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Essays on Behavioral Tax Compliance and Trust in Government

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Abstract. Research on tax compliance has shown that nonpecuniary incentives are very important for explaining tax compliance, and may outweigh the importance of enforcing tax payments with deterring instruments. This thesis seeks to deepen the understanding of why and how taxpayers respond to nonpecuniary incentives to comply with the tax code. In particular, this thesis examines the importance of framing, reputational concerns, and the interplay of trust in authorities and deterrence exerted by the state. The second central research objective in this thesis is to explore the societal determinants and characteristics of trust in government. This dissertations shows that the objective trustworthiness of institutions does not necessarily coincide with the subjective trust people put in them. However, even with lacking accountability and reliability of institutions, this thesis suggests positive direct links between trust in government and countries' economic development.

Keywords: *behavioral tax compliance, trust in government, institutions*

Kurzfassung. Nicht-monetäre Anreize haben einen großen Einfluss auf die Entscheidung zur Steuerehrlichkeit; sie sind so stark, dass sie die Bedeutung von Instrumenten zur Erzwingung von Steuerzahlungen überwiegen können. Die vorliegende Dissertation hat zum Ziel, das Verständnis über die Wirkweise dieser Anreize zu vertiefen. Im Besonderen untersucht sie den Einfluss von Framing, Sorgen um die eigene Reputation sowie das Zusammenspiel von Vertrauen in öffentliche Institutionen und der Abschreckung, die durch den Staat betrieben wird. Das zweite zentrale Forschungsziel dieser Arbeit ist die Analyse der Determinanten und Charakteristika von Vertrauen in die Regierung. Die vorliegende Dissertation zeigt, dass die objektive Vertrauenswürdigkeit von Institutionen und das subjektive Vertrauen in die Regierung nicht notwendigerweise übereinstimmen. Außerdem wird aufgezeigt, dass umfassendes Vertrauen trotz unverlässlicher Institutionen positiv mit Wirtschaftswachstum in Verbindung steht.

Schlagwörter: *Steuerehrlichkeit, Vertrauen in die Regierung, Institutionen*

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Chapter 1

Preface

1.1 Introduction to the topic

Taxes are an essential part of fiscal policies, and primarily in developed economies they are the most important source of government revenue. Taxes are spent for the provision of public goods and services such as national security, public administration, the judicial system and infrastructure projects, but also for the public provision of private goods, for example health and education. Thus, high tax revenues and fiscal capacity finance and maintain institutions, and historically coincide with the development of democratic and pluralistic states of law. Institutions are vital not only for levying and collecting taxes, but also for allocating and (re-)distributing them. Countries which are able to tax at higher rates and can rely on a broader tax base are typically more prosperous and rich in both economic and social terms (Besley and Persson, 2013; Bird and Zolt, 2008; Martinez-Vazquez and Bird, 2014). By now, high-quality institutions are widely regarded as a (if not *the*) decisive element for economic and social development and used as a major explanation why some nations progressed and others did not, despite richness in, for example, natural resources and land (Acemoglu et al., 2001; Acemoglu and Robinson, 2012; Bosworth and Collins, 2003; Dowrick and Golley, 2004; Rodrik et al., 2004; Fatás and Mihov, 2013; Easterly and Levine, 2016).

The nature of taxation is that no individual or even group-specific attributable benefits are received from its use. Despite the irrefutable importance and usefulness of taxes, there is a strong incentive to free-ride: not complying means a financial benefit without having to forgo the use of goods and services provided by the government. For single free-riders, the marginal loss for the government budget and society is negligible, but becomes problematic when non-compliance grows into a social phenomenon. The remaining honest and cooperative taxpayers have to bear the extra burden; this dynamic creates an additional incentive not to pay as well, and is ultimately detrimental to a country's fiscal capacity and economic development.

Naturally, it is in the interest of state and society alike to curb such self-interest. The neoclassic approach towards tax compliance is to reduce the expected utility from evading below the utility derived from complying with the use of deterring instruments. Authorities audit taxpayers and punish detected evaders with fines or imprisonment. For economic agents, taking the risk of non-compliance becomes less worthwhile the more rigorous deterrence is (Allingham and Sandmo, 1972; Yitzhaki, 1974; Becker, 1968).

Since audit frequencies exerted by the authorities and penalties inflicted on tax evasion are relatively lenient, researchers quickly began to wonder why taxpayers were predominantly compliant.[1] Scholars found psychological and sociological factors to be an important piece in this so-called tax compliance puzzle. Besides the misperception of (small) probabilities and loss aversion (Kahneman and Tversky, 1979; Alm et al., 1999), behavioral triggers often evolve around moral or social norms, reputational concerns, and the aptness to fall for framing.

[1] See, for example, Andreoni et al. (1998) and Sandmo (2005) for literature reviews. Alm et al. (1992), with an experiment, came to the conclusion that relative risk aversion would have to be extraordinarily high to explain actual tax compliance given the (lack of) deterrence. Since tax evasion is deliberately concealed behavior, reliable estimates on the extent of non-compliance are hard to get. Feinstein (1991) analyzed the *taxpayer compliance measurement program* (TCMP) in the USA and estimated an income tax gap of 84 bn US-Dollars in 1987. Andreoni et al. (1998) estimated a tax gap of 17.3% in the USA on the federal level and claim that 40% of individual taxpayers underreported some of their taxable income. Cebula and Feige (2012) estimate underreporting of 18%-23% of taxable income for the USA, while the HM Revenue & Customs (2018) reports a gap of 5.7% of all tax liabilities for the UK in 2016-2017. CASE (2013) estimates VAT gaps for EU countries and finds marked variation across countries and time.

The concept of *tax morale*, defined by Luttmer and Singhal (2014) as "nonpecuniary motivations for tax compliance as well as factors that fall outside the standard, expected utility framework" (p. 250), has received extensive attention in recent years. Factors and motivations include reciprocal attitudes and behavior of others and institutions, adherence to established social norms, and a simple intrinsic incentive to comply based on a personal, moral framework. Tax morale depends on a wide array of determinants, including, among others, patriotism and religiosity, trust in, and the quality of, institutions and the perceived inequality in society (Alm and Torgler, 2006; Feld and Frey, 2002; Luttmer and Singhal, 2014; Torgler, 2003, 2006).

Besley and Persson (2014) describe tax morale as a tipping point towards tax compliance in the complementary relationship with authorities' deterrence efforts, which is very sensitive to the relationship between the state (that collects taxes and reallocates them) and the citizens (who pay taxes and are at the receiving end of government expenses). However, even in direct democracies, taxpayers have only limited control and influence over the government's actions and use of the budget. If taxpayer-money is systematically wasted, if officials are corrupt and serve special interest groups rather than the common good, voters' preferences are ignored, or the government even pursues warmongering ways, non-compliance might be seen as a morally justifiable, even mandatory response (Cowell, 1990; McGee, 2012a, 2012b).

In a nutshell, taxes are (or, as a normative statement, should be) paid if authorities behave in a way that citizens/taxpayers feel confident to *trust* them. Kirchler (2007), reviewing decades of research on tax compliance from the perspective of tax psychology, regards trust in authorities as a "critical factor in understanding the origins of civic engagement [and] cooperation with authorities" (p. 202) and sees it as efficiency-increasing, since a trusted government would not need to consistently justify and explain decisions. Picked up in the *tipping point* described above, trust in government is complemented by authorities' deterrence efforts in a reciprocal relationship. The perception of *power of authorities* depends on how trustworthy a government acts. Pursuing either strategy can result in a high-compliance equilibrium, but the emerging societal climate can either be

"synergistic" (trust predominates) or "antagonistic" (trust is low and taxpayers seek to escape coercive deterrence). In the former environment taxes are paid voluntarily, while tax compliance is enforced in the latter.

1.2 Structure and research objectives

This thesis consists of three further chapters which contribute to two main research objectives. The first objective is to deepen the understanding of why and how taxpayers respond to nonpecuniary incentives to comply with the tax code. Chapter 2 examines the reciprocal relationship between trust in authorities and power of authorities (first formulated by Kirchler (2007)) and its repercussions for tax compliance from an aggregate, societal perspective – thus, it explores the tipping point of tax compliance. Chapter 2 is the first study that transfers and tests the tax-psychological *Slippery Slope Framework* (Kirchler et al., 2008) in the context of a "behavioral public finance" approach (see McCaffery and Slemrod (2016) for a review). Chapter 2 also introduces novel indicators for tax compliance and governments' deterrence efforts and employs a within-country approach to ensure that results are not driven by unobservable heterogeneity across countries.

Chapter 3 adds to the first research objective by studying a context where trust in government does not apply, at least not trust in the government of the country of residence. This is the case for offshore tax avoidance, where the goods and services financed by taxes are used but not paid for. In their consequences, tax evasion and tax avoidance are quite similar: taxpayers contribute less to the government budget than the legislator had earmarked, and the resulting excess burden is borne by the compliant citizens. Yet, tax avoidance is, in most cases, not an illegal contraction of reported income, but rather a lawful and often sophisticated exploitation of loopholes in (international) tax laws.

The big tax leaks in 2016 (Panama Papers) and 2017 (Paradise Papers) brought to light that not only multinational companies, but also thousands of (wealthy) private persons made use of the legal shifting of income from high-tax to low-tax jurisdictions. The large media attention accompanying the tax leaks focused not only on reporting the technique and extent, but was even more so concentrated

on naming and shaming prominent tax avoiders, overwhelmingly condemning this behavior as a moral bankruptcy and as anti-social.

Chapter 3, co-authored by Andreas Wagener (†), uses a simple linear Public Goods Game in a 2×2 design to test and causally identify the effects of induced moral obligations (tax avoidance is legal, but is it legitimate?), proneness to framing (moralized tax avoidance vs. a voluntary contribution) and reputational concerns (directing attention to tax avoiders by disclosing their identity). The lab experiment presented in Chapter 3 is one of the first studies to jointly and separately analyze causal effects of moral framing and shaming. Moreover, it is the first study to do this in the context of a legal but morally refutable action, bypassing behavioral biases like an aversion to violate legal norms and to gamble on small probabilities of getting caught and fined.

The second major research objective in this thesis is to explore societal determinants and characteristics of trust in government, how they relate to the quality and perception of institutions, and whether there is evidence for untested claims of ties between trust in government and economic growth (see, e.g., OECD, 2017). Chapter 4 studies these questions by using a cross-country design for up to 92 economies worldwide and by modeling a 2SLS and 3SLS estimator. Chapter 4 directly links to the importance of trust in government for tax compliance, which is pivotal for a country's fiscal capacity and thus for institutional quality and economic development.

Chapter 4 also complements the literature on the determinants of social trust (not directed at any specific persons or organizations) and its impact on economic growth. Uslaner (2002) describes common underlying values – the belief that strangers share the same fate – as the bonding element of trust, while he regards trust in people we know as strategic and reciprocal. The author's description of generalized trust can, in principle, also be applied to trust in government, which is, on the one hand, particularistic and directed, but on the other hand also works through shared values and norms. Referring to Uslaner, the more democratic and pluralistic a country is, the more influence citizens get – trust may become more strategic and less dependent on shared or propagated values and norms.

