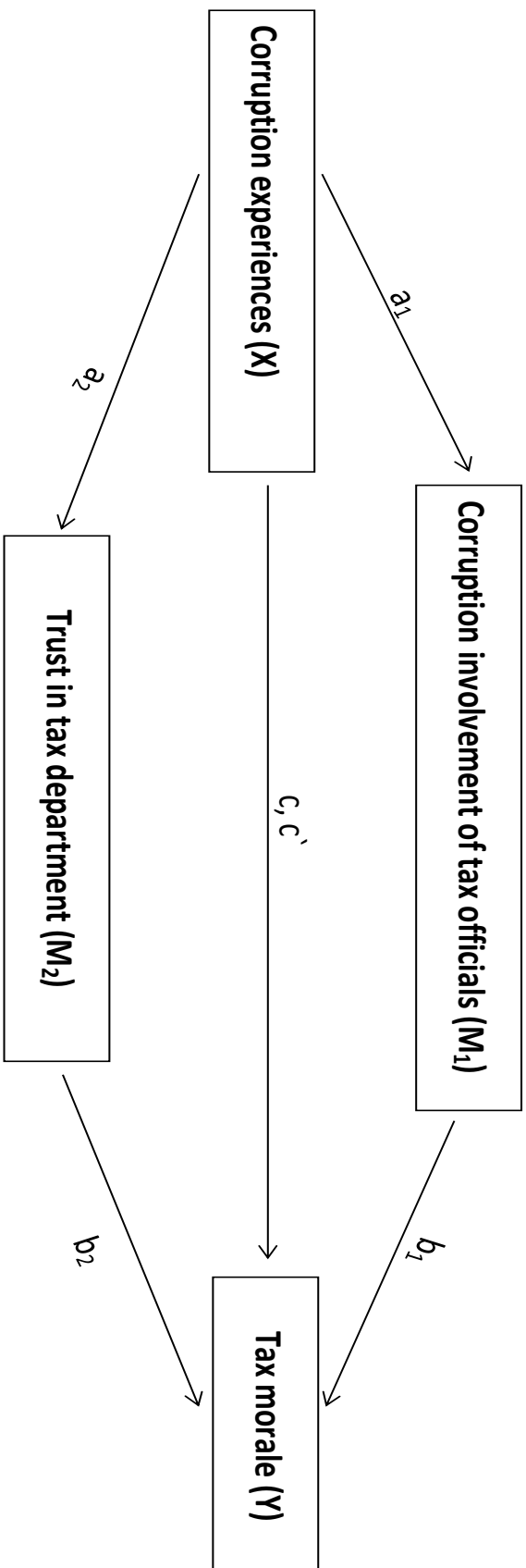
Tab. 4.9: **Attitudes towards other people's decision not to pay their taxes (in percentage of total)**

Country	Wrong and punishable	Wrong but understandable	Not wrong at all	Observations
Benin	51.47	43.73	4.79	1189
Botswana	59.67	33.64	6.69	1091
Burkina Faso	43.07	46.63	10.30	1126
Burundi	63.12	19.92	16.96	1185
Cameroon	66.17	30.22	3.61	1135
Côte d'Ivoire	56.11	38.27	5.62	1121
Cape Verde	38.11	40.65	21.23	1121
Ghana	64.24	29.63	6.12	2352
Guinea	54.28	29.23	16.49	1146
Kenya	53.98	34.84	11.18	2262
Lesotho	43.45	22.42	34.13	1008
Liberia	64.09	26.31	9.61	1072
Madagascar	42.34	37.60	20.06	1032
Malawi	27.99	43.12	28.89	2347
Mali	65.63	30.09	4.27	1193
Mauritius	73.13	24.23	2.64	1176
Mozambique	39.86	40.86	19.27	1899
Namibia	51.10	39.79	10.11	1137
Niger	63.68	25.04	11.28	1126
Nigeria	41.25	48.34	10.41	2344
Senegal	56.32	39.49	4.19	1170
Sierra Leone	55.46	38.13	6.41	1154
South Africa	57.31	37.27	5.42	2270
Swaziland	59.36	36.94	3.69	1164
Tanzania	46.53	32.85	20.62	2347
Togo	43.58	48.01	8.41	1129
Uganda	32.38	47.94	19.68	2307
Zambia	44.16	47.78	8.05	1105
Zimbabwe	38.45	51.01	10.54	2286
All countries	50.08	37.61	12.31	42,975

Source: Author's calculation based on Afrobarometer Round 5 (2011-2013).

Tab. 4.10: **Bribe experiences (in percentage of total)**

Country	Get a document	Get water or sanitation	Get a health treatment	Solve problem with police	Get a place in primary school	Share of people with corruption experience	Observations
Benin	13.17	6.25	7.17	7.42	7.00	23.0	1200
Botswana	1.75	0.50	0.50	3.00	0.58	4.00	1200
Burkina Faso	12.50	2.75	6.75	10.25	9.42	25.00	1200
Burundi	14.83	4.75	7.33	14.08	7.67	29.00	1200
Cameroon	25.25	13.92	24.75	25.17	16.42	45.00	1200
Côte d'Ivoire	20.25	7.92	16.75	17.17	14.17	37.00	1200
Cape Verde	3.39	1.90	2.81	1.41	0.99	5.00	1208
Ghana	10.79	7.58	8.13	11.33	6.04	23.00	2400
Guinea	19.33	16.58	41.48	20.50	28.92	57.00	1200
Kenya	38.77	17.38	27.55	31.85	17.05	56.00	2399
Lesotho	15.54	3.09	2.76	5.43	1.34	20.00	1197
Liberia	23.10	15.51	32.53	27.02	26.19	47.00	1199
Madagascar	14.42	3.33	14.50	6.17	8.50	27.00	1200
Malawi	4.11	3.37	3.49	5.94	3.07	14.00	2407
Mali	8.25	2.75	5.92	7.42	4.33	17.00	1200
Mauritius	1.83	0.50	0.33	2.50	0.42	5.00	1200
Mozambique	21.29	13.88	21.88	14.92	18.79	38.00	2400
Namibia	2.58	1.00	1.83	2.58	2.08	6.00	1200
Niger	9.58	3.50	18.83	13.58	4.33	33.00	1200
Nigeria	17.92	10.21	14.83	19.58	9.29	35.00	2400
Senegal	19.08	6.17	8.83	4.08	4.42	25.00	1200
Sierra Leone	34.62	25.38	40.25	36.47	32.44	63.00	1190
South Africa	5.42	5.79	7.29	6.34	5.50	13.00	2399
Swaziland	12.50	2.17	2.58	8.42	3.50	19.00	1200
Tanzania	15.88	9.83	24.33	13.17	8.71	35.00	2400
Togo	19.42	4.92	12.92	13.67	10.75	34.00	1200
Uganda	20.21	16.92	29.96	20.83	17.46	48.00	2400
Zambia	10.08	4.00	6.50	8.00	7.83	21.00	1200
Zimbabwe	21.25	7.92	11.00	23.00	8.58	21.00	2400
All countries	15.59	8.22	14.53	13.89	10.00	30.00	45,599

Source: Author's calculation based on Afrobarometer Round 5 (2011-2013).

Chapter 5

Does The Reliability Of Institutions Affect Public Good Contributions? Evidence From A Laboratory Experiment.[1]

5.1 Introduction

Studies on the causes of economic prosperity emphasize the role of high-quality institutions: societies with a strong rule of law, firmly protected property rights, a competent public administration, and solid physical and regulatory infrastructures perform economically better than societies without or with only weak institutions (Acemoglu and Robinson, 2012; Acemoglu et al., 2005; LaPorta et al., 1998; Dixit, 2004; Eicher and Leukert, 2009). Measures of human well-being, including subjective measures for happiness, are higher in countries with better governance and greater state and administrative capacity (Ott, 2010; Holmberg et al., 2009). Arguably, many positive effects of good institutions work quite directly: high-quality public infrastructure, legal security, clarity of administrative procedures and the state's power to enforce contracts, to regulate markets and to finance public goods generate immediate economic benefits to citizens (Besley and Persson, 2010).

However, non-tangible aspects of institutions matter strongly, too: institutions frame agents' behavior, coordinate their beliefs, expectations, and actions. They shape the rules of the game, both formally (e.g., by laws) and informally (e.g., by defining or reflecting norms for socially adequate behavior). Good institutions impose, follow, and enforce well-defined rules in the interest of the common good. In particular, they provide

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a stable framework not only for interactions of citizens with the state but also with each other. All this can have positive effects: good institutions may inculcate higher levels of civic-mindedness, altruism, and cooperation in citizens (Rothstein, 2000; Letki, 2006). The willingness of citizens to care for, and contribute to, the public good as well as their abstention from corruption and free-riding are contingent on the (perceived) quality of the system within which they operate. Our main hypothesis is: institutional reliability and credibility foster cooperative behavior among economic agents.

This hypothesis echoes earlier theoretical reasoning on the positive impact of institutional quality, legitimacy or procedural justice on citizens' cooperation, compliance, or civic morality (see Section 5.2 for a survey). Confirming the proposed mechanism is, however, difficult: due to positive feedback, causation may run either way. Reliable institutions encourage cooperation and compliant behavior among citizens (top-down causality) — and cooperative, norm-abiding citizens are more likely to establish and maintain high-quality institutions (bottom-up causality). As such endogeneity issues are hard to resolve empirically, we follow an experimental approach that establishes a top-down causality.[2] With our design, we are able to provide evidence that reliable institutions make citizens behave more cooperatively.

Our experiment proceeded as a sequence of standard public goods games in groups of four players (for details, see Section 5.3). Such games can, in various ways, be understood to elicit the civic-mindedness of individuals: the willingness to forgo individual gains for the social good, to cooperate with others, to act pro-socially, to pay taxes, to comply with individually burdensome but collectively beneficial social norms etc.[3] We embedded the public goods game into a setting with varying institutional reliability. By screen messages, participants were primed towards individual and institutional compliance with social norms of cooperation and non-corruptibility. After five rounds of undisturbed play (first part of the experiment), participants were informed that from then on "corruption events" might arise from outside the game (second part) – which would constitute a break of the salient norm of non-corruption. There were three potential scenarios, in addition to a Baseline treatment without corruption: corruption attempts could be fended off, without costs to players, by "the system" (System-Defense treatment); if not fended off, corruption might or might not reduce the return on contributions to the public good (Harmful-Corruption treatment and Harmless-Corruption

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[2]This is, of course, not to deny that bottom-up channels might also exist.

[3]Moreover, unlike tax evasion games, public goods games do not run the risk that results might be polluted by gambling considerations.

treatment); reductions in returns presented as a deterministic change in the payoff function. For the opening round of the second part, participants were left uncertain about which treatment applied for their group. After that round, each group was informed about the actual scenario for their group, which would then remain in place for the remaining rounds of public good games.

It was made clear to players that neither they nor any of their co-players were involved in the corruption event, but that it came from outside the game itself; the occurrence of corruption was a "systemic" event. Moreover, it (potentially) called institutional reliability into question: in each round of the game, participants were primed that corruption was socially unacceptable both for citizens and institutions. In treatments where corruption attempts were let pass (with or without monetary consequences) the institutional environment would then be perceived as less reliable in maintaining no-corruption than in treatments without corruption or with warded-off corruption. The hypothesis that good institutions foster cooperative behavior would then imply for the experiment that contributions to the public good are higher, *ceteris paribus*, in treatments where the institutional framework was more reliabe (see Section 5.4 for our hypotheses).

Importantly, in terms of monetary payoffs the Baseline, System-Defense, and Harmless-Corruption treatments in the second part of the experiment are identical. Moreover, since they do not involve any losses in payoffs, they do not differ from the uniform no-corruption scenario of the first part. Consequently, eventual differences in behavior across the no-loss treatments can only arise from non-pecuniary, perception- or norm-based considerations.

Our key interest is in the differences in contributions to the public good between the various corruption scenarios.[4] Comparing the contribution levels between the various scenarios of the second part, Table 5.1 summarizes our main experimental results (see Section 5.5 for details).

The most striking observation is that agents in the System-Defense treatment, where the corruption attempt is fended off, contributed more to the public good than in the other no-loss scenarios, including the Baseline treatment without corruption. This confirms our main hypothesis that a reliable and credible institution fosters cooperative behavior (*Reliability Effect*): groups exposed to an institution that ensures that social norms are

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[4]The first part of the experiment, where corruption was absent, confronted all subjects with the same decision task. As expected, behavior did not differ between the groups of subjects who would later be assigned to the different corruption treatments.

Tab. 5.1: Summary of main results

Contributions to the public good in the . . .

		Second part (corruption is possible)
First part (w/o corruption)	$<$	System-Defense (corruption fended off)
		$\vee$
	$=$	Baseline (no corruption attempt)
		$\parallel$
	$=$	Harmless-Corruption

indeed obeyed contribute more than groups where institutional reliability is irrelevant (Baseline treatment) or dubious (Harmless-Corruption treatment).

In contrast to this positive effect on cooperation, we find no significant difference between the Baseline and the Harmless-Corruption treatment. Here, corruption did not pose dangers to participants' payoffs. Feeling personally unaffected by the institution's lack of reliability, players might have seen no reason to change their behavior. However, compared to the Harmful-Corruption treatment where subjects are directly confronted with an unreliable institution as they suffer from corruption, we find evidence for a negative effect on cooperation (*Lack-of-Reliability Effect*).

5.2 Related literature

5.2.1 Theoretical studies and evidence

Our main hypothesis posits that reliable institutions (a stable public order, a firm system of rules, credible public officials etc.) are positively linked with cooperation or, more abstract, civic morality. There is quite some empirical evidence in line with this view. For example, a study of 38 democratic countries by Letki (2006) shows that the reliability of the institutional setting positively shapes citizen's community-oriented attitudes while corrupt and clientelistic policies undermine them. Likewise, citizens who believe that institutions fulfill their obligations are significantly less likely to evade taxes or claim benefits for which they are not eligible (Scholz and Lubell, 1998). While these studies report correlations, there are various channels through which the link from institutions to behavior could operate in a causal way:

Setting a model. Already Aristotle argued that governments ought to instill the formation of "good habits" in citizens, i.e., shape civic and cooperative attitudes, and social norms that are conducive to economic efficiency (see Bowles, 2014). In that perception, the repeated exposure to good institutions makes even opportunistic citizens act decently and cooperatively (Bidner and Francois, 2010). Dixit (2009) and Greif (2002) suggest that good institutions, understood as social means to detect and rein in opportunistic acts and to credibly enforce well-defined rules, "create" cooperative people. Societies where gods and deities (understood as religious institutions) are designed as moral beings see more cooperative and socially-minded behavior than societies with morally unconcerned, whimsical and fickle godnesses (Norenzayan and Shariff, 2008). Similarly, Bohnet and Huck (2004) establish experimental evidence that subjects' propensity to be trustworthy in the second phase of a trust game is driven by the reliability of institutions they were exposed to in the first phase. In an experimental iterated public goods game, Strimling et al. (2013) find that, when faced with socially efficient institutions at the outset, even groups with low levels of social trust manage to achieve high-yield collective outcomes. Conversely, if institutions are engaged in practices such as discrimination, clientelism, or patronage, individuals might feel compelled to engage in anti-social practices as well (Rothstein and Stolle, 2008, p. 284).

The importance one attaches to upholding a social or legal norm is a good predictor of actual behavior with respect to that norm (Bardi and Schwartz, 2003; Kirchler et al., 2008). Institutions that keep with pro-social norms signal that these norms are important, fostering pro-social behavior in citizens.

Inference. With imperfect information, individuals may use the behavior of the system as a clue for the civic-mindedness of other people (Ostrom, 1990, pp. 98f). The ethics of the system signals to citizens what kind of game is played in society.[5] There is substantial evidence that people are conditional cooperators, i.e., their willingness to cooperate is stronger when everyone else also is seen as cooperative (Hibbing and Alford, 2004). Reliable institutions might signal general willingness to cooperate.

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[5]Hayek (1994) emphasizes the importance of the Rule of Law. Only within known rules of the game can individuals be sure that ad hoc actions will not be used deliberately to frustrate his efforts. Hayek likens the Rule of Law to a production function, "helping people to predict the behavior of those with whom they must collaborate" (Hayek, 1994, p. 81).

Legitimacy of the system. Dalton (2004, Ch. 8) and Tyler (2006) argue that when citizens believe that governments are acting for the common good, decisions will be perceived as legitimate and citizens will be more norm-compliant on a voluntary basis. Citizens consider paying taxes and obeying laws as the "proper" things to do precisely *because* they are members of a community with legitimate organizational structure. Rothstein (2000) reports two prerequisites why citizens pay taxes: they need to trust that other taxpayers were paying their share too (interpersonal trust), and tax authorities need to ensure that the money in fact finances what it is meant to finance rather than being diverted into corruption (institutional trust and legitimacy). This is in line with our experimental observations.

Perceptions. Rothstein (2000) and Levi (1998) emphasize that it is perceptions ("cognitive maps") of reliability and trustworthiness that matter, not the institutions *per se*.[6] In three treatments of our experiment, we therefore confine ourselves to shaping participants' "perceptions" of institutional reliability but do not alter the institutions themselves: the rules of the game and the monetary payoffs are left unchanged.

Trust. The actual performance of institutions arguably is an important determinant of trust in institutions. A number of studies report strong associations between the quality of institutions, confidence in government, and general trust (Knack and Keefer, 1997; La Porta et al., 1997; Zak and Knack, 2001). However, so far no causal relation between these types of trust has been established (Letki, 2006),[7] and links between generalized trust and cooperative behavior are at best weak (Rothstein and Eek, 2009). Our experiment therefore does not test for trust spillovers from institutions to economic agents but directly tests for differences in behavior and economic efficiency when agents face institutions of different reliability.

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[6]Already Adam Smith (1776, Book V, Ch. II, p. 7) observes that "[c]ommerce and manufactures, in short, can seldom flourish in any state in which there is not a certain degree of *confidence* in the justice of government" (emphasis added).

[7]As an exception, Anderson et al. (2004) report that, when asking participants in a public goods experiments for the drivers of their behavior in the experiment, generalized trust (in particular towards strangers) turns out to be the most important correlate with contributions to the public good. However, this relies on surveys and there is no established causality.