1.3 Outline of the results

Understanding the facets and consequences of trust in government is a recurring motive in this dissertation. Chapter 2 explores the reciprocal relationship between an authority's attitude towards deterring tax non-compliance and the trust taxpayers put in, for example, the government. The results in Chapter 2 suggest that both higher trust and increased deterrence efforts by the authorities are positively associated with tax compliance. This in particular the case for increased financial capacities of tax agencies. Chapter 2 also finds support for the Slippery Slope Framework's moderating relationship. Deterrence is most effective when trust in authorities is low, and vice versa. When tax enforcement becomes coercive, however, it negatively affects trust and tax compliance. In particular, the government's signal to counter crimes with retaliation forecloses a social climate characterized by mutual trust between taxpayers and the government.

Chapter 3 finds that framing a lack of cooperation in a public goods game as legal but morally condemnable behavior led to increased compliance. However, the positive effect of this moral appeal lasted only when it was combined with a social sanction. The disclosure of tax avoiders (uncooperative participants) had no adverse financial consequences, but proved that individuals are heavily influenced by reputational concerns, regardless of whether it involves the legal violation of the norm to pay (all) taxes or to voluntarily support a socially profitable public action. Also, Chapter 3 demonstrates the importance of clarifying the purpose of taxation and the consequences and moral responsibility of non-compliance. Simply deciding about tax avoidance without any moral guidance led to similar contributions as in the baseline voluntary contribution game. Without the moral appeal presented in the experiment, participants were significantly more ready to reveal their non-compliance.

Chapter 4 shows that, in a worldwide comparison, trust in government is not necessarily coupled with the objective trustworthiness of authorities. The expected relationship holds only for Western democracies, and the criteria of good governance usually describe democratic ideals from a Western perspective. Other countries and political systems might build on a different culture of trust, char-

acterized by commitment to specific policies and a system of shared norms rather than on the *rule of law* (see, e.g., Rothstein, 2015). Chapter 4 finds that people put the highest trust in regimes that propagate pro-state attitudes and in governments that take a pro-active role in organizing the economy, culture, and even day-to-day life. Especially government control over the media is positively correlated with trust in government, since authorities can both sell (alleged) good deeds and conceal government failure in an unimpeded manner.

Many of the restrictive autocracies are also among the most dynamic emerging economies of the world with palpable improvements in the quality of living in the recent decades. Chapter 4 suggests that high trust in government can have positive ties to growth despite unaccountable and unreliable institutions.[2] Chapter 4 does, however, not find growth-enhancing effects of trust via intermediaries like investments and consumption. This is in contrast to some studies on social trust and supports Rothstein and Uslaner (2005), who argue that social trust (the willingness to get involved in social communities) is caused by governments and institutions that promote economic equality, social cohesion and equal opportunities.

Three main conclusions can be derived from this thesis. First, governments need to be very cautious in their strategy to deter crimes like tax evasion. Trust in government is important for high and stable tax compliance and potentially hampered by an antagonistic tax climate. Second, morally condemning legal tax avoidance increases compliance, but this effect is overlaid when reputational concerns are activated by bringing this behavior to light. Third, trust in government can have direct positive ties to economic growth. However, trust in and the trustworthiness of institutions are not congruent. Different cultures of trust exist, and trust in government can be manipulated by the government. When confidence in institutions is not "heartfelt", it might not evolve into social trust.

[2]This direct link might be supported by a lack of resistance (either through norms or because it is enforced) to policy decisions potentially harming the well-being of individuals – the lapse of legal hurdles and tedious democratic decision-making processes can arguably expedite investment decisions.

Chapter 2

Enforce Taxes, but Cautiously: Societal Implications of the Slippery Slope Framework[1]

2.1 Introduction

When large-scale tax evasion is uncovered, the media and the public often vehemently demand (broadly) expanded tax audits and harsher penalties for tax evaders. This reflects the expectation that tax evasion is no longer seen as a peccadillo or as a popular sport. The adequacy of this expectation is, however, debatable. A growing body of literature finds that voluntary tax payments[2] play an important role for the decision whether to evade taxes or not (Alm et al., 1992, 1999; Cowell, 1990; Falkinger, 1995; Feld and Frey, 2002, 2007). Given low probabilities of detecting tax evasion and moderate punishments in the case of

[1] An earlier version of Chapter 2 is available as Number 589 of the Hannover Economic Papers (HEP) series. This paper was presented at the 2016 DIBT conference "Tax Compliance in a Globalized World" in Rust (Austria) and at the 2017 Annual Congress of the IIPF in Tokyo. I thank Andreas Wagener for his guidance. I acknowledge valuable comments and suggestions made by Kay Blaufus, Arevik Gnutzmann-Mkrtchyan, Tejaswi Velayudhan, and Reinhard Weisser.

[2] Taxpayers comply with the tax laws and report income honestly not because they are forced to do so, but because they want to or feel obliged to, for example due to moral or societal norms.

detection – the "classic" deterrence instruments for a rational agent (Allingham and Sandmo, 1972; Becker, 1968; Yitzhaki, 1974) – scholars argue that voluntary tax compliance might even outweigh the importance of enforcing tax payments. The former explanatory approach, often summarized under the term tax morale (see, e.g., Luttmer and Singhal, 2014; Torgler, 2003, 2006, 2007), is regarded as an important piece to solve the so-called tax compliance puzzle, which asks why most people pay taxes when it would be individually rational to be non-compliant.[3]

The question how tax enforcement and voluntary tax compliance interact and how they (jointly) influence the tax evasion decision is in many aspects still a black box. Kirchler (2007) and Kirchler et al. (2008) prominently united enforced and voluntary tax compliance in a single conceptual tool, the "Slippery Slope Framework" (SSF). In the SSF, trust in authorities (as the determinant of voluntary compliance) and power of authorities (the representation of deterrence tools) enhance tax compliance. The two determinants can operate independently, but also interact with and moderate each other: when trust is low, increases in deterrence matter most and vice versa.

The SSF considers the decisions of a single individual. This paper is a first attempt to analyze the interplay of voluntary and enforced payments and their connection to tax compliance on an aggregate level, treating tax evasion as a "social phenomenon" (Sandmo, 2005: p. 656): how does a government signaling deterrence or even retaliation affect the readiness to trust and to cooperate in the society? Can mutual trust between taxpayers and government thrive when norm violations are (severely) punished, or does deterrence act as a barrier towards voluntary tax payments?

I examine these questions by employing a panel data set for 25 EU member states. The present paper makes use of the first internationally (EU-wide) comparable tax gap estimates available for multiple years. This paper also introduces novel indicators for the degree of deterrence exerted by the state. To approximate the (potential) frequency of tax audits, I use OECD data on the expenditures for a country's tax administration (as a share of GDP). To approximate the perceived severity of punishments for crimes and as a signal towards governments' retalia-

[3]See e.g. Andreoni et al. (1998) and Slemrod (2007) for comprehensive literature reviews.

tion, I use incarceration rates (per 100,000 inhabitants), described in more detail in Section 2.3. From a descriptive, cross-country perspective, I assess whether distinct patterns between the motivation to voluntarily pay taxes, deterrence, and tax evasion are evident. With a within-country fixed effects approach I test whether and how trust in authorities and the power of authorities moderate each other, and if increases in either of the both determinants are associated with higher tax compliance. While the within-country approach allows to eliminate unobserved between-country heterogeneity, I do not aim to establish causal links between trust, deterrence and tax compliance.

The results in this paper show that both, higher trust and increased deterrence efforts, are associated with less tax evasion in European countries. This holds for potential audit probabilities and to a distinctly lesser degree also for coercion signaled by the government. The results indicate that trust and deterrence need time to positively respond with tax compliance. This paper also finds support for the moderating relationship put forward in the SSF: on the societal level, increases in deterrence indeed matter most when trust in government is low, and vice versa. When trust is not pronounced, increased deterrence is positively associated with tax compliance. Coercive policies with severe penalties for law-violations could eventually expedite tax evasion.

The remainder of this paper is organized as follows: Section 2.2 reviews literature on the importance of mutual trust between taxpayers and the government for tax compliance, elaborates on the SSF in more detail, and discusses how these concepts relate to tax evasion as an aggregate, social process. Section 2.3 discusses the characteristics of trust in authorities, deterrence, and tax compliance in detail and presents the indicators used for the empirical analysis. Section 2.4 provides a short descriptive inquiry and presents the results of the fixed effects analysis. Section 2.5 discusses the results and concludes.

2.2 Background

2.2.1 Mutual trust and tax compliance

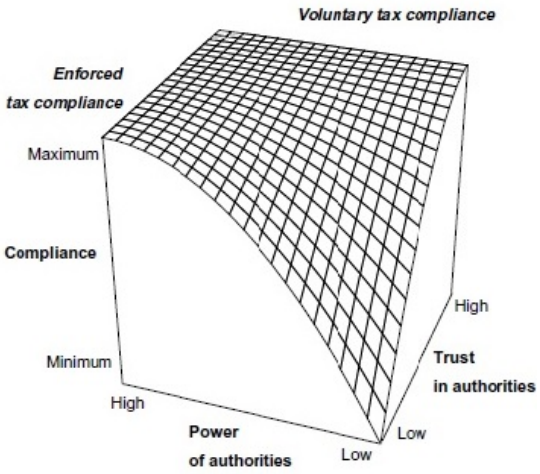
In his paper on *Trust in Public Finance*, Slemrod (2002) calls for a careful differentiation of trust between private parties and trust between, for example, taxpayers and the government. He describes the latter relationship as unique because of the protruding role the government has in providing goods and services, the power to tax, and the circumstance that tax payments cannot be directly translated into individually attributable benefits. Slemrod (2002) defines trust in government as the belief that authorities take the necessary steps to induce other taxpayers to forgo their financial incentives to act opportunistically. This definition leaves space to include a variety of aspects: besides law enforcement, also trust in others and functional institutions, i.e. equity and complexity of the tax system, efficiency and reliability of the government and the absence of corruption attribute to a trustworthy government (Rothstein, 2000).

Feld and Frey (2002) describe mutual trust between tax authority and taxpayer as a psychological contract. A breach of this contract would crowd out tax morale, with the consequence of taxpayers developing a purely rational attitude towards taxpaying. Other studies also connect trust, extrinsic incentives to comply with the law, and tax compliance to crowding-effects: similar to Feld and Frey (2002), Frey and Jegen (2001) argue that the crowding out of intrinsic compliance could be prevented if civic virtue was bolstered by laws conveying the notion that citizens were trusted. In a lab experiment, Feld and Tyran (2002) find that endogenously set fines led to more tax compliance compared to fines that were imposed exogenously. Bohnet et al. (2001) conducted a lab experiment and found that an institution's trustworthiness was crowded in with weak law enforcement and crowded out with medium law enforcement. Schulze and Frank (2003) ran a lab experiment on corruption with and without the possibility of detecting the offense. The authors find that monitoring destroyed the intrinsic motivation for honesty, shifting behavior towards corruption.

2.2.2 The Slippery Slope Framework

Kirchler et al. (2008) developed the SSF with the idea of two different tax climates in a society in mind: the *antagonistic* tax climate is characterized by a "cops and robbers" attitude, where authorities and taxpayers work against each other. In this environment, the authors argue, the government perceives all taxpayers as potential criminals and persecutes them, while the taxpayers feel the need to escape this oppression. In the *synergistic* tax climate, by contrast, authorities act in the spirit of performing services to the public. Kirchler et al. (2008) see a large social distance between authorities and taxpayers in the antagonistic climate, and describe it as low in the latter: the government acts in the interest of the public, and the taxpayers feel obliged to contribute their share and thus to enable authorities to provide public goods and services.

Figure 2.1: The Slippery Slope Framework



Kirchler et al., 2008: p.212.