5.2.2 Corruption

Our experiment exposes participants to possible events of corruption. Different from other studies on corruption (e.g., Cameron et al., 2009; Alatas et al., 2009; Xiao, 2013), subjects cannot themselves corrupt or punish corrupt subjects. We make salient the norm that corruption ought not to occur. This reflects that corruption is a most crucial political factor that lets levels of trust in governments decline (Bjørnskov 2003; Warren, 2006; Catterberg and Moreno, 2006). Even stronger, the absence of corruption already seems to serve as an indicator for general reliability. Rothstein (2000) and Rothstein and Eek (2009) experimentally show that trust in authorities, captured by low levels of (perceived) corruption, mirrors the perceptions on the general trustworthiness of others in society. In a study based on the World Values Survey, Delhey and Newton (2005) conclude that corruption-free government seems best suited to set societal structures "in which individuals are able to act in a trustworthy manner and in which they can reasonably expect that most others will generally do the same." Varying the exposure to corruption, thus, is an appropriate scenario for eliciting differences in cooperative behavior in our experiment.

5.3 Experimental design

5.3.1 General description

We employed a Voluntary Contribution Mechanism (VCM) in which subjects had to decide on their investment in a private good and on their contribution to a public good. The VCM experiment consisted of two parts with five rounds each and was played in groups of four (see the Instructions in Appendix 5.A.1). In the first part (rounds 1 to 5), subjects played a standard, no-frills public goods game. This part of the experiment was identical for all subjects.

At the beginning of the second part (rounds 6 to 10), subjects were informed that now corruption events could occur that might reduce the return from contributing to the public good.[8] In fact, four within-subjects design treatments with different corruption scenarios were implemented and each group was randomly assigned to one of the treatments (with equal probability of 25%) at the beginning of round 6. This assignment

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[8]The written instructions used the term "corruption". This approach refers to Abbink (2006, p. 425) who argues that loaded instructions trigger moral sentiments of the subjects that are in line with the context of our experimental treatment.

was invariably kept for the rest of the experiment, confronting each subject with the same corruption scenario in each round of the second part of the experiment. Subjects were not immediately informed about the scenario to which they had been assigned. At the beginning of round 6 they only learned about the possible corruption scenarios but not which scenario their group would encounter. Thus, investment decisions in round 6 had to be made under incomplete, but symmetric information.

At the end of round 6, each subject was informed about the treatment assignment for her group in rounds 7 to 10 (but not about the scenarios for other groups). From then on, subjects had complete information about the corruption scenario. Figure 5.1 depicts the experimental procedure.

Fig. 5.1: Experimental procedure
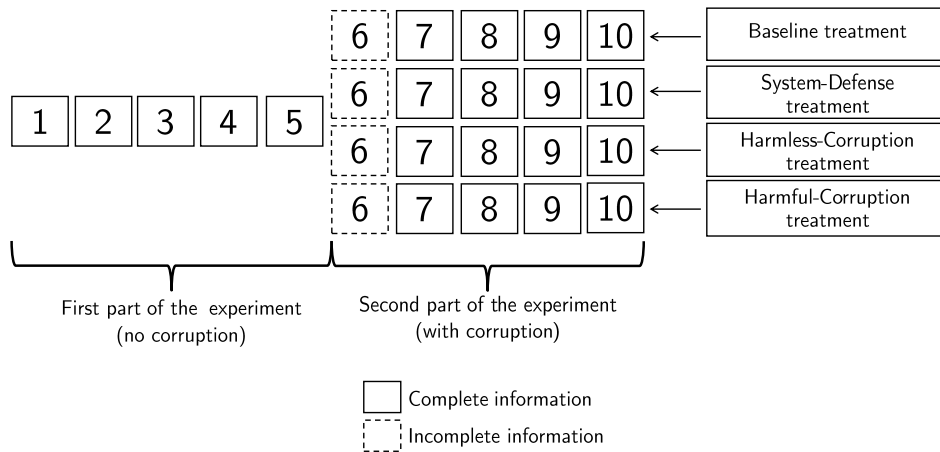
5.3.2 Treatments in the second part

Rounds 6 to 10 consisted of public goods games, as did the first part. But now attempts of "corruption" from outsiders to the game might arise. In case they occurred, corruption attempts might be successfully fended off by "the system" and would then remain innocuous for the participants in the experiment. If not averted, corruption attempts might, however, reduce the return on investments in the public good and, hence, the total payoff from the experiment. Figure 5.2 depicts the four scenarios that could arise:

- **Baseline treatment:** No corruption attempt occurs. Public good returns and total payoffs do not change compared to the first part of the experiment. This treatment serves as a benchmark.

Fig. 5.2: Corruption attempts and treatments
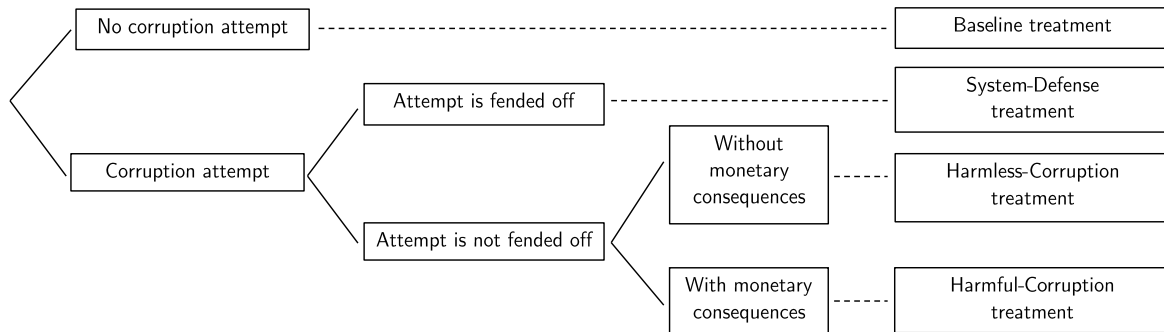
- **System-Defense treatment:** A corruption attempt occurs. However, the attempt is fended off by the system. As a consequence, public good returns and total payoffs are not affected and, from a purely monetary perspective, subjects face the same decision problem as in the first part of the experiment.

- **Harmless-Corruption treatment:** A corruption attempt occurs and is not fended off by the system. However, no monetary consequences result: neither public good returns nor total payoffs are affected. From a purely monetary perspective, subjects faced the same decision problem as in the first part of the experiment.

- **Harmful-Corruption treatment:** A corruption attempt occurs, is not fended off by the system, and has negative monetary consequences: the returns on contributions in the public good (and consequently total payoffs) are reduced; returns on investments in the private good remain unchanged. Changes in payoffs are deterministic in that the new payoff matrix is known to participants. Subjects are now confronted with a different decision problem than in the first part.

The idea behind our design of treatments is as follows. Throughout the experiment, participants were primed by screen messages that corruption is not (to be) tolerated in Germany, the country of play. Under such circumstances, a good (i.e., reliable) institutional system can be expected to fend off corruption in case it arises; the mechanisms built into the system would then appear functional in detecting and neutralizing the trespassing of social norms. Thus, the System-Defense treatment — where the corruption attempt did not to succeed — represents a scenario where institutions are strong and reliable. In the other two (non-baseline) scenarios institutions fail to live up to the implicit expectation that corrupters ought not to get away with their attempts. In both

treatments, institutions are not fully reliable, either without or with harmful economic consequences for citizens.

A couple of remarks on our modeling and framing of "corruption" seem in place. Attempts for corruption come from outside the experiment; they are not carried out by participants in the experiment. In the experimental instructions, we used a neutral wording ("an outside individual") that did not specify who was the corrupter and how corruption actually was (planned to be) carried out. To motivate why corruption might go along with a reduction in participants' payoffs, participants were told that the corrupter would get a benefit at the expense of subjects who contributed to the public good. However, there was no possibility to interact with the corrupter, not even indirectly. To participants, corruption was an exogenous event that could not be influenced by themselves or by any player in the experiment. Consequently, participants should not harbor any desire to punish or retaliate against any member of their group.

Corruption in the experiment could only lead to a reduction in the return on contributions to the public good; the return on investment to the private good is not affected. This should not imply that corruption does not affect private economic activities; "public good" and "private investment" are simply labels for activities where, respectively, players interact with each other and where they do not.

5.3.3 Payoffs

Subjects are randomly assigned to groups of size N. The assignment is constant over all ten rounds. At the beginning of each round, each subject receives an endowment E that she has to divide into an "investment" in a private good and a "contribution" to a public good. Both uses earn the individual independent payoffs of, say, v_i and g_i, which add up to total payoffs, $\pi_i = v_i + g_i$.