In the SSF, the antagonistic tax climate is connected to low trust in authorities and considerable deterrence, while the reverse mix will occur in the synergistic climate. Kirchler et al. (2008) define trust in authorities as "the general opinion of individuals and social groups that the tax authorities are benevolent and work beneficially for the common good" (p. 212), which is fostered by functional institutions and likely results in voluntary tax compliance.

The continuum of the two tax climates and the SSF's features result in the three-dimensional framework depicted in Figure 2.1. Trust in authorities [power of authorities] can result in high tax compliance regardless of power in authorities [trust in authorities]. The marginal returns on tax compliance are, however, decreasing. The joint influence and moderating relationship of trust and power is visualized in the grid-area of Figure 2.1. The deployment of trust and power can be substituted at will because both factors are equally valuable for tax compliance. In the SSF, the perception of deterrence depends on the level of trust: if it is low, power is perceived as coercive. In a trusting environment, deterrence is perceived as legitimate. However, the perception of power has no consequence for actual tax compliance, as long as tax payments are in fact enforced.

More recent works on the SSF have begun to incorporate different forms of trust. Gangl et al. (2012) and Gangl et al. (2015) describe reason-based trust as rational, strategic and driven by knowledge, while implicit trust relies on social identities and norms. The two forms of trust also interact differently with the perception of power. The authors argue that coercive power would reduce implicit trust, whereas it is fostered by governmental power that is perceived as legitimate. Gangl et al. (2012) argue in favor of a third tax climate on the societal level: in the "confidence climate", taxpayers feel responsible for the tax system, and the government reciprocates by avoiding extensive controls and punishment.

In the SSF, high and stable tax compliance is reached with high (or maximum) investments in trust, power, or both. Kirchler et al. (2008) acknowledge that both, extreme deterrence or encouragement, are not attainable, resulting in an outcome where an inclination towards tax evasion *(the slippery slope)* will always prevail. Surveys and experiments on the SSF's mechanics find evidence for an interaction of trust and power and for the slippery slope: when both, trust and power, were (exogenously) set at high levels by the experimenters, tax compliance was more pronounced than in a scenario only power *or* trust were high (Wahl et al., 2010, Muehlbacher et al., 2011, Kaplanoglou et al., 2016). However, it is questionable whether high trust and high power can or need to co-exist: on the one hand, the two determinants appertain to different tax climates; on the other hand, focusing on one dimension is sufficient to reach (high) tax compliance.

2.2.3 From the individual to the aggregate perspective

Sandmo (2005) appealed for a more careful consideration of tax evasion as an aggregation problem and called for analyses going beyond treating tax evasion as a purely individual cost-benefit choice. He argues that non-compliance could spread from an individual to an aggregate problem if taxpayers observe others' evasive behavior: on the one hand, the taxpayer might perceive a smaller probability of detection; on the other hand, the (potential) disutility of evading taxes might decrease if it is perceived as common, and the government is not trusted to secure cooperation and to responsibly proceed with its revenues. While the SSF considers the evasion decision of single taxpayers and treats trust in authorities as a subjective sentiment, Kirchler et al. (2008) acknowledge the societal dimension of tax compliance with the inclusion of the two tax climates and with power of authorities as a public good.

Scholz and Lubell (1998) and Slemrod (2002) analyze the connection of trust in government and tax compliance with cross-country data. Scholz and Lubell find that higher scores in their trust measure significantly reduced the likelihood of non-compliance. Slemrod (2002) aimed at untangling structural relationships between trust, growth, and tax compliance with a 3SLS approach. He finds that a more trustworthy government is generally associated with less tax cheating, but that the acceptance of tax evasion increases as the size of the government grows. Knack and Keefer (1997) and LaPorta et al. (1999) studied the impact of trust on economic growth and prosperity. Both studies find significantly positive correlations and LaPorta et al. (1999) additionally find connections of trust to juridical efficacy and the absence of corruption. The interrelation of trust with tax enforcement (as incorporated in the SSF) is not scrutinized in these cross-country studies, and this paper makes an attempt to explore this missing link.[4]

[4] Lisi (2012), with a cross-country study, tried to test the SSF's assumptions on the aggregate level. He finds negative correlations between trust (World Values Survey data), power (proxied with the "Rule of Law" index (World Bank)) and tax evasion (size of the shadow economy). However, the author failed to incorporate the interplay of trust and power, and his indicator for "power of authorities" might be rather a measure of government trustworthiness than of deterrence.

2.3 Data

2.3.1 Tax compliance

A tax evader's primary concern is to conceal his illegal behavior; tax evasion is not observable, unless the non-complier is audited. Information on the extent of noncompliance is consequentially always a rough estimate. Tax gaps, for instance, measure the difference between planned (theoretically due) and actually collected tax revenues. Until recently, only few countries reported tax gaps, often relying on different estimation techniques.

Beginning in 2013, CASE Network[5] has published and gradually expanded tax-gap estimates for the EU member states (CASE, 2013, 2014, 2016). CASE focuses on a single tax, the Value Added Tax (VAT). Using the difference between actually collected and theoretically due VAT revenues to approximate for tax non-compliance is promising for mainly two reasons: firstly, with employees' wages often taxed at source, the VAT is the only important tax with the possibility to cheat on. This works best with cash-deals, where for example a handyman is hired and paid without issuing a bill. Secondly, in most developed economies, the VAT is the most revenue-intensive tax after the personal income tax (see for example Besley and Persson, 2013). In this sense, concentrating on the VAT gap might give a meaningful measure for a society's readiness to engage in tax evasion.

In CASE (2013), the VAT Gap is defined as the difference between the theoretical VAT liability according to national tax laws (VTTL) and the actual VAT revenue per country and year, divided by the VTTL.[6] The theoretically due tax liability is adjusted for tax exemptions and exclusions. To transform the VAT gap to a compliance measure, I quantify tax compliance (TC) as 100% - VAT gap (in %).[7]

[5] Center for Social and Economic Research, a non-profit research institute based in Warsaw (Poland). CASE prepared the VAT-gap reports for the European Commission.

[6] The VTTL is calculated by applying appropriate VAT rates to a theoretical consumption (or tax) base deduced from key macroeconomic figures ("top-down" approach, CASE 2013).

[7] Table A2.1 in the Appendix describes all data and variables used in this paper.

2.3.2 Trust in authorities

Trust, in other people or in institutions, is subjective and has different meanings and values attached to it, based on personal beliefs and experiences. As a rough definition, trust is the expectation that one's own vulnerability is not exploited by another party. Translated to the taxpayer-government relationship, this definition is mirrored in the "synergistic" tax climate described by Kirchler et al. (2008): when the government uses its funds in the interest of the taxpayers, they feel obliged to reciprocate this behavior and not to withhold the taxes they owe.

In socioeconomic surveys and opinion polls, specifically designed questions seek to assess trust (in others or in institutions). I use a question from the European Social Survey (ESS)[8] polling for subjective trust in (the respective country's) national parliament, to which respondents could answer on a scale ranging from 0 (no trust at all) to 10 (full trust). While items on trust in the tax authority or in the national government are not included in the ESS, using trust in the parliament might be beneficial: the relationship between taxpayer and tax authority is presumably very indirect. A taxpayer will only think about the agency when filing a tax return or when being audited; trust might not be an important factor. Governments are led by an exposed president, prime minister, or chancellor. Personal affection or dislike could bias the evaluation of the government's work. The work of the parliament, by contrast, could rather be seen as a sign of the general democratic conduct: are all topics and facets the public is interested in debated? Are the debates fair and the commerce of parliamentarians characterized by mutual respect? Does the parliament get legislation done, and is the legislative process transparent?

I aggregate the answers on the question of subjective trust in parliament by calculating the share of trusting citizens per country and year. I define trusting as a response between 4 and 10 on the 0-10 scale. Table A2.2 (in the Appendix) shows that on average 61.81% (median: 62.47%) of surveyed participants in the ESS had at least some trust in their government. The least trusting were Latvians

[8]The ESS aims at mapping social and political attitudes in Europe. Starting in 2002, surveys are conducted every two years, covering more than 30 European countries.

surveyed in 2008 (21.02%), the highest trust (90.39%) was reached in Denmark, also in 2008.

2.3.3 Deterrence

The present paper tests two tools for deterring tax non-compliance available to authorities. The first, administrative costs of the tax administration (in % of GDP) can be used to approximate the capacity of the tax administration to detect tax evasion, for example with expanded audits and more personnel, or with better and time-saving technologies. However, this measure is endogenous to tax compliance: more tax evasion could either result in less resources that can be allocated to the tax agency, or motivate the government to invest in audit capacities all the more. Independent of budgetary concerns, the second tool uses the number of inmates (per 100,000 inhabitants) in a country to approximate how rigidly a government tries to daunt rule- or norm breaking; thus, to what extent a government adopts a "cops and robbers" attitude towards the citizens, for example if the law threatens harsh (prison-) sentences even for minor offenses. The opposite are legal systems which count on social re-integration instead of retribution.

Tax administration expenditures. Data for this particular source of government expenditures come from the OECD (2015) in its "Tax Administration 2015" report. The numbers reported by the OECD were not provided for all 25 EU countries in this sample and also only available for a limited number of years. To counter the resulting gaps in the sample, I linearly interpolated the data for all countries where multiple observations were available.

A glance at the data shows that, relative to the GDP, expenses for the tax administration are very low, the sample average is .25% of GDP. Thus, even a seemingly small increase of .1 percentage points could have a large effect. However, variation within countries and over time is small (see Figure A2.3).

Incarceration rates are obtained from the Institute for Criminal Policy Research (ICPR).[9] The ICPR provides data for countries worldwide, typically in a two-year frequency. Research on incarceration as a signal for a government's retributive attitude first and foremost originates from political sciences and sociology. In these fields scholars describe imprisonment primarily as a political force and the prison as a political institution (Jacobs and Carmichael, 2001; Smith, 2004; Shannon and Uggen, 2012). Studies on the use of prisons as a tool for governmental power focus almost exclusively on the USA. Incarceration rates in the USA are well above 700 (per 100,000 inhabitants), around five times higher than in the European Union. However, this constantly expanding disparity is not matched by a similar increase in crime rates (Smith, 2004; Shannon and Uggen, 2012). As a consequence, Smith (2004) sees imprisonment as the demonstration of the state's coercive powers. In a sense, the government uses the size of the prison population as a signal to what extent it dislikes and punishes wrongdoing. Garland (1991) points out that until the 1960s incarceration in the USA had been very similar to the numbers in Western Europe and then started to climb sharply, resulting in growing pessimism and distrust. Already Pincoffs (1966) noted a shift in the justification for punishment towards retribution and get-tough policies.[10]