Denote by x_i participant i's contribution to the public good; they are the main variable of interest in our study. Investments in the private good earn a safe and constant return $v > 0$ per unit:

$$v_i = v \cdot (E - x_i).$$

The return on contributions to the public good depends on own contributions and those by the other group members. To limit the risk that players get stuck in corner solutions where potential corruption could not show much effect, we use a voluntary contribution

mechanism (VCM, see, for example, Keser, 1996, and Willinger and Ziegelmeyer, 2001) that plausibly leads to interior solutions, particularly, for any behavior between best response play and efficiency. Specifically, the VCM has a quadratic return function:

$$g_i = g(x_i + X_{-i}) = \frac{1}{N}\left(a(X - C) - b(X - C)^2\right),$$

where $X = \sum_{i=1}^{N} x_i$ denotes total contributions and $X_{-i} = \sum_{k \neq i} x_k$. Parameters $a, b > 0$ are set such that g is strictly increasing and strictly concave in the relevant range and that contributions are positive in a Nash equilibrium (specifically, $a > vN$). Variable C represents the potential damage done by corruption to the return on the public good. In the Harmful-Corruption treatment, $C > 0$; in all other treatments (where corruption does not occur, is fended off, or does not have monetary effects), $C = 0$. Participant i's total payoff amounts to

$$\pi_i = \pi(x_i, X_{-i}) = v \cdot (E - x_i) + \frac{1}{N} \cdot \left(a(x_i + X_{-i} - C) - b(x_i + X_{-i} - C)^2\right).$$

While lowering absolute payoffs, harmful corruption (i.e., $C > 0$) increases the marginal returns of contributing to the public good ($\frac{\partial^2 \pi}{\partial x_i \partial C} = 2b/N > 0$), *ceteris paribus* strengthening individuals' incentives to contribute. To motivate this specification recall that the change in the payoff function (only) materializes in a treatment with non-reliable institutions. We hypothesize that such irreliability alone makes individuals lower their contributions (see Section 5.4). Letting the effects of changes in material payoffs and in institutional perceptions point into opposite directions (rather than into the same direction) allows for a cleaner separation of these two features of corruption. The symmetric Nash equilibrium of the public goods game is

$$x_i^N = \frac{1}{N}\left(\frac{a - vN}{2b} + C\right) > 0$$

for all i, with total contributions $X^N = Nx_i^N$. The efficient solution maximizes $\sum_{i=1}^{N} \pi(x_i, X_{-i})$ and is given by

$$x_i^* = \frac{1}{N}\left(\frac{a - v}{2b} + C\right)$$

for all i. It entails higher individual and total contributions than the Nash equilibrium. Again, a larger C calls for higher contributions to the public good.

In the experiment, group size is $N = 4$ and endowments are $E = 10$ (Euros). Parameters in the payoff function were set to $v = 0.36$, $a = 2.4$, and $b = 0.03$.

For simplicity, we allowed only integer values for investments. Payoffs v_i, g_i, and π_i were presented to participants in tables (see Tables A1 to A5 in Appendix 1). Public good returns and total payoffs were tabulated as functions of individual contributions (x_i) and the aggregate of others' contributions X_{-i}. This provides enough information to find out best responses, Nash equilibria and efficient solutions (if players wished so). Due to the integer constraints, Nash equilibrium and efficient solutions in the tabular form of the game were $x_i^N = 4$ and $x_i^* = 9$ without corruption and $x_i^N = 6$ and $x_i^* = 10$ with corruption $C = 8$.

5.3.4 Priming

Following the recommendation in Binmore (2010) that social norms needed for an experiment should be triggered before the experiment starts, we primed participants towards cooperation and non-corruption.[9] We reminded them that the majority of the people in Germany (where the experiment was conducted) socially demanded cooperative behavior, believed in the welfare-enhancing property of public contributions (Mau, 2003, pp. 99–104.) and reject anti-social behavior such as cheating on taxes (Stiftung Markt-twirtschaft, 2010, p. 7 and figure 4.5) or accepting bribes.[10] Prior to each round, a message appeared on every participant's computer screen, stating:

> "Scientific studies regularly show that the majority of people living in Germany favor community responsibilities over individualism. Most of the people are therefore willing to make own contributions to the public community. Similarly, the majority of the people in Germany consider private benefits from corruption and the associated burden for the public community as never justifiable." (originally in German)

In the first part of the experiment corruption does not occur and the norm of cooperation and non-corruption could sink in. In the non-baseline treatments of the second part, the norm is then violated to various degrees.

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[9]A number of experimental studies investigates find that pro-social behavior in social dilemmas is indeed influenced by interventions such as framing (e.g., Andreoni, 1995; Dufwenberg et al., 2011; Cubitt et al., 2011), non-binding cooperation defaults (Altmann and Falk, 2009) or priming (Drouvelis et al., 2015).

[10]World Values Survey (2015, Wave 6, Question 202, own estimations): More than 70 percent of the people living in Germany consider accepting a bribe as "never justifiable".

5.3.5   Experimental protocol

The experiment was run at the computerized laboratory (LLEW) of Leibniz University Hannover in May and July 2015. The experimental software was programmed with z-Tree (Fischbacher, 2007). Participants were recruited from the general student population with the software hroot (Bock et al., 2014). A total number of 184 subjects (85 females and 99 males) participated in our experiment and earned on average 15 Euros, including a show-up fee of 4 Euros, in approximately 80 minutes (i.e., around 11.25 Euros per hour).

We conducted twelve sessions and attempted to have 16 subjects (i.e., four groups) per session to assign participants to each of our four treatments in each session. Since some invited participants failed to show up, we had to limit the number of groups to three in two sessions. In total, we had 46 independent groups: each twelve in the Baseline and Harmful-Corruption treatment and each eleven in the System-Defense and Harmless-Corruption treatment. As each group went through ten rounds of decisions, we ended up with 1,840 observations from 460 rounds in total.

At the beginning of the experiment, subjects were seated randomly, assigned to groups, and given the instructions for the first part of the experiment. Instructions included tables with the returns on investments in the private good (Table A1, Appendix 5.A.1), the returns from contributing to the public good (Table A2) and total payoffs (Table A3). The understanding of the experiment was checked by a computer-based comprehension test before the experiment (see Appendix 5.A.2). After round 5 participants received the instructions for the second part of the experiment. The instructions described the possible corruption scenarios in the rounds to come and the payoff tables for the scenario with harmful corruption (Tables A4 and A5).

At the end of each round, each player was informed about her own contribution to the public good (x_i), the total contribution of the other group members (X_{-i}), and her resulting total payoff ($\pi(x_i, X_{-i})$).

To avoid income effects, payouts were only made at the end of the experiment. Specifically, the total payoff of one round (randomly selected) was paid in cash immediately after the experiment. Although very unlikely, a negative total payoff could arise in the Harmful-Corruption treatment. Any negative payoff would have been offset against the show-up fee, keeping effective positive. Subjects were informed about the payout procedures.

At the end of the experiment (but before payouts), a questionnaire solicited socio-demographic information on participants, their experiences with tax filing, and attitudes towards tax compliance, solidarity, risk, etc. We summarize the characteristics of our subjects in Table 5.2.

Tab. 5.2: Descriptive statistics for individual characteristics

	Mean	Median	Standard deviation
Female	46.20%		
Economics major	36.96%		
Bachelor's degree	78.26%		
Religion	71.74%		
Job	42.08%		
Social insurance	73.37%		
Tax declaration completed	65.76%		
Age	23.40	23.00	4.23
Risk attitude	5.00	5.00	2.59
Flexible monthly income	293.04	250.00	354.16
No. of semesters studied	5.55	6.00	3.44
Solidarity attitude	8.28	9.00	1.90
Cooperative behavior in society	4.47	4.00	1.99
Tax compliance attitude	8.30	9.00	2.15

Notes: Total number of subjects is 184. "Economics major" ("bachelor's degree") denotes whether a subject studies economics or management (in a bachelor program). "Religion" denotes whether a subject belongs to a religious community. "Job" denotes whether a subject has a job besides studying. "Social insurance" denotes whether a subject contributes to social insurance due to employment. "Tax declaration completed" denotes whether a subject has ever completed a tax declaration in the past. "Risk attitude" is subjects' self-reported willingness to take risk, measured on an 11-point scale (0: not willing to take risk; 10: highly willing to take risk). "Flexible monthly income" is the monthly income after fixed cost. Furthermore, we asked subjects to state to what extent they agree with the following statements: "It is important to make one's contribution to the common good" ("solidarity attitude"); "Individuals generally behave cooperatively and not selfishly" ("cooperative behavior in society"); and "Tax evasion is never justified" ("tax compliance attitude"). Each variable is measured on a 10-point scale, with 1 indicating strong agreement and 10 strong disagreement with the statement.

5.4 Hypotheses

In the first part of the experiment all treatments are identical. We therefore expect no differences between groups. As common in public goods games we expect contributions to be above their Nash equilibrium level $x_i^N = 4$, but below the efficient level $x_i^* = 9$. In the second part, treatments differ. We are interested in how contributions to the public good vary across treatments. For this analysis, the Baseline treatment (no corruption) serves as a natural benchmark. For those in this treatment, the first and second parts

of the experiment are identical.

In contrast to the Baseline treatment, corruption attempts occur in the System-Defense and Harmless-Corruption treatments. They do, however, not affect payoffs. From a purely monetary perspective, the first and second part are identical both within and across Baseline, System-Defense, and Harmless-Corruption treatments. The parts and the scenarios potentially differ, however, in how reliable the institutional system (= the experimental setting) is perceived.