2.4 Results

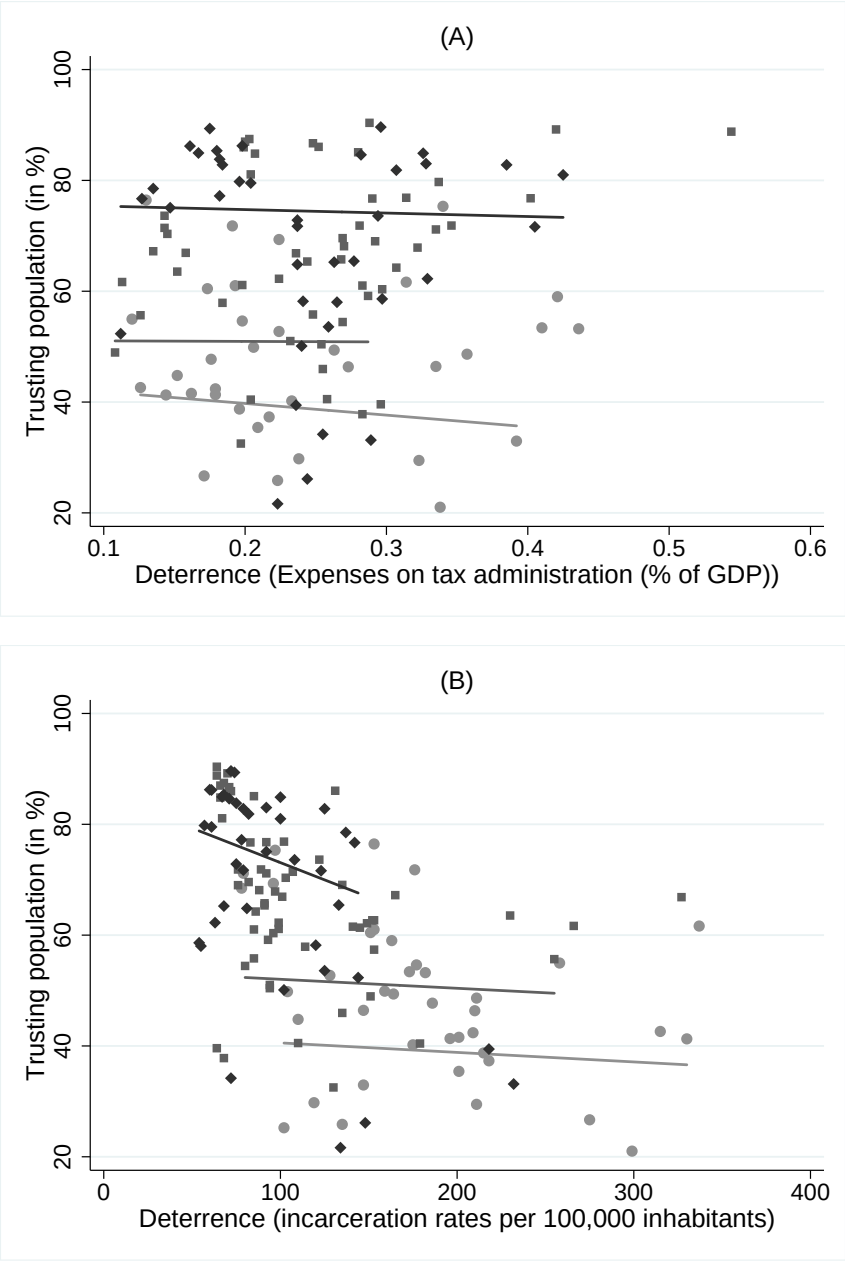
2.4.1 Descriptive analysis

Figure 2.2 plots all available observations for countries' trust in authorities and the intensity of deterrence (tax administration expenses in Panel A, incarceration rates in Panel B), displaying the interplay of the two determinants on a descriptive level. The data in Figure 2.2 is pooled across countries and years, and visually separated by differences in the corresponding tax compliance.

[9] http://www.prisonstudies.org/map/europe (as of August 14th, 2018)

[10] Of course, only a vanishingly small number of prisoners are convicted tax evaders, and a greater proportion of inmates by no means implies reduced opportunities to commit tax fraud. Imprisonment describes the "cops and robbers" attitude of authorities in a broad sense because it typifies the risk of getting (severely) punished for engaging in unlawful behavior in general.

Figure 2.2: Data plotted in the Trust-Deterrence space



Pooled sample (over countries and years). Panel A: trust in authorities (% of the population) is plotted against the administrative costs of the tax administration. Panel B: trust is plotted against the incarceration rate (per 100,000 inhabitants). Circles: observation corresponds with tax compliance smaller or equal to 85%. Squares: tax compliance within 85% and 90%. Diamonds: tax compliance above 90%. Lines represent linear fits for the different levels of tax compliance.

Circles in Figure 2.2 represent tax compliance smaller or equal to 85%, squares tax compliance between 85% and 90%, and diamonds tax compliance above 90%. The lines in Figure 2.2 represent linear fits of the correlation between deterrence and trust in authorities. The linear fits are corrected for outliers. For high tax compliance (black lines) observations were excluded when the share of the trusting population fell below 40%. For intermediate tax compliance (medium gray lines) trust had to lie between 40% and 60%, while for low tax compliance (light gray lines) observations were excluded when trust was greater or equal to 50%.

Panel A of Figure 2.2 shows the correlates between trust in government and the budget-based measure for deterring tax evasion. Across countries and years, the determinants are not correlated. This is line with the conception of the SSF, where trust in authorities and the power of authorities are two separate strategies to raise tax compliance. The budget for the tax administration is in most cases quite low, rarely exceeding .3% of the GDP.

Panel A suggests that high trust generally coincides with high tax compliance, examples are countries like Denmark, Sweden, Finland, or the Netherlands. The lower trust in government, the lower tax compliance (intercepts of the linear fits). Regardless of the extent of non-compliance, the very flat (negative) slopes of the linear fits suggest that trust in government and deterrence could (across countries) be substituted almost at will.

Panel B of Figure 2.2 looks at the incarceration rates as a political signal to deter crimes and presents a different picture. Trust in government and the propensity to punish crimes with imprisonment are negatively correlated (r = -.53, p <.001). As in Panel A, more trust coincides with higher tax compliance. Yet, for low and medium tax compliance (light and medium gray line), the trade-off between trust and deterrence is very small (comparable to Panel A). This changes for those observations where both trust and tax compliance are high; an increase in deterrence (more incarceration) is correlated with a considerable loss of trust. Ubiquitous punishments for crimes (in general, not specifically for tax evasion) and high trust never go hand in hand.

2.4.2 Within-country analysis

Equation (2.1) describes the model employed for the fixed effects analysis. Tax compliance (TC) in country i in year t is the dependent variable, trust in authorities (voluntary compliance) and deterrence the predictors of interest. $Trust$ contains the share of people stating trust in the national parliament in a given country in a given year. Thus, β_1 measures the response of tax compliance to a one-percent increase in the trusting population. When $Deterrence$ is measured by the budget for the tax administration (as a share of GDP), β_2 gives the response of TC to a .1 percentage point increase in the budget. In most countries, this would mean a major policy change, often doubling the expenses for the tax administration. For the incarceration rates, β_2 measures the response of tax compliance to one additional prisoner (per 100,000 inhabitants), a comparably marginal change.

$$TC_{it} = \beta_0 + \beta_1 Trust_{it} + \beta_2 Deterrence_{it} + \beta_3 Trust_{it} \times Deterrence_{it} + \beta_4 \mathbf{X_{it}} + FE_i + FE_t + u_i + \epsilon_{it} \quad (2.1)$$

Vector $\mathbf{X_{it}}$ contains variables which may affect tax compliance besides trust and deterrence. Country fixed effects (FE_i) ensure that the effect of deterrence and trust on tax compliance is estimated for each country by measuring yearly deviations from the country's respective mean. The inclusion of time fixed effects (FE_t) captures the influence of aggregate time-dependent trends. The analysis will also make use of the panel's dynamic structure by introducing leads, lags, and first differences to the dependent variable.

The interaction term (β_3) is of central importance to analyze the interplay and moderation of trust and governmental power. In regression tables, β_3 gives only a slope; neither the effect size nor the statistical significance can be meaningfully interpreted. In the present paper, the interaction term is always negative and has a very flat slope, meaning that the effect of an increase in trust [deterrence] on tax compliance becomes smaller the greater deterrence [trust], but that the impact of a marginal change is small. β_3 does, however, not reveal whether the effect is

initially positive or negative, or if it becomes negative at high levels of trust or deterrence. To illustrate the moderating relationship of the two determinants and to meaningfully interpret the interaction term, marginal effects (thus, the effect of an increase in one variable, evaluated at different levels of the moderator variable) are calculated and visualized in Figures 2.3 and 2.4 below.

Expenses for the tax administration as deterrence. Column (1) of Table 2.1 shows that neither trust nor the tax administration expenditures or their interaction are positively correlated with tax compliance. Yet, specification (1) estimates the response of TC in year t to changes in the explanatory variables in the same year. Likely, changes in the administrative costs for the tax administration and in trust will need time to affect tax compliance.

Table 2.1: Within-country analysis, Part I

	(1) TC	(2) TC_{t+1}	(3) $\Delta TC_{t+1,t}$	(4) TC_{t-1}
Trust	0.062	0.227*	0.279*	0.038
	(0.117)	(0.113)	(0.135)	(0.131)
Deterrence	1.538	6.889**	7.912**	−2.222
	(3.033)	(3.085)	(3.469)	(3.399)
Trust × Deterrence	−0.011	−0.085*	−0.103*	0.045
	(0.036)	(0.041)	(0.050)	(0.042)
Unemployment	−0.187	0.162	0.414	−0.822***
	(0.367)	(0.325)	(0.369)	(0.253)
Budget deficit	−0.039	−0.080	−0.066	−0.083
	(0.135)	(0.150)	(0.233)	(0.129)
Service sector	−1.094**	−0.830**	0.453	−0.402
	(0.493)	(0.357)	(0.487)	(0.487)
GDP per capita	−1.217	−1.001*	0.505	−1.788***
	(0.764)	(0.533)	(0.801)	(0.595)
VAT rate	−0.134	0.524	0.793	−0.363
	(0.556)	(0.526)	(0.764)	(0.433)
Country FE	*Yes*	*Yes*	*Yes*	*Yes*
Year FE	*Yes*	*Yes*	*Yes*	*Yes*
Observations	125	99	99	99
R^2	0.315	0.318	0.268	0.395

Notes: Within-country fixed effects estimates. Year fixed-effects included whenever jointly significant (Wald-Test). The measure for deterrence is a country's expenses on the tax administration (% of GDP) Trust is the share of the trusting population.. Robust standard errors are in parentheses. When no subscripts are used, variables represent present values. $^{*}: p < 0.1; ,^{**}: p < 0.05; ^{***}: p < 0.01$.

Thus, column (2) of Table 2.1 tests the associations to changes in the explanatory variables in year t and tax compliance in year t+1, i.e. two years later (ESS

surveys take place every two years). Holding all other variables constant, a one percent increase in trust in government is now significantly correlated with a raise in tax compliance of .23 percentage points. Deterrence in t is also significantly positively associated with tax compliance in the following time period. An increase of .1 percentage points in expenditures for the tax administration (% of GDP) is estimated to increase tax compliance by 6.9 percentage points.[11] The interaction term is also statistically significant and will be visualized and discussed in Figure 2.3 below.