As discussed in Section 5.2, there are several channels how reliable institutions foster cooperative behavior. In particular, subjects who learn that they are operating in a reliable framework (where institutions comply with the social norm) behave more cooperatively (*Reliability Effect*). Hence,

Hypothesis 1 (Reliability Effect):   *In the System-Defense treatment, contributions to the public good are higher than in the Baseline treatment.*

In contrast, subjects who face an institution of lower reliability (one that lets norm transgressions pass) reduce their cooperative effort (*Lack-of-Reliability Effect*). Hence,

Hypothesis 2 (Lack-of-Reliability Effect):   *In the Harmless-Corruption treatment, contributions to the public good are lower than in the Baseline treatment.*

In the Harmful-Corruption treatment, the corruption attempt is not fended off and leads to reductions in absolute payoffs. To compensate for this negative effect, rational subjects should increase their public good contribution (see Section 5.3.3). In particular, we expect contributions to lie between Nash equilibrium $x_i^N = 6$ and efficient solution $x_i^* = 10$. However, as subjects are exposed to an unreliable institution, the Lack-of-Reliability Effect should decrease the willingness to cooperate, implying lower contribution levels. Since both effects work in opposite directions we refrain from formulating a hypothesis for this treatment. Nevertheless, this treatment is important: first, a corruption treatment with negative monetary consequences is necessary to ensure credibility of the experiment to our subjects. Second, the results from this treatment enable us to assess the Reliability and Lack-of-Reliability Effects revealed in the System-Defense and Harmless-Corruption treatments, respectively, where payoffs are not affected.

Although belonging to the second part of the experiment, round 6 is special. As in rounds 1 to 5, all treatments are identical. The setting differs from previous rounds, however, by involving uncertainty about the corruption scenario to which the group would be exposed. This uncertainty is resolved at the end of round 6. We incorporate this setting to check whether potential corruption events have the same systematic effect in all groups: if subjects reacted differently to the corruption threats in round 6, observed differences across groups in rounds 7 to 10 could not be cleanly attributed to the differences in treatments but might reflect different reactions to the corruption environment itself. Since information is symmetric across treatments (though incomplete) in round 6, we do not expect any significant differences in behavior across groups. Compared to rounds 1 to 5, there are three channels through which contributions might be affected: first, expected payoffs from the investment in the public good decrease (calling for higher contributions). Second, payoffs are uncertain. Third, the reliability of the system is in doubt. We refrain from offering a hypothesis how these effects worked in conjunction.[11]

5.5 Results

5.5.1 Descriptive statistics and non-parametric tests

Individual contributions to the public good are our variable of interest. The contribution levels observed in each treatment in the first and second parts of the experiment are shown in Table 5.3; their mean values are depicted in Figure 5.3. The data set for the first part of the experiment consists of rounds 4 and 5. We ignored the first three rounds as subjects might have needed time to get familiar with the decision problem. The data for the second part of the experiment come from rounds 7 and 8. To exclude last-round effects, as observed in many public good experiments, we decided to ignore the last two rounds. Our findings are robust if we relax these restrictions (see, for example, section 5.5.2).

In the first part of the experiment, subjects contributed approximately 5.5 Euros to the public good – which, in line with previous studies, is between the Nash equilibrium level $x_i^N = 4$ and the efficient level $x_i^* = 9$. As expected, we observe no significant differences between the groups of subjects who are assigned to the different treatments

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[11]Decisions in rounds 7 to 10 are made under certainty: all participants know their treatment. Risk attitudes and risk perceptions, thus, should not impact on contribution behavior.

in the second part. In the incomplete-information round 6, individuals made higher contributions to the public good than in the first part. As expected, there were (again) no significant differences in behavior across treatments (two-sided Mann-Whitney U-test; 5%-level). Consequently, we did not observe any differences between the groups in the rounds before they were informed about the treatment assignment.

However, in rounds 7 and 8, where all subjects knew their assigned corruption scenario, subjects in the System-Defense and in the Harmful-Corruption treatment increased their contributions to the public good significantly ($p = 0.016$ and $p = 0.003$, respectively; Mann-Whitney U-test, two-sided). Contributions remained on the same level in the Baseline and Harmless-Corruption treatment. For the latter two treatments, we observe no significant differences between the first and second part.

Comparing the treatment results in the second part, we observe no significant differences between System-Defense and Harmful-Corruption treatments or between Baseline and Harmless-Corruption treatments. However, the other treatment effects are significant (at least at the 5%-level, Mann-Whitney U-test, two-sided). This implies that contributions are significantly higher in the System-Defense and the Harmful-Corruption treatment than in the Baseline or the Harmless-Corruption treatment. Consequently, we find support for Hypothesis 1, but not for Hypothesis 2. These findings are robust with respect to rounds selection: we observe the same pattern when using the data of rounds 7 to 10 or of the entire second part of the experiment (i.e., rounds 6 to 10).

Tab. 5.3: Public good contributions across treatments

		Baseline	System-Defense	Harmless-Corruption	Harmful-Corruption
First part	mean	5.32	5.52	5.41	5.65
(no corruption)	median	6.00	6.00	5.00	6.00
	SD	3.25	3.20	3.14	3.07
	obs.	96	88	88	96
Second part	mean	5.50	6.67	5.69	6.86
(corruption	median	6.00	7.00	6.00	7.50
is possible)	SD	3.14	2.79	3.10	3.02
	obs.	96	88	88	96

5.5.2 Regression analysis

To verify our descriptive results we ran linear regressions, having contributions to the public good by individual participants in each period as the dependent variable (see Table 5.4). Since subjects face repeated decisions, we run regressions with random

Fig. 5.3: Public good contributions on average
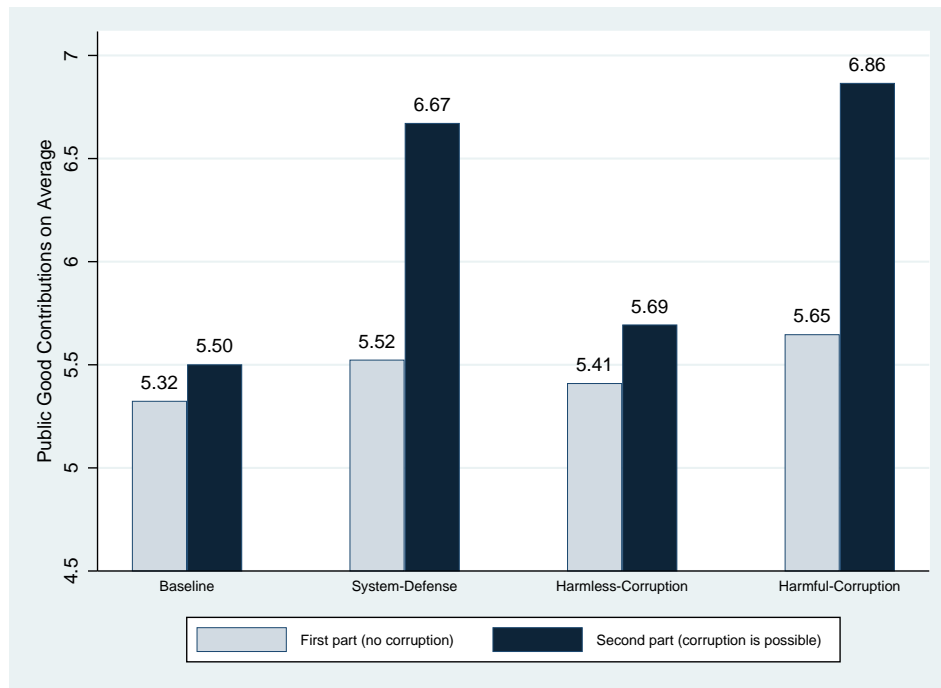
effects, with the round number as time variable and the subject's identity number as the cross-sectional variable.

To analyze the treatment differences in the first and second part of the experiment, we use four specifications. Model 1 and 3 encompass the observations from the first part (rounds 1 to 5), Model 2 and 4 those from the second part (rounds 6 to 10). In all models, we regress on the treatment dummies "System-Defense treatment", "Harmless-Corruption treatment", and "Harmful-Corruption treatment", with dummy value 1 indicating that the subject participated in the respective treatment. The Baseline treatment serves as the default; the coefficient of each treatment dummy measures the difference between the treatment and the baseline. Statistical significance of treatment dummies was checked by Wald tests, and the resulting p-values are reported at the bottom of Table 5.4. Although the assignment to treatments took place only at the beginning of the second part, we ran regressions with treatment dummies also for the first part to check whether subjects had already differed then. In Models 1 and 2 only the treatment dummies are taken into account.

In Models 3 and 4, we use the following controls: number of rounds ("rounds"), "age", "gender" (female = 0, male = 1), "economics major" (1 if subject studies economics or management, 0 otherwise), "bachelor's degree" (1 if subject studies in a bachelor program, 0 otherwise), "number of semesters studied", "risk attitude" (subjects' self-

reported willingness to take risk, measured on an 11-point scale where 0 = not willing to take risk and 10 = highly willing to take risk), "flexible monthly income" (monthly income after fixed cost, in Euro), "religion" (1 if subject belongs to a religious community, 0 otherwise), "job" (1 if subject has a job besides studying, 0 otherwise), "social insurance" (1 if subject contributes to social insurance due to employment, 0 otherwise), "tax declaration completed" (1 if subject stated that she has ever completed a tax declaration, 0 otherwise). Furthermore, we asked subjects to state to what extent they agree with the following statements: "It is important to make one's contribution to the common good" (solidarity attitude); "Individuals generally behave cooperatively and not selfishly" (cooperative behavior in society); and "Tax evasion is never justified" (tax compliance attitude). Each variable is measured on a 10-point scale, with 1 indicating strong agreement and 10 strong disagreement with the statement.