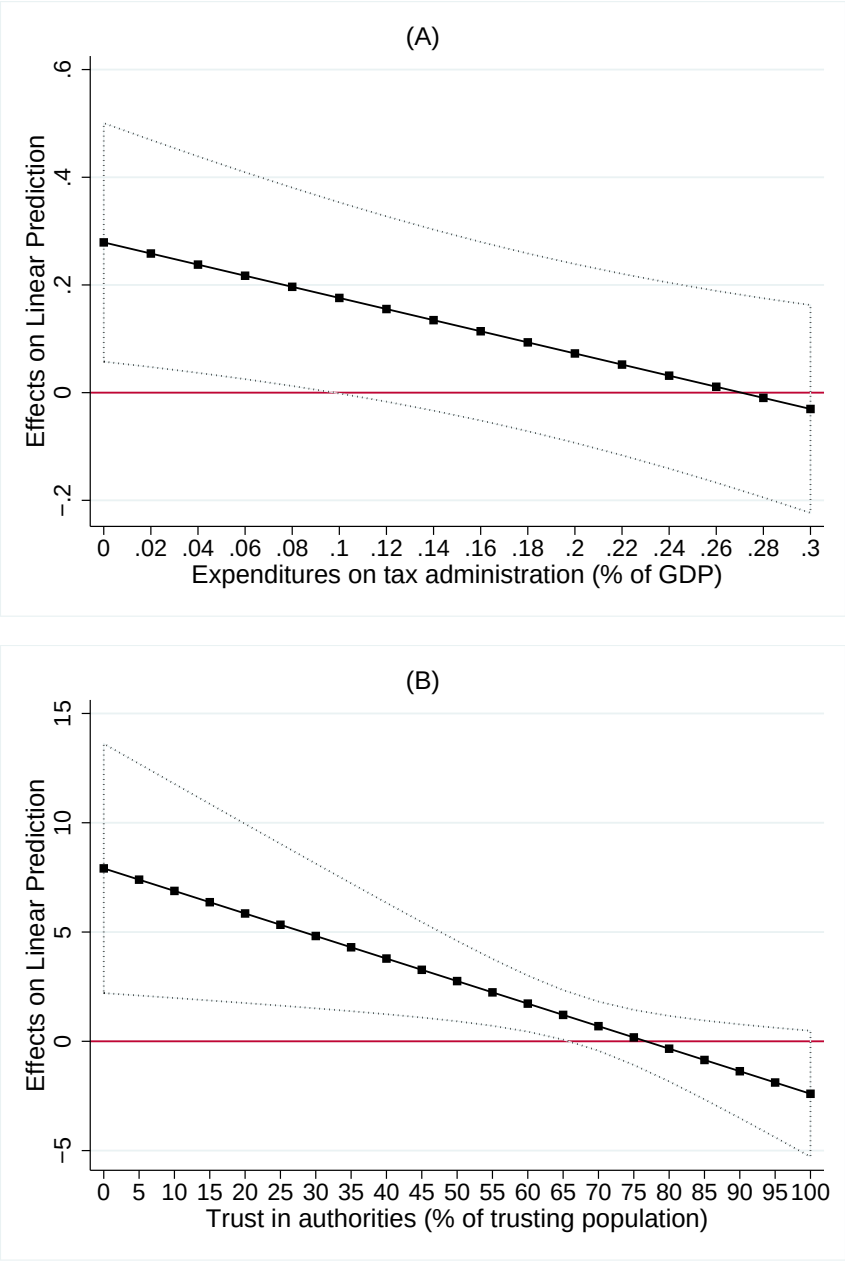
Column (3) of Table 2.1 uses the change from tax compliance in year t to year t+1 as the dependent variable, further exploiting the dynamic structure of the panel: in column (3), the coefficients of the explanatory variables do not show the response of tax compliance in t+1 in levels, but the impact on changes in TC. The coefficient sizes and the statistical significance are robust to this change. Column (4) uses past tax compliance (dependent variable) as a robustness check; current levels of trust and deterrence should not explain past tax compliance – this is the case.

All specifications in Table 2.1 include the following control variables: a higher unemployment rate points towards a more constrained budget for taxpayers. Except for column (4), unemployment is not significantly correlated with tax compliance. The same holds for countries' public budget deficit, which arguably could imply both an incentive for authorities to generate additional revenues but at the same time means less resources available to enforce tax payments and to invest in trustworthiness. In columns (1) and (2) of Table 2.1, a larger service sector (share of GDP) is significantly correlated with less tax compliance. Since most everyday chances to evade the VAT will occur in the retail business, the association is of the expected sign (see also CASE, 2018). Further controls included are per capita GDP and the VAT rate.

Panel A of Figure 2.3 depicts the marginal effect of a one-percent increase in the trusting population on tax compliance, evaluated at different levels of tax administration expenditures. The negative slope indicates that the impact of

[11] Tax compliance in year t will influence TC in year t+1. However, with a small t, including lagged tax compliance as an additional control variable would introduce endogeneity to the statistical model (see, e.g., Nickell, 1981).

Figure 2.3: The Moderating Effect of Trust and Deterrence, Part I



This Figure is the graphical representation of the interaction effect in column (3) of Table 2.1. Panel (A) shows the marginal effect of a one percentage point increase in the non-trusting population in on tax compliance, evaluated at different expenditures on the tax administration (% of GDP). Panel (B) depicts the marginal effect of a .1 percentage point increase in the tax administration's budget (relative to the GDP) , evaluated at rising levels of trust in society. 90% confidence intervals are depicted.

additional trust in authorities becomes smaller the more extensive deterrence is. However, only at comparably high expenses the marginal effect turns negative, but is statistically not significant.

The association of additional trust and tax compliance is only significantly positive when tax administration expenditures do not exceed about .1% of GDP. This is in line with the SSF, where a change in trust in authorities matters most when the power of authorities is weak. The large confidence intervals reflect the wide range of trust in authorities found across expenses for the tax administration.

Panel B of Figure 2.3 shows the partial effect of an increase in deterrence, evaluated at the share of the trusting population. Because of the strong impact of a (large) increases in tax administration expenditures, the association with tax compliance remains significantly positive at least until the share of people having trust in authorities does not exceed about 65%. Only when trust in society is very high the marginal effect turns negative, but is statistically not significant.

Incarceration rates as deterrence. Table 2.2 estimates Equation 2.1 with the incarceration rates (per 100,000 inhabitants) in a country as the measure for punishments of crimes as a political signal to taxpayers, and uses the same control variables as in Table 2.1. Column (1) and (2) test immediate responses of explanatory and dependent variables. In column (1) neither of the variables of interest is significantly correlated with tax compliance. Column (2) suggests that this is partly due to including the size of the service sector as a control. Without it, *Trust* and the interaction term are significantly correlated with the dependent variable. As in Table 2.1, the size of the service sector is important for the VAT gap in the same time period. Throughout all models in Table 2.2, the alternative *Deterrence* measure is never positively associated with tax compliance.

Columns (3) and (4) of Table 2.2 use tax compliance in time period t+1 and the first difference of tax compliance as the dependent variable. Again, neither of the predictors of interest is significantly associated with TC; this is independent from whether the size of the service sector is included as a control variable or not.

Reconnecting to the arguments by Gangl et al. (2012) and Gangl et al. (2015) discussed in Section 2.2, this lack of significant responses and the differences to

Table 2.2: Within-country analysis, Part II

	(1) TC	(2) TC	(3) TC_{t+1}	(4) $\Delta TC_{t+1,t}$	(5) TC_{t-1}
Trust	0.238	0.317**	0.317	0.077	0.264***
	(0.147)	(0.130)	(0.212)	(0.262)	(0.079)
Deterrence	0.081	0.108	0.135	0.024	−0.010
	(0.085)	(0.094)	(0.010)	(0.141)	(0.043)
Trust × Deterrence	−0.002	−0.002*	−0.002	−0	−0.001
	(0)	(0.001)	(0.001)	(0.002)	(0.008)
Unemployment	−0.272	−0.528**	0.030	0.402	−0.861***
	(0.290)	(0.234)	(0.286)	(0.401)	(0.179)
Budget deficit	−0.011	0.206	0.041	0.052	−0.119
	(0.120)	(0.150)	(0.110)	(0.176)	(0.086)
Service sector	−0.909*		−0.448	0.593	−0.302
	(0.456)		(0.321)	(0.585)	(0.350)
GDP per capita	−1.349*	−1.454**	−1.448**	0.097	−1.685***
	(0.702)	(0.684)	(0.523)	(0.723)	(0.535)
VAT rate	−0.013	0.041	0.111	0.170	0.152
	(0.333)	(0.368)	(0.431)	(0.540)	(0.270)
Year FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	135	135	107	107	106
R^2	0.348	0.291	0.314	0.230	0.468

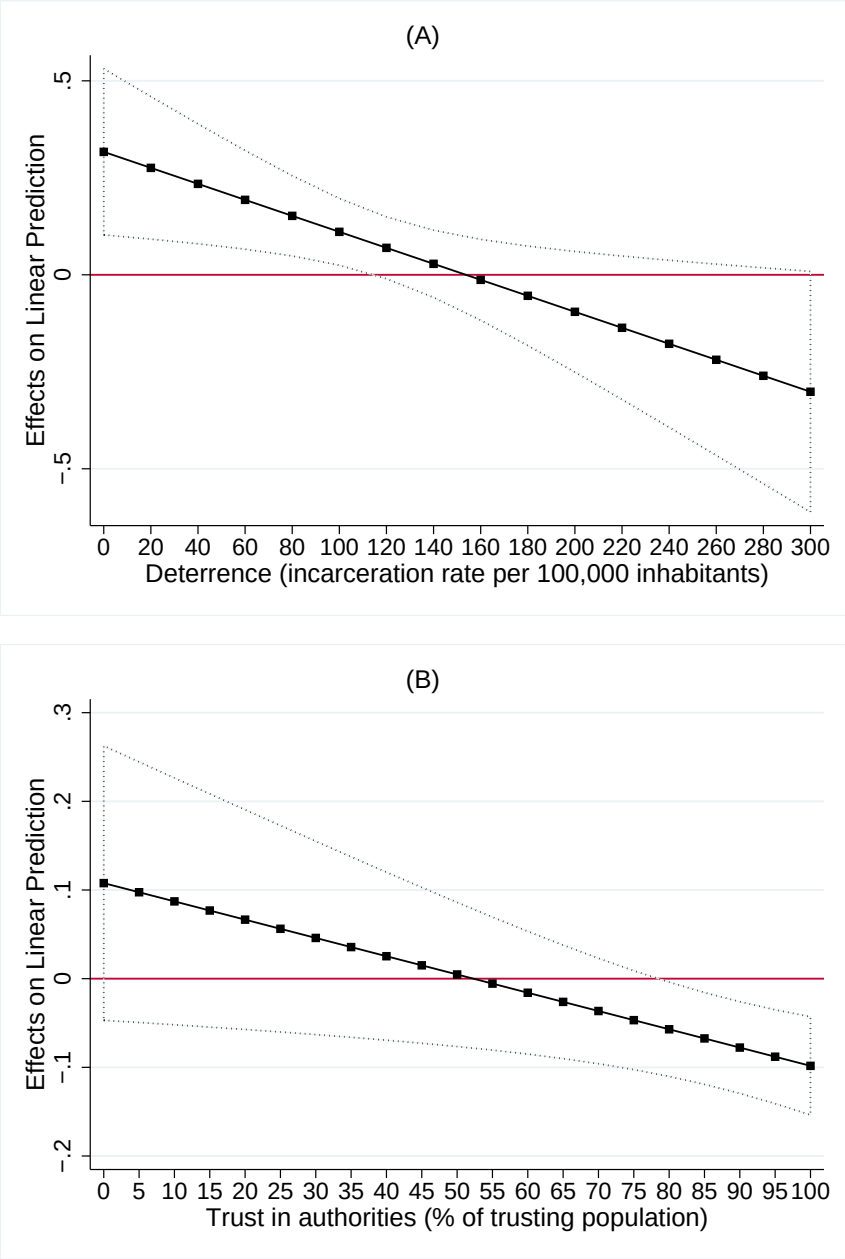
Notes: Within-country fixed effects estimates. Year fixed-effects included whenever jointly significant (Wald-Test). Robust standard errors are in parentheses. Trust is the share of the trusting population. When no subscripts are used, variables represent present values. $^{*}: p < 0.1; ,^{**}: p < 0.05; ^{***}: p < 0.01$.