All regressions corroborate our descriptive observations. There are no significant treatment differences in the first part of the experiment (Model 1 and 3). In the second part (Model 2 and 4), we observe significant differences across treatments. In particular, subjects contributed significantly more in the System-Defense than in the Baseline treatment ($p < 0.05$ in both Models 2 and 4). As a consequence, Hypothesis 1 is supported. However, we observe no significant differences between the Baseline and the Harmless-Corruption treatment. Therefore, we find no support for Hypothesis 2. Wald tests reveal that subjects contributed more in the System-Defense than in the Harmless-Corruption treatment ($p = 0.0499$ in Model 2 and $p = 0.0330$ in Model 4). Furthermore, we observe significant differences between the Harmful-Corruption and Baseline treatment ($p < 0.01$ in both Models 2 and 4) and between the Harmless- and Harmful-Corruption treatment ($p < 0.01$ in both Models 2 and 4), but no significant difference between the System-Defense and Harmful-Corruption treatment ($p = 0.3192$ and $p = 0.3006$).[12]

Contributions decrease significantly with the number of rounds – which is in line with previous public goods experiments. Among the other controls, only "solidarity attitude" and "risk attitude" are significantly correlated with public goods contributions in both Models 3 and 4. Specifically, subjects who stated that contributing to society was important contributed more while subjects who stated that they were more willing to take risk contributed less.

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[12]As further robustness tests, we ran linear regressions with session fixed effects to control for session differences. The results of these tests indicate that our findings are robust.

Tab. 5.4: Regressions with random effects (DV: public goods contribution)

	Model 1 first part (rounds 1-5)	Model 2 second part (rounds 6-10)	Model 3 first part (rounds 1-5)	Model 4 second part (rounds 6-10)
System-Defense treatment	0.1394	0.9208**	0.4471	1.0424**
	(0.4354)	(0.4266)	(0.4635)	(0.4407)
Harmless-Corruption treatment	-0.3200	0.0663	-0.2739	0.0850
	(0.4354)	(0.4266)	(0.4485)	(0.4264)
Harmful-Corruption treatment	-0.2833	1.3458***	-0.1063	1.4967***
	(0.4259)	(0.4173)	(0.4566)	(0.4341)
round			-0.3983***	-0.5017***
			(0.0535)	(0.0602)
age			0.0618	0.0111
			(0.0566)	(0.0538)
gender			0.2547	0.7483**
			(0.3330)	(0.3166)
economics major			-0.4289	-0.1394
			(0.3964)	(0.3769)
bachelor's degree			0.5633	0.3352
			(0.4427)	(0.4209)
no. of semester studied			0.0676	0.0912*
			(0.0501)	(0.0477)
risk attitude			-0.1437**	-0.1460**
			(0.0663)	(0.0631)
flexible monthly income			0.0025***	0.0008
			(0.0008)	(0.0008)
religion			0.2063	0.0290
			(0.3721)	(0.3538)
job			0.2049	0.2862
			(0.3955)	(0.3760)
social insurance			0.2516	0.6763*
			(0.4107)	(0.3905)
tax declaration completed			0.4065	-0.5035
			(0.3677)	(0.3496)
solidarity attitude			0.2209**	0.2453***
			(0.0917)	(0.0872)
cooperative behavior in society			0.0275	-0.0690
			(0.0815)	(0.0775)
tax compliance attitude			0.0298	-0.0496
			(0.0808)	(0.0768)
constant	6.1833***	5.3792***	2.1069	6.8290***
	(0.3011)	(0.2951)	(2.0318)	(1.9852)
observations	920	920	880	880
number of subjects	184	184	176	176
R-sq within	0.0000	0.0000	0.0731	0.0898
R-sq between	0.0085	0.0750	0.1329	0.2249
R-sq overall	0.0043	0.0336	0.1031	0.1494
Wald test				
System-Defense = Harmless-Corr.	$p = 0.3020$	$p = 0.0499$	$p = 0.1269$	$p = 0.0330$
System-Defense = Harmful-Corr.	$p = 0.3316$	$p = 0.3192$	$p = 0.2304$	$p = 0.3006$
Harmless-Corr. = Harmful-Corr.	$p = 0.9334$	$p = 0.0027$	$p = 0.7153$	$p = 0.0012$

Standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

5.5.3 Interpretation

To interpret our results, two features of the experiment should be recalled. First, from a purely materialistic perspective, the treatments Baseline, System-Defense, and Harmless-Corruption are identical. Second, payoff functions were crafted such that they warranted *higher* contributions in the Harmful-Corruption scenario than in the other treatments: marginal returns on investments in public goods were higher with corruption.

The interpretation then is as follows: rounds 1 to 5 of public goods games generate among participants the perception that they were operating under stable and credible rules. The salience of the "cooperate and don't-corrupt" norm primed individuals to cooperate and rely on the system (= experimenter). The potential emergence of a corruption event in round 6 constitutes, per se, a breach of this norm and of the previously valid rules, calling institutional reliability into question. If participants learn in the System-Defense treatment, before round 7, that the system fended off the corruption attempt this not only restores, but reinforces the institutional credibility of the "system". Such assurance leads agents to behave consistently more cooperatively than agents in the Baseline treatment (i.e., Reliability Effect). The monetary value of having a reliable institution can be calculated as the increase in average payoffs, caused by the rise in contributions to the public good from the first to the second part of the experiment. Specifically, the rise in average contributions from 5.52 to 6.67 Euros (see Table 5.3) meant an increase in payoffs by 6 percent (from 11.20 to 11.87 Euros).

In treatments where, by contrast, the corruption attempt is not fended off, the reliability of institutions and the validity of the social norm are in question. In the second part of the experiment, agents who do not experience any material loss from corruption (Harmless-Corruption treatment) do not behave differently from agents in the no-corruption baseline scenario. As a consequence, a Lack-of-Reliability Effect is – in contrast to our conjecture – not revealed. Although institutions are not reliable, cooperate behavior is not negatively affected in this case.

One explanation for the asymmetric effects is that subjects had different perceptions of the corruption attempts and their consequences. The corruption attempt in the System-Defense treatment could, if not fended off, have directly harmed the individual (after all, payoff reductions appeared possible). Hence, players had reason to interpret the institution's reliability as beneficial: the institution's steadiness protected them from potential

individual losses. By contrast, when learning, in the Harmless-Corruption treatment, that a corruption event had occurred, players remained individually unaffected by institutional unreliability; if anybody, it was outsiders who were harmed. With adverse effects being remote, agents might have chosen not to change their behavior.

Against this backdrop, the results in the Harmful-Corruption treatment, where agents experienced material losses from corruption, are illuminating. As theoretically predicted, players in this treatment contribute more to the public good (6.86 Euros in the second versus 5.65 Euros in the first part of the experiment; see Table 5.3). Still they experienced an average reduction in payoffs by 11.9 percent (from 11.30 to 9.96 Euros), relative to the first part of the experiment. However, the increase in contributions is smaller than what the increase in marginal returns would dictate, provided that players did not change their rationale for contributions. Given our parameters, the marginal return on contributions at total contribution level X is given by $\frac{\partial g_i}{\partial x_i} = 0.25(2.4 - 0.06(X - C))$. If the players assigned to the Harmful-Corruption treatment had wished to maintain the same marginal return for their contributions as in the first part (where they on average contributed $X = 4 \times 5.65 = 22.6$ Euros at $C = 0$) they should have contributed $30.6/4 = 7.65$ Euros in the treatment at $C = 8$ – but they contributed less (6.86 Euros).[13]

This tentatively suggests that having experienced harm from a failed institution *per se* reduces incentives to contribute. As a consequence – and in line with the previous explanation –, in a situation where an individual is directly confronted with an unreliable institution, we find evidence for a negative effect on cooperative behavior (i.e., Lack-of-Reliability Effect).

5.6 Conclusions

Civic responsibility, which makes citizens care for and contribute to the public good and deters them from corruption and free-riding, is contingent on the quality of the system within which citizens operate. With the help of public goods games, we experimentally confirm the hypothesis that institutions that stick to professed rules and social norms increase cooperation among citizens. The effect also arises relative to scenarios where

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[13]Likewise, if the players assigned to the Harmful-Corruption treatment (where they on average contributed $X = 4 \times 6.86 = 27.4$ Euros at $C = 8$) had wished to reach the same marginal return on their investment already in rounds 1 to 5, they should only have contributed $19.4/4 = 4.85$ Euros then – but they actually had contributed more.

non-compliance by institutions does not alter (absolute or marginal) monetary payoffs. This is noteworthy as, in a pure rational choice framework, institutions affect behavior only by changing incentives or constraints – but not by influencing motivation.

Equating the experimenter in a laboratory with "the government", the common setting of economic experiments is one with strong, impartial and reliable institutions that stick to the rules of the game. In reality, the setting often is less ideal, and institutions, though paying lip service to decent norms of cooperation and honesty, often fail to live up to expectations. Our experimental design tries to depict institutions with various degrees of imperfections (without cheating participants, though). In the lab, credible institutions leave citizens better off. Needless to say, the question of how to build such high-quality institutions outside the lab is a separate and thorny issue.

Appendix 5.A

5.A.1 Instructions

This appendix provides a verbatim translation from the German original of the experimental instructions handed out to participants.

Instructions

Thank you very much for participating in today's experiment. Each participant will be credited a show-up fee of 4 Euros right from the outset.

The experiment consists of two parts. You can earn money in each part. Before each part you will receive introductions that describe the experiment to come. Then the experiment proper will be carried out. The experiment is finished after the second part. You will then receive a payment that depends upon the results of the two part experiments.

Before we start, we would like to call your attention to some important points.

- You are not allowed to communicate with other participants during the experiment or to leave your seat. Please keep your eyes on the screen in front of you.

- Please switch off your cellphone and store it in your bag.

- Please read through the instructions carefully.

- It is important that you understand the instructions. Do not hesitate to ask questions. Please raise your hand if you have a question. We will come to your seat to answer your question. Please do not ask questions aloud.

- You may make notices and marks on the instructions.

- You may use the pen in front of you.

- Please do not take home these instructions but return them to us when the experiment is finished.

- The program that runs the experiment - the gray area on your screen - must not be closed. Please do not open any other programs because it might lead to the abortion of the experiment.

- Please observe that the experiment might involve some waiting time: participants vary in the speed of responding. Please be prepared to wait for a couple of minutes.

You will find the instructions to the first part of the experiment on the following pages.

Instructions for the first part of the experiment

This experiment allows you to earn money. How much you earn depends upon your own decisions, the decisions of the other players, and chance. These instructions explain how you can influence your payouts by your decisions. Please read through the following paragraphs carefully.

General. The experiment consists of two parts. Each part consists of 5 rounds. The rounds are independent from each other. After all 10 decisions have been made, the computer randomly selects (with the same probability) one round. You will get paid in cash the total payoff you achieved in that round plus the the show-up fee.

In both parts of the experiment you will be a member of a group of four. Each of the four group members will face the same decision problem. The composition of the group remains the same for the 10 rounds. Hence, you always interact with the same people. It is guaranteed that neither you nor any other participant knows about the group composition.

Initial endowment and decision. At the beginning of each round you (and each member of your group) receive an initial endowment of 10 Euros. The endowment has to be divided into a private account (= investment) and a public account (= contribution). Your decisions will not be communicated to other group members and thus remain anonymous.

Since the initial endowment has to be completely divided between the private and the group account, participants only need to decide how much to contributed to the public account. The investment in the private account residually results from:

Investment into private account = 10 Euros - contribution to the public account.

For simplification only integer amounts can be paid in both accounts.

Both accounts lead to returns. The returns on the private account are presented in Table A1. The returns to contributions to the public account are presented in Table

A2. The money you can earn in this experiment depends on the total return. The total return is the sum of the two returns and is presented in Table A3.

Return on investment in private account. Dependending on the amount you invested in the private account, you receive the following return (in Euros) on the private account:

Tab. 5.5: Return on the private account

Investment in private account	10	9	8	7	6	5	4	3	2	1	0
Return on group account	3.60	3.24	2.88	2.52	2.16	1.80	1.44	1.08	0.72	0.36	0.00

Please observe: your investment in the private account has no influence on the return on the private investment of any other group member.

Return on contributions to the public account. In contrast to the private account, your return on the public account not only depends on your contribution to that account but also on the contributions by the other three group members. The more a group member contributes to the public account, the higher is the return on the public account for every group member.

The following table gives your individual return (in Euros) on the public account, depending on your contribution and the sum of the contributions by the other three group members. The table is based on a formula that is the same for all group members.

Tab. 5.6: Return on the public account

		Your contribution to the public account										
		0	1	2	3	4	5	6	7	8	9	10
	0	0.00	0.59	1.17	1.73	2.28	2.81	3.33	3.83	4.32	4.79	5.25
	3	1.73	2.28	2.81	3.33	3.83	4.32	4.79	5.25	5.69	6.12	6.53
	6	3.33	3.83	4.32	4.79	5.25	5.69	6.12	6.53	6.93	7.31	7.68
	9	4.79	5.25	5.69	6.12	6.53	6.93	7.31	7.68	8.03	8.37	8.69
	10	5.25	5.69	6.12	6.53	6.93	7.31	7.68	8.03	8.37	8.69	9.00
	11	5.69	6.12	6.53	6.93	7.31	7.68	8.03	8.37	8.69	9.00	9.29
Sum of contri-	12	6.12	6.53	6.93	7.31	7.68	8.03	8.37	8.69	9.00	9.29	9.57
butions by the	13	6.53	6.93	7.31	7.68	8.03	8.37	8.69	9.00	9.29	9.57	9.83
other three	14	6.93	7.31	7.68	8.03	8.37	8.69	9.00	9.29	9.57	9.83	10.08
group members	15	7.31	7.68	8.03	8.37	8.69	9.00	9.29	9.57	9.83	10.08	10.31
to the public	16	7.68	8.03	8.37	8.69	9.00	9.29	9.57	9.83	10.08	10.31	10.53
account	17	8.03	8.37	8.69	9.00	9.29	9.57	9.83	10.08	10.31	10.53	10.73
	18	8.37	8.69	9.00	9.29	9.57	9.83	10.08	10.31	10.53	10.73	10.92
	19	8.69	9.00	9.29	9.57	9.83	10.08	10.31	10.53	10.73	10.92	11.09
	20	9.00	9.29	9.57	9.83	10.08	10.31	10.53	10.73	10.92	11.09	11.25
	21	9.29	9.57	9.83	10.08	10.31	10.53	10.73	10.92	11.09	11.25	11.39
	24	10.08	10.31	10.53	10.73	10.92	11.09	11.25	11.39	11.52	11.63	11.73
	27	10.73	10.92	11.09	11.25	11.39	11.52	11.63	11.73	11.81	11.88	11.93
	30	11.25	11.39	11.52	11.63	11.73	11.81	11.88	11.93	11.97	11.99	12.00

Please observe that your contribution to the public account influences the return on the public account for all other group members: from their perspective, the sum of the contributions by the other three group members includes your contribution.

Please also note that for purpose of presentation Table A2 does not show the contributions by the other group members in steps of one Euro but rather in steps of 3 Euros. You might not see in the table the returns on the public account for some combinations of contributions. In these cases, the computer automatically calculates the correct value in accordance with the employed formula.

Total return. The money you can earn in the experiment depends on the total return. The total return in a round is given by:

$$\text{Total return} = \text{return on private account} + \text{return on public account.}$$

Table A3 (that combines the numbers from Tables A1 and A2) presents the total return, depending on your own contribution and the sum of the contributions by the other three group members to the public account.

Tab. 5.7: Total return

		Your contribution to the public account										
		0	1	2	3	4	5	6	7	8	9	10
	0	3.60	3.83	4.05	4.25	4.44	4.61	4.77	4.91	5.04	5.15	5.25
	3	5.33	5.52	5.69	5.85	5.99	6.12	6.23	6.33	6.41	6.48	6.53
	6	6.93	7.07	7.20	7.31	7.41	7.49	7.56	7.61	7.65	7.67	7.68
	9	8.39	8.49	8.57	8.64	8.69	8.73	8.75	8.76	8.75	8.73	8.69
	10	8.85	8.93	9.00	9.05	9.09	9.11	9.12	9.11	9.09	9.05	9.00
	11	9.29	9.36	9.41	9.45	9.47	9.48	9.47	9.45	9.41	9.36	9.29
Sum of contri-	12	9.72	9.77	9.81	9.83	9.84	9.83	9.81	9.77	9.72	9.65	9.57
butions by the	13	10.13	10.17	10.19	10.20	10.19	10.17	10.13	10.08	10.01	9.93	9.83
other three	14	10.53	10.55	10.56	10.55	10.53	10.49	10.44	10.37	10.29	10.19	10.08
group members	15	10.91	10.92	10.91	10.89	10.85	10.80	10.73	10.65	10.55	10.44	10.31
to the public	16	11.28	11.27	11.25	11.21	11.16	11.09	11.01	10.91	10.80	10.67	10.53
account	17	11.63	11.61	11.57	11.52	11.45	11.37	11.27	11.16	11.03	10.89	10.73
	18	11.97	11.93	11.88	11.81	11.73	11.63	11.52	11.39	11.25	11.09	10.92
	19	12.29	12.24	12.17	12.09	11.99	11.88	11.75	11.61	11.45	11.28	11.09
	20	12.60	12.53	12.45	12.35	12.24	12.11	11.97	11.81	11.64	11.45	11.25
	21	12.89	12.81	12.71	12.60	12.47	12.33	12.17	12.00	11.81	11.61	11.39
	24	13.68	13.55	13.41	13.25	13.08	12.89	12.69	12.47	12.24	11.99	11.73
	27	14.33	14.16	13.97	13.77	13.55	13.32	13.07	12.81	12.53	12.24	11.93
	30	14.85	14.63	14.40	14.15	13.89	13.61	13.32	13.01	12.69	12.35	12.00

Information at the end of a round. In each round, after every group member has chosen her contribution to the public account, you will receive information on your returns on the private and the public account and on your total returns in that round.