Table 2.1 might be explained by incarceration being perceived as coercive power, which, according to the authors, reduces or even forecloses the development of (implicit) trust. Instead, financial investments in the tax agency could be perceived as a legitimate way to combat free-riding. Hence, (reason-based) trust increases, making coercive practices unnecessary. Only when the budget for the tax administration is, for example, more than doubled, taxpayers might become suspicious and begin to doubt that the government's policy is in their interest (see Figure 2.3).

Lastly, column (5) of Table 2.2 again uses past tax compliance (dependent variable) as a robustness check. Trust in year t is significantly correlated with tax compliance in the previous period, further weakening the explanatory power of the model with the incarceration rates as the tool for deterring tax evasion.

Panel A of Figure 2.4 depicts the marginal effect of a one-percent increase in the trusting population on tax compliance, evaluated at different incarceration rates. With low deterrence, additional trust has a positive effect, which decreases with

Figure 2.4: The Moderating Effect of Trust and Deterrence, Part II



This Figure is the graphical representation of the interaction effect in column (2) of Table 2.2. Panel (A) shows the marginal effect of a one percentage point increase in the non-trusting population in on tax compliance, evaluated at different levels of extrinsic incentives. Panel (B) depicts the marginal effect of a one unit increase in power on tax compliance, evaluated at rising levels of distrust in society. 90% confidence intervals are depicted.

increasing coercion. At an incarceration rate of about 150 the prediction becomes negative, but is significant only at extreme levels of deterrence; this is in some contrast to Figure 2.3.

Panel B of Figure 2.4 displays the marginal effect of one additional inmate (per 100,000 inhabitants) on tax compliance, evaluated at different levels of trust. When trust in society is very low, additional deterrence is predicted to positively influence tax compliance. This association is, however, not statistically significant. When trust in authorities is pronounced, additional deterrence is significantly correlated with increased tax evasion. This is also in contrast to Panel B in Figure 2.3, where increased deterrence (thus, a larger budget for the tax administration) was significantly positively associated with tax compliance when a majority of citizens did not state trust in the country's authorities. When trust in a society is pronounced, a "cops and robbers" attitude by the government might be connected to less compliance with the law.

2.4.3 Robustness checks

Excluding outliers. While between-country variation in the data used in this paper is substantial, the Figures A2.1-A2.4 in the Appendix show that within-country variation is rather low in a large number of countries. Table 2.3 tests the robustness of the within-country analysis when "outliers" are excluded from the sample. A country is classified as an outlier when the variance in one or more of the variables *Tax Compliance*, *Trust*, and *Deterrence* is on average more than one standard deviation above the pooled sample mean. Table 2.3 estimates the models with the current TC and tax compliance in year t+1 for both tools of "power of authorities".

Columns (1) and (2) estimate Equation 2.1 with the tax administration expenditures as the measure for *Deterrence*. The countries that dropped out are Bulgaria, Denmark, Hungary, Italy, Poland, and Spain. While the variables of interest in column (1) remain comparable to Table 2.1, the correlates for trust in authorities, deterrence, and their interaction decrease in size and become insignificant in column (2) of Table 2.3; the standard error for *Deterrence* is large.

Table 2.3: Within-country analysis, Part III

Deterrence:	(1)	(2)	(3)	(4)
	Expenses on tax administration		**Incarceration rates**	
	TC	TC_{t+1}	TC	TC_{t+1}
Trust	0.109	−0.073	0.284***	−0.017
	(0.189)	(0.261)	(0.092)	(0.151)
Deterrence	−2.266	−2.568	0.096*	−0.025
	(5.006)	(6.336)	(0.048)	(0.099)
Trust × Deterrence	0.003	0.051	−0.002*	0.0
	(0.078)	(0.090)	(0.001)	(0.001)
Unemployment	−0.254	−0.575*	−0.518	−0.478
	(0.481)	(0.315)	(0.444)	(0.431)
Budget deficit	−0.020	0.043	0.035	0.187*
	(0.093)	(0.074)	(0.091)	(0.096)
Service sector	−0.664	−0.328	−0.592	−0.240
	(0.416)	(0.278)	(0.363)	(0.354)
GDP per capita	−0.941	−1.488***	−1.378**	−1.613***
	(0.831)	(0.458)	(0.577)	(0.526)
VAT rate	−1.086	0.387	−0.390	−0.102
	(0.737)	(0.629)	(0.408)	(0.397)
Country FE	*Yes*	*Yes*	*Yes*	*Yes*
Year FE	*Yes*	*Yes*	*Yes*	*Yes*
Observations	91	72	100	82
R^2	0.366	0.370	0.451	0.384

Notes: Within-country fixed effects estimates. Year fixed-effects are included. Robust standard errors are in parentheses. When no subscripts are used, variables represent present values. Countries in this Table are excluded when the variance in tax compliance, trust, or deterrence was more than one standard deviation above the sample mean in at least one of the three variables. $^{*}: p < 0.1$; ,$^{**}: p < 0.05$;$^{***}: p < 0.01$.

With the incarceration rates as the measure for the power of authorities, Bulgaria, Estonia, Greece, Italy, Lithuania, Luxembourg and Poland drop out of the sample. In column (3) of Table 2.3 the results and the model fit improve in comparison to column (1) of Table 2.2, while in column (4) the results for the variables of interest remain statistically insignificant, and the coefficient sizes shrink. The results from excluding those countries with large within-variation (in either trust *or* deterrence *or* tax compliance) should, however, not surprise: when, on average, no palpable changes in the tax compliance policy occur, an effect should not be expected.

Alternative measures for trust in authorities. Table 2.4 estimates the model described in Equation 2.1 with three alternative proxies for trust in authorities: the satisfaction with the government, trust in the country's legal system, and general trust in politicians. All items are included in the ESS and use the

same 0-10 answer scale as the trust in parliament question. In Table 2.4, average values (per country and year) instead of the share of the trusting population are used.[12]

Table 2.4: Alternative measures for trust in authorities

Deterrence:	(1) **Expenses on tax admin.** TC	(2) **Expenses on tax admin.** TC_{t+1}	(3) **Incarceration rates** TC	(4) **Incarceration rates** TC_{t+1}
Trust: satisfaction with government				
Trust	0.433	1.933	−0.183	2.0
	(1.451)	(1.451)	(2.067)	(1.417)
Deterrence	1.740	4.954*	−0.026	0.078
	(2.642)	(2.607)	(0.094)	(0.068)
Trust×Deterrence	−0.217	−0.868**	−0.0	−0.019
	(0.440)	(0.479)	(0.015)	(0.013)
Observations	124	98	134	106
R^2	0.313	0.278	0.321	0.273
Trust: confidence in the legal system				
Trust	3.437**	1.919	3.823	4.824
	(1.468)	(2.135)	(2.317)	(3.939)
Deterrence	2.548	7.771**	0.039	0.253*
	(3.099)	(3.005)	(0.103)	(0.142)
Trust×Deterrence	−0.280	−1.250**	−0.013	−0.053*
	(0.453)	(0.491)	(0.017)	(0.030)
Observations	125	99	135	107
R^2	0.346	0.318	0.354	0.335
Trust: confidence in politicians				
Trust	1.717	2.971*	3.311	2.515
	(1.756)	(1.584)	(3.153)	(3.616)
Deterrence	1.800	6.234**	0.045	0.082
	(2.901)	(2.867)	(0.094)	(0.1)
Trust×Deterrence	−0.249	−1.288*	−0.02	−0.026
	(0.521)	(0.648)	(0.020)	(0.029)
Observations	125	99	135	107
R^2	0.320	0.314	0.334	0.221
Controls	*Yes*	*Yes*	*Yes*	*Yes*
Country FE	*Yes*	*Yes*	*Yes*	*Yes*
Year FE	*Yes*	*Yes*	*Yes*	*Yes*

Notes: Within-country fixed effects estimates. Control variables included: see Table 2.1. Trust alternatives coded on a 0-10 scale. Mean values per country and year are used. $^{*}: p < 0.1; ,^{**}: p < 0.05; ^{***}: p < 0.01$.

[12] Estimating the models in Tables 2.1-2.3 with the average value of "trust in parliament" returned similar results. Using the share of the trusting population in particular facilitated the interpretation of the partial effects in Figures 2.3 and 2.4.

Satisfaction with the government and trust in parliament are highly correlated (r=.88, p <.001). Yet, it is not significantly associated with tax compliance in any of the models estimated in Table 2.4. Trust and satisfaction might have different meanings and implications. The latter is perhaps connected to a more factual evaluation of the government's work, thus, whether it processes campaign pledges and if it acts in accordance with the voters' expectations or wishes. Trust, on the other hand, could be more intuitive and detached from a government's actual success. Rather, it depends on a general attitude and societal climate, as described by Kirchler et al. (2008). *Deterrence* and the interaction term in column (2) of Table 2.4 is significantly correlated with tax compliance, but the coefficient's magnitude is smaller compared to Table 2.1.

Trust in the legal system and trust in politicians are also highly correlated with trust in the national parliament (r=.9, p <.001). Trust in the legal system arguably means that the authorities can be trusted in terms of protecting personal and property rights, equality before the law, and that politicians or interest groups are constrained in their powers. Politicians constitute and represent the parliament, but have also individual agendas and responsibilities, adding a personal note to trust in the parliament (or the legal system), which is in essence trust in an (impersonal) authority or a system. In column (1) of Table 2.4, trust in the legal system is significantly correlated with tax compliance. In columns (2) and (4) this is the case for the respective deterring instrument and the interaction term. Confidence in politicians is significantly positively associated with tax compliance in column (2), as are deterrence (tax administration expenditures) and the interaction term. In the other specifications the variables of interest fail to reach statistical significance.

2.5 Discussion and concluding remarks

The literature recognizes two major determinants of tax compliance: deterrence and voluntary tax payments. While increasing importance is attributed to the latter driver, the broad public seems to favor a "law and order" approach towards (potential) tax evaders. Deterring misconduct and the intrinsic motivation to

voluntarily follow laws can be assumed to be closely tied, and Kirchler et al. (2008) were the first to conceptualize these interrelations. The present paper aimed to explore whether high deterrence efforts could contribute to high tax compliance, or whether they may be adversely associated with the voluntary tax payments.

The findings suggest that both determinants are associated with reduced tax evasion, but also that deterrence efforts by the government and a trusting societal environment do not go hand in hand. The more severe deterrence becomes, the smaller is the positive response of tax compliance on an increase in trust towards authorities. The interrelation of trust and power differs with the deterrence instrument used. In low-trusting environments, a larger budget for the tax administration is correlated with a significant increase in tax compliance, which is not the case for coercive punishments for crimes. This notion might speak in favor of the argument brought forward by Gangl et al. (2012): signaling get-tough policies and retaliation is met by distrust; taxpayers wonder if they and the authorities have common goals, even if coercion is not very pronounced. Conversely, investments in the tax administration are seen as a signal that the government wants to impede free-riding to the benefit of the compliant taxpayers. This increases authorities' legitimate powers, at least as long as they do not squeeze deterrence too hard.

A moderate attitude towards penalizing offenses might be the expression of a social contract promoting societal peace, egality, and the idea of social re-integration of offenders. Such values could be understood as trust in citizens' good intentions, which is reciprocated by the taxpayers (synergistic tax climate, see Section 2.2). Coercion could be interpreted as a sign of distrust and retaliation; in essence the "antagonistic" tax climate described by Kirchler et al. (2008). This climate is characterized by a lack of trust, commonly found in Eastern European countries.