Moreover, the sum of the contributions by the other three group members to the public account will be announced.

Final information. After you have read these instructions we ask you to answer some questions at your computer. Answering these questions only serves to check your understanding and does not influence your payoffs. Then the first part of the experiment will start, consisting of five rounds. Please note that the computer program does not separate decimal places by a comma but by a dot.

Instructions for the second part of the experiment

The second part of the experiment is almost identical with the first part. The only difference is that now events of corruption can arise that might affect the returns on investments to the public account and, hence, total returns. The second part of the experiment again consists of five rounds (rounds 6 to 10).

Events. In the second part of the experiment your group might be exposed to attempts of corruption which diminish the return on investments to the public account. Corruption attempts can be fended off by the system. In that case the return on investment to the public account and your total return remain the same as in the first part of the experiment. In case a corruption attempt is not fended off, the return on the public account can be reduced and this might diminish your total return; this will be explained below. Such a reduction need not always arise with corruption: then (like in the case tht no corruption attempt occurs) the return on investment in the public account and, thus, your total return do not change in comparison to the first part of the experiment.

Please note that corruption is not carried out by a group member but by an outside individual. If a corruption attempt is not fended off, the corrupter can get a private benefit at the expense of your group. The return on the private account remains unaffected by corruption. The following table lists the possible events.

The corruption attempt, the possibility of fending off corruption, and the level of the reduction of the return on the group account are exogenously given. In fact, neither you nor any other participant in this experiment can influence the event of corruption or whether it has negative consequences for your group.

Event	Description	Return on the public account and total return
A	No corruption attempt	Payoff tables as in the first part
B	A corruption attempt occurs. The corruption attempt is fended off.	Payoff tables as in the first part
C	A corruption attempt occurs. The corruption attempt is *not* fended off. Returns on the public account are *not* reduced.	Payoff tables as in the first part
D	A corruption attempt occurs. The corruption attempt is *not* fended off. Returns on the public account are reduced.	New payoff tables (see below)

New return tables for Event D.   In case a corruption attempt will not be fended off and the return on the group will be actually be reduced (event D), new return tables A4 and A5 become valid.

Tab. 5.8: New table for the return on the public account

		Your contribution to the public account										
		0	1	2	3	4	5	6	7	8	9	10
	0	-5.28	-4.57	-3.87	-3.19	-2.52	-1.87	-1.23	-0.61	0.00	0.59	1.17
	3	-3.19	-2.52	-1.87	-1.23	-0.61	0.00	0.59	1.17	1.73	2.28	2.81
	6	-1.23	-0.61	0.00	0.59	1.17	1.73	2.28	2.81	3.33	3.83	4.32
	9	0.59	1.17	1.73	2.28	2.81	3.33	3.83	4.32	4.79	5.25	5.69
	10	1.17	1.73	2.28	2.81	3.33	3.83	4.32	4.79	5.25	5.69	6.12
	11	1.73	2.28	2.81	3.33	3.83	4.32	4.79	5.25	5.69	6.12	6.53
Sum of contri-	12	2.28	2.81	3.33	3.83	4.32	4.79	5.25	5.69	6.12	6.53	6.93
butions by the	13	2.81	3.33	3.83	4.32	4.79	5.25	5.69	6.12	6.53	6.93	7.31
other three	14	3.33	3.83	4.32	4.79	5.25	5.69	6.12	6.53	6.93	7.31	7.68
group members	15	3.83	4.32	4.79	5.25	5.69	6.12	6.53	6.93	7.31	7.68	8.03
to the public	16	4.32	4.79	5.25	5.69	6.12	6.53	6.93	7.31	7.68	8.03	8.37
account	17	4.79	5.25	5.69	6.12	6.53	6.93	7.31	7.68	8.03	8.37	8.69
	18	5.25	5.69	6.12	6.53	6.93	7.31	7.68	8.03	8.37	8.69	9.00
	19	5.69	6.12	6.53	6.93	7.31	7.68	8.03	8.37	8.69	9.00	9.29
	20	6.12	6.53	6.93	7.31	7.68	8.03	8.37	8.69	9.00	9.29	9.57
	21	6.53	6.93	7.31	7.68	8.03	8.37	8.69	9.00	9.29	9.57	9.83
	22	6.93	7.31	7.68	8.03	8.37	8.69	9.00	9.29	9.57	9.83	10.08
	23	7.31	7.68	8.03	8.37	8.69	9.00	9.29	9.57	9.83	10.08	10.31
	24	7.68	8.03	8.37	8.69	9.00	9.29	9.57	9.83	10.08	10.31	10.53
	27	8.69	9.00	9.29	9.57	9.83	10.08	10.31	10.53	10.73	10.92	11.09
	30	9.57	9.83	10.08	10.31	10.53	10.73	10.92	11.09	11.25	11.39	11.52

Information about the prevailing case   Which of the events A to D applies to your group will be randomly assigned by the computer at the beginning of the second part. The event will remain in place for the entire second part of the experiment. The information about the prevailing event will be announced to you not until after your decision about your contribution to the public account at the first round of the second part. This means that you will not know the event that applies to you in your first

Tab. 5.9: New table for the total return

		Your contribution to the public account									
		0	1	2	3	4	5	6	7	8	9	10
	0	-1.68	-1.33	-0.99	-0.67	-0.36	-0.07	0.21	0.47	0.72	0.95	1.17
	3	0.41	0.72	1.01	1.29	1.55	1.80	2.03	2.25	2.45	2.64	2.81
	6	2.37	2.63	2.88	3.11	3.33	3.53	3.72	3.89	4.05	4.19	4.32
	9	4.19	4.41	4.61	4.80	4.97	5.13	5.27	5.40	5.51	5.61	5.69
	10	4.77	4.97	5.16	5.33	5.49	5.63	5.76	5.87	5.97	6.05	6.12
	11	5.33	5.52	5.69	5.85	5.99	6.12	6.23	6.33	6.41	6.48	6.53
Sum of contri-	12	5.88	6.05	6.21	6.35	6.48	6.59	6.69	6.77	6.84	6.89	6.93
butions by the	13	6.41	6.57	6.71	6.84	6.95	7.05	7.13	7.20	7.25	7.29	7.31
other three	14	6.93	7.07	7.20	7.31	7.41	7.49	7.56	7.61	7.65	7.67	7.68
group members	15	7.43	7.56	7.67	7.77	7.85	7.92	7.97	8.01	8.03	8.04	8.03
to the public	16	7.92	8.03	8.13	8.21	8.28	8.33	8.37	8.39	8.40	8.39	8.37
account	17	8.39	8.49	8.57	8.64	8.69	8.73	8.75	8.76	8.75	8.73	8.69
	18	8.85	8.93	9.00	9.05	9.09	9.11	9.12	9.11	9.09	9.05	9.00
	19	9.29	9.36	9.41	9.45	9.47	9.48	9.47	9.45	9.41	9.36	9.29
	20	9.72	9.77	9.81	9.83	9.84	9.83	9.81	9.77	9.72	9.65	9.57
	21	10.13	10.17	10.19	10.20	10.19	10.17	10.13	10.08	10.01	9.93	9.83
	22	10.53	10.55	10.56	10.55	10.53	10.49	10.44	10.37	10.29	10.19	10.08
	23	10.91	10.92	10.91	10.89	10.85	10.80	10.73	10.65	10.55	10.44	10.31
	24	11.28	11.27	11.25	11.21	11.16	11.09	11.01	10.91	10.80	10.67	10.53
	27	12.29	12.24	12.17	12.09	11.99	11.88	11.75	11.61	11.45	11.28	11.09
	30	13.17	13.07	12.96	12.83	12.69	12.53	12.36	12.17	11.97	11.75	11.52

decision. In the following four rounds the same event applies to your group as in the first period of the 2. part experiment. You then exactly know about the event when making your decisions.

Negative total returns? In case the computer selects a round where you had a negative total payoff to be paid out at the end of the experiment, the negative payoff will be offset with your show-up fee of 4 Euros. Please observe that the design of the experiment does not allow for negative payouts after offsetting.

Final information. After all participants understood the instructions, the second part of the experiment with five periods starts. When the five rounds are finished we ask you to answer some questions. A short questionnaire will automatically start.

5.A.2 Comprehension test

Experimental proceedings. We would like to ask you some questions regarding your understanding of the experiment. Please let us know whether the following statements are correct or wrong. Please tick a box below the statement and mark **Yes** if the statement is correct or **No** if the statement is wrong.

- The experiment consists of two parts. ☐ Yes ☐ No

- Each group consists of 4 players. ☐ Yes ☐ No

- The contributions to the public account of all players will be announced. ☐ Yes ☐ No

- All players receive the same payoff from the public account. ☐ Yes ☐ No

Expected total returns. Now we would like to ask you to calculate your total return from the public account. [Follows a series of questions with the following wording:]

- What is the return on the public account if you give X Euros and the other three players contribute Y Euros to the public account?

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