Of course, completely waiving tax enforcement would not be applicable, and likely be accompanied by a loss of trust in authorities. Taxpayers might react with increased evasion if they noticed that cooperative behavior and property was not protected against exploiters and free-riders. Dwenger et al. (2016), for instance, show with a field experiment that taxpayers adopt a rational attitude towards tax compliance when a zero-deterrence policy is clearly and transparently conveyed.

Data restrictions limited the sample size in this paper with respect to country-coverage and timespan. Tax non-compliance is concealed behavior and has to rely on (rough) estimates, and neither trust in the tax authority nor the power of authorities is directly and reliably measurable, too. Interesting questions that remain unanswered are whether the results hold for countries worldwide (especially developing economies) and how the interplay of extrinsic incentives and intrinsic motivation will affect tax revenues in the long run.

No causal inferences are drawn in this paper. Trust in authorities and power of authorities are by definition reciprocal. In the SSF, subjective trust is (also) a function of perceived power and vice versa. Consider trust in authorities: high or increased tax compliance might act as a signal towards the government's success in securing revenues to provide goods and services for the public, and for the success in discouraging free-riding at the cost of the society. While feedback cycles between power, trust, and tax compliance come very natural in the SSF's dynamics, potential measurement error is a more severe issue. Trust, for instance, is influenced by an array of personal traits and attitudes, factors which not only contribute to trust but also to tax compliance directly (for example corruption and rent-seeking, tax knowledge, social and personal norms), and by a number of economic surroundings like income or unemployment. Many of these influences are subjective and not observable.

The results in this paper could be also used as a starting point to analyze the role of tax enforcement and voluntary compliance on a more conceptual, public finance level. Tax enforcement and trust in authorities are additional production factors to tax revenue. High trust produces substantial tax revenues, a focus on coercion leads to less tax compliance. Both factors are costly for the government to supply, calling for the derivation of an optimal policy mix. Meanwhile, consuming the two (public) goods might be connected to contradicting behavioral responses on behalf of the taxpayers, leading to distortionary taxation in both cases.

Appendix Chapter 2

Table A2.1: Sources and Descriptions of the data

Variable	**Source**	**Description**
Tax Compliance = 100% - VAT-Gap	CASE Network Reports 2013, 2014, 2016	VAT-Gap: Difference between the estimated, theoretical tax liability in a country and the actual VAT (Value Added Tax) revenue collected, as a share of the theoretical tax liability.
Trust in authorities	European Social Survey (ESS)	ESS Rounds 1-7; Individual answers on how high is "trust in parliament", on a scale from 0 (no trust at all) to 10 (complete trust).
Deterrence (budget of the tax administration)	OECD (2015)	Expenses on the national tax administration in % of GDP
Deterrence (incarceration rates)	Institute for Criminal Policy Research (ICPR)	Prison population rate (per 100,000 of national population)
Per-capita GDP	World Bank	In PPP-dollars.
Unemployment rate	World Bank	Unemployed among the total labor force, in percent
Value Added Tax (VAT) rate	CASE (2013)	Full rate in a country in a given year. Reduced rates and exemptions are not considered.
Size of the service sector	Eurostat	Percentage of GDP.
Budget deficit	Eurostat	As a percentage of GDP
Satisfaction with government	ESS	ESS Rounds 1-7. Individual answers on a scale ranging from 0 (none) to 10 (full).
Trust in the legal system	ESS	ESS Rounds 1-7. Individual answers on a scale ranging from 0 (none) to 10 (full).
Trust in politicians	ESS	ESS Rounds 1-7. Individual answers on a scale ranging from 0 (none) to 10 (full).

Table A2.2: List of countries

Country	**Number of observations**	**Mean Tax Compliance (%)**	**Mean % of trusting population**	**Mean incarceration rate**	**Mean expense on tax administration (% of GDP)**
Austria	4	89.25	70.95	100.75	0.15
Belgium	7	87.71	73.55	94.71	0.33
Bulgaria	4	86.50	25.84	134.00	0.23
Czech Rep.	6	78.67	44.57	189.17	0.19
Denmark	7	90.29	87.20	68.43	0.33
Estonia	6	85.33	60.72	278.83	0.18
Finland	7	89.43	84.40	64.26	0.20
France	7	85.43	64.39	95.14	0.23
Germany	7	88.29	64.91	86.57	0.28
Greece	4	72.75	53.67	90.75	
Hungary	7	75.14	52.31	164.57	0.35
Ireland	7	91.00	60.15	84.00	0.24
Italy	2	74.00	60.06	103.50	0.25
Latvia*	1	74.00	21.02	299.00	0.34
Lithuania	3	62.00	36.86	306.67	0.15
Luxembourg	2	88.50	85.57	108.00	0.27
Netherlands	7	94.29	80.70	103.67	0.36
Poland	7	83.29	39.54	214.43	0.27
Portugal	7	90.43	49.47	122.14	0.25
Romania*	1	63.00	52.74	128.00	0.22
Slovak Rep.	5	69.20	50.19	173.20	0.19
Slovenia	7	92.29	50.82	63.43	0.28
Spain	7	89.71	67.68	144.86	0.13
Sweden	7	96.00	84.24	71.71	0.18
United Kingdom	7	88.00	62.41	146.86	
Average	5.44	85.77	61.81	128.27	0.25

Note: *: countries with only one observation are omitted in the within-country analysis for statistical reasons.

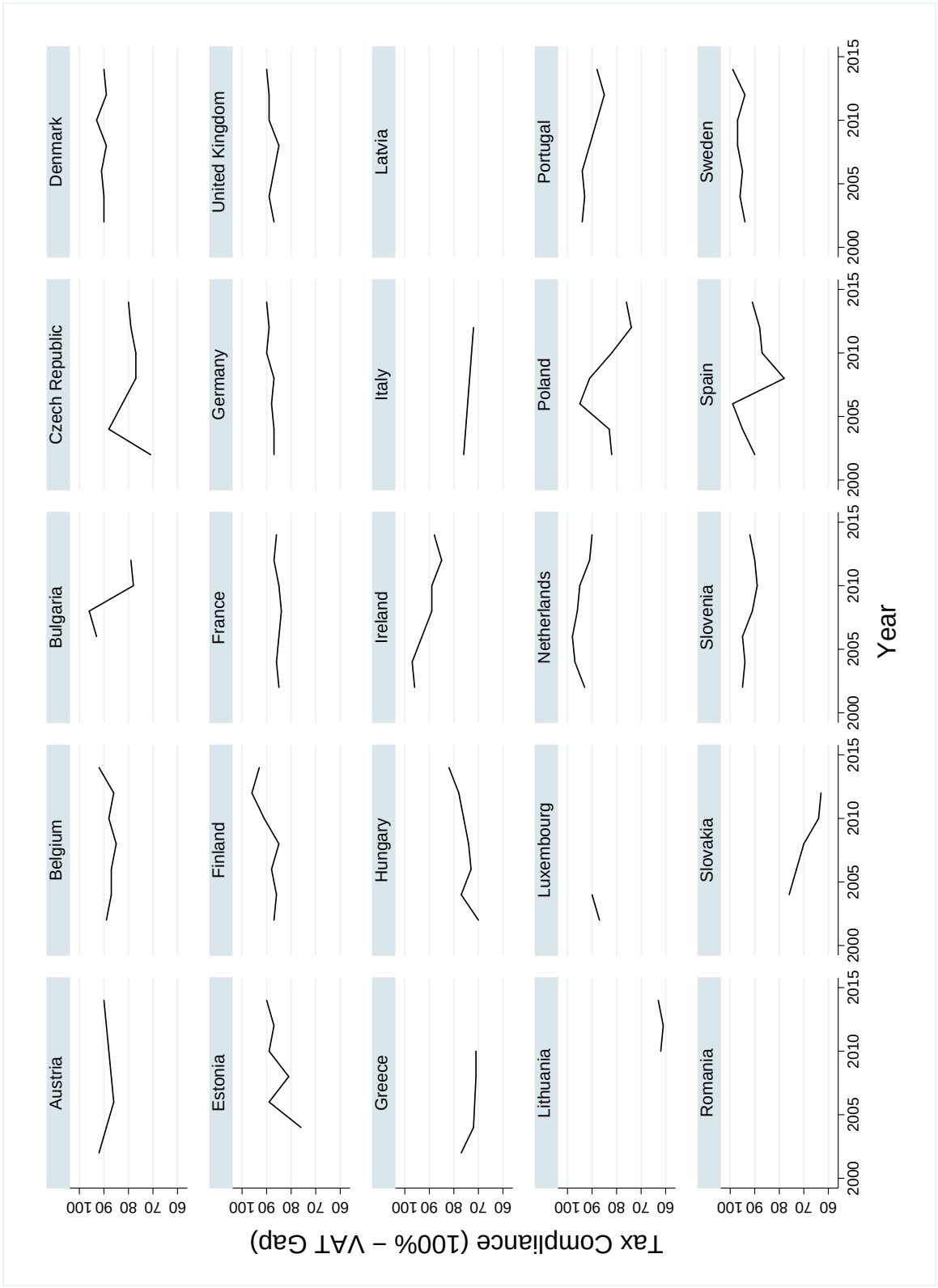
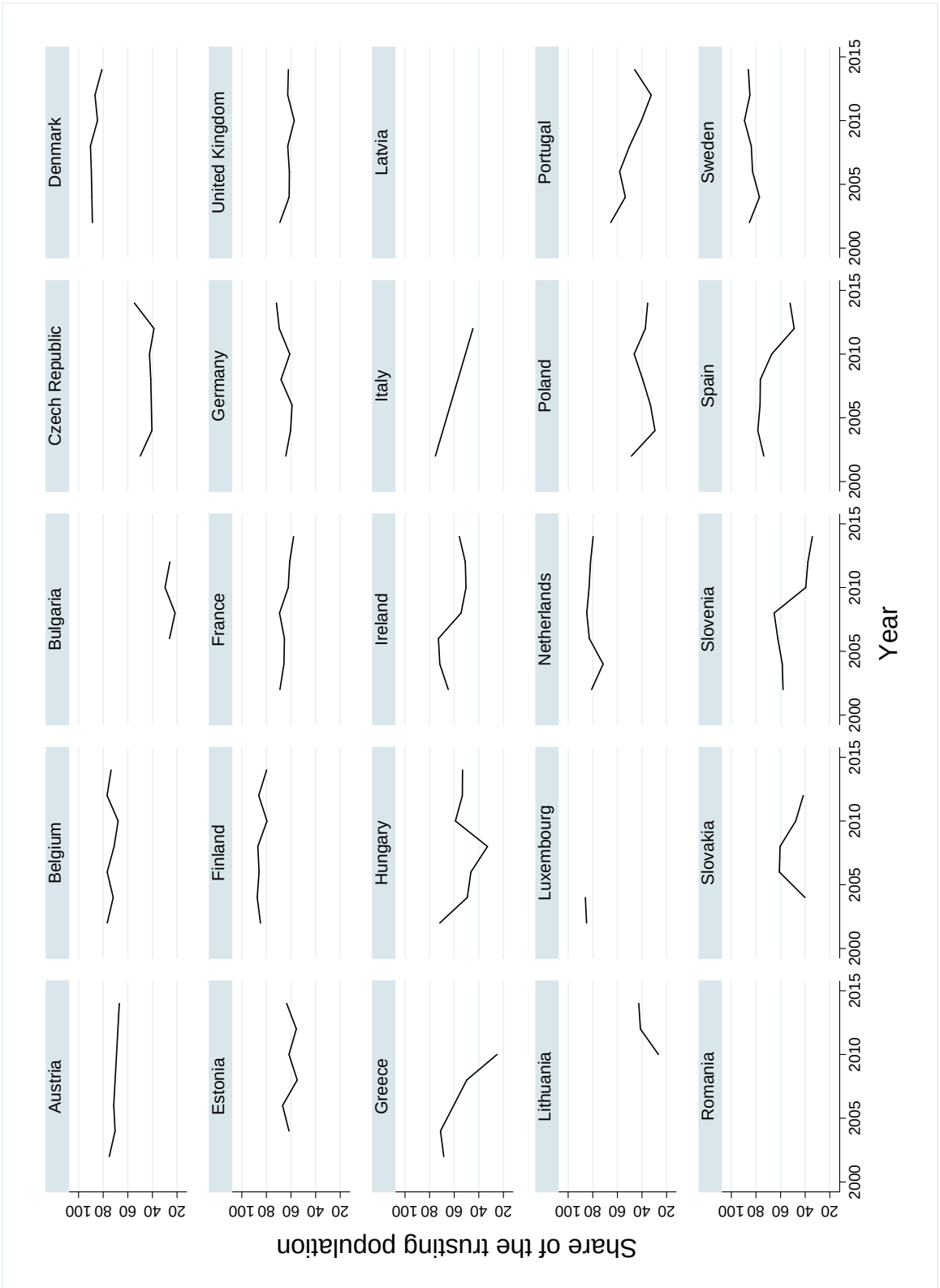


Figure A2.1: Tax Compliance within countries over time

Figure A2.2: Trust in authorities within countries over time



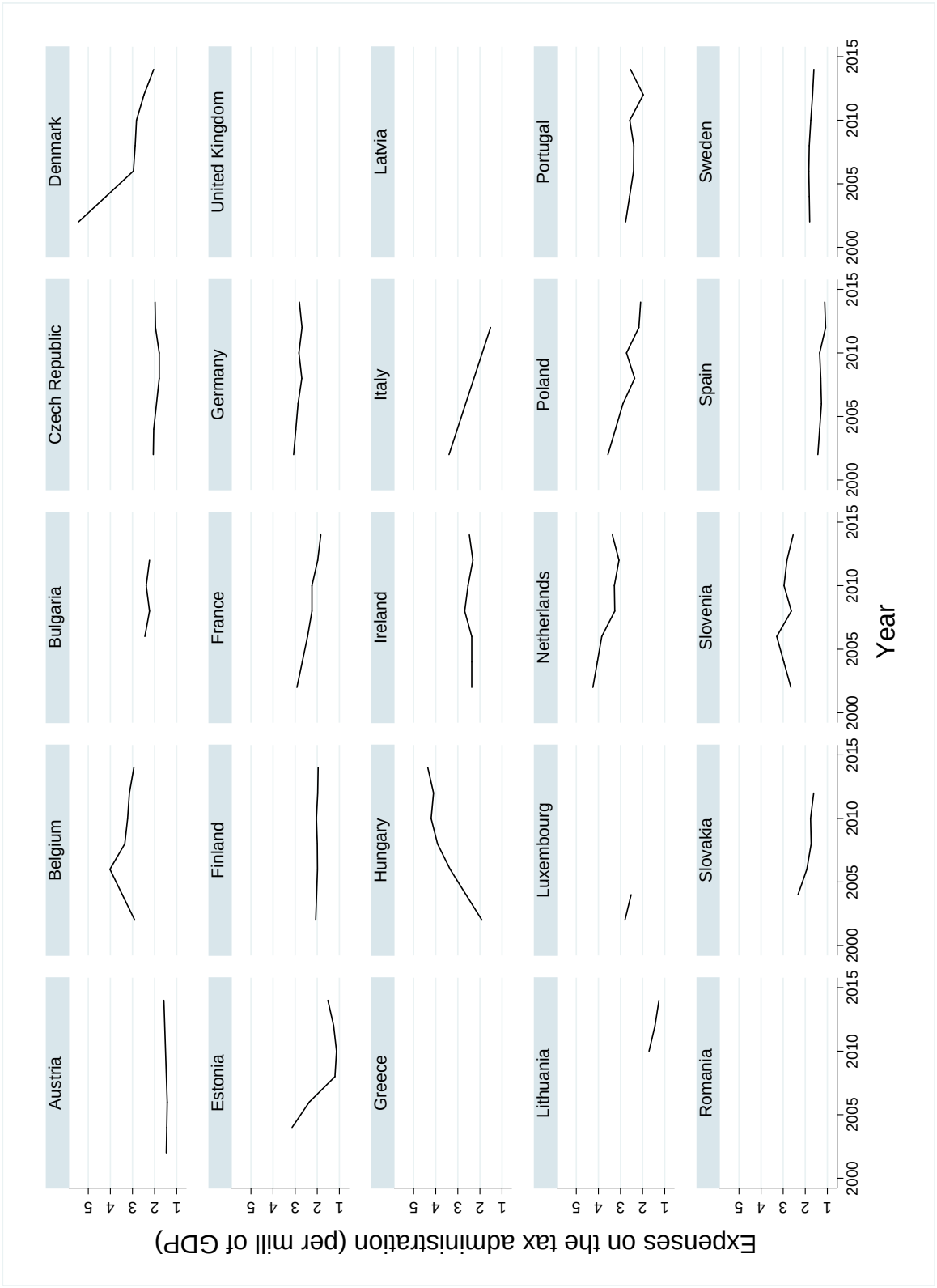
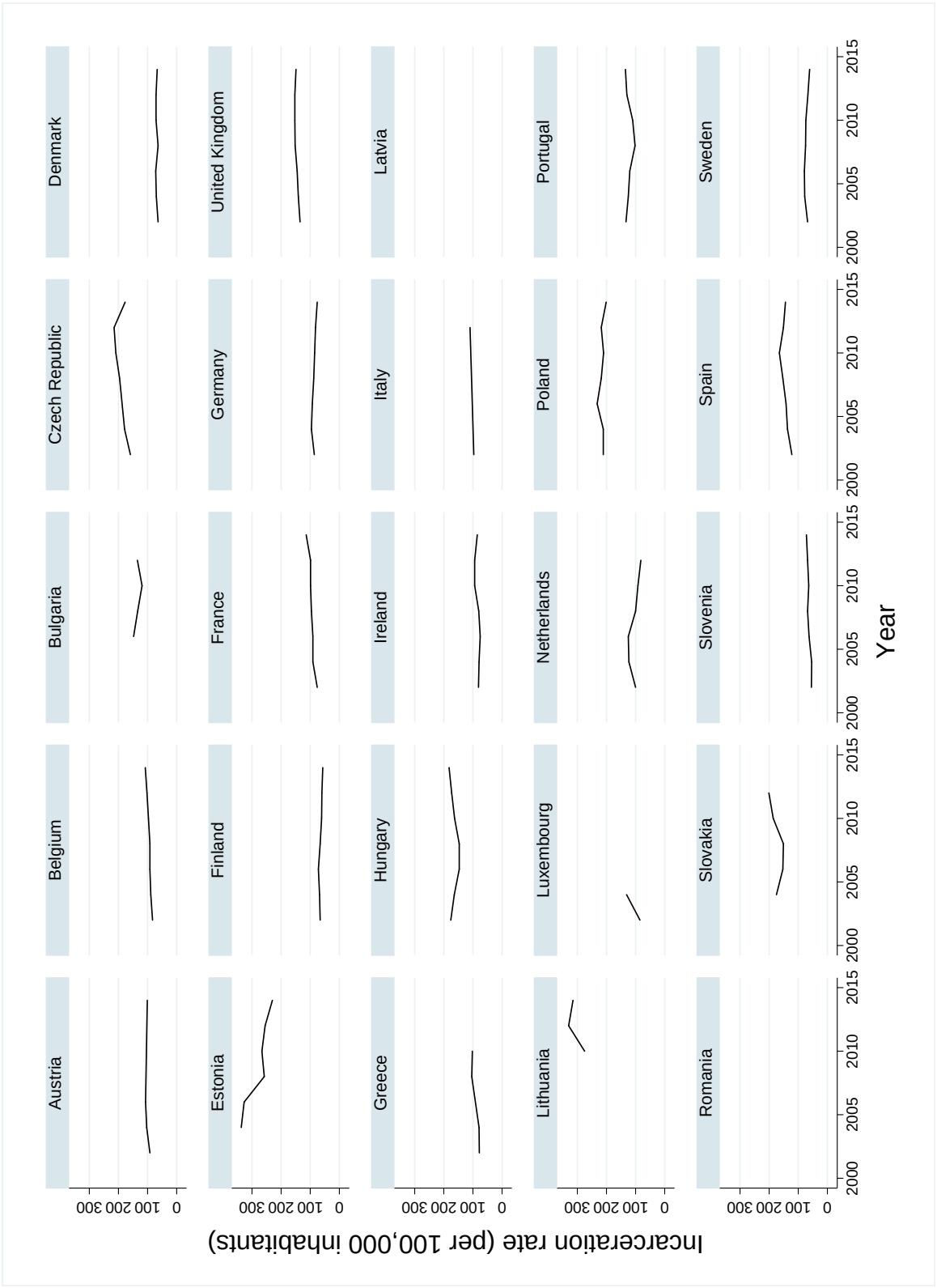


Figure A2.3: Tax administration expenses within countries over time

Figure A2.4: Incarceration rates within countries over time



Chapter 3

Bringing Tax Avoiders to Light: Moral Framing and Shaming in a Public Goods Experiment[1]

3.1 Introduction

Over the past years, the media has repeatedly reported on large-scale tax avoidance schemes by firms and wealthy individuals, often assisted by wealth management firms and the professional classes. Some of the reported activities may constitute criminal tax evasion, fraud, or money laundering – but most seem perfectly legal. Still, the press and the wider public judge their escape from taxes as morally reprehensible, opportunistic and disreputable. The incriminated persons may not have violated any law, but their behavior is seen as debasing the spirit of the tax law for the sake of personal gains. The broad media coverage has not only

[1]This chapter is co-authored by Andreas Wagener (†). We acknowledge funding by the German Research Council (DFG) in its RTG 1723 "Globalization and Development". This paper was presented at the "Finanzwissenschaftlicher Workshop" in Goettingen (2017), the RGS Doctoral Conference in Essen, the ZEW Public Finance in Mannheim, the 2nd GlaD conference in Goettingen, the Annual IIPF Congress in Tampere, and the annual meeting of the "Verein für Socialpolitik" in Freiburg im Breisgau (all in 2018). We are grateful to Kay Blaufus, Sarah Ciaglia, Björn Jahnke and Susan Steiner for insightful discussions. We thank Michael Milde for technical and organizational support.

brought that behavior to light but it overwhelmingly also issued a devastating moral verdict. For the politicians, sports stars, artists or business people who were pilloried for tax avoidance, the unprecedented and embarrassing publicity damaged their reputation – and the shaming might deter them and others in the future.

These recent developments exemplify two insights: first, socially cooperative behavior often cannot be fully formalized in laws, legislated and judicially enforced. Rather it requires a specific "morality" – a sense of virtue and decency, of duty and civic obligations – or a normatively "right" demeanor. Appeals to this morality may positively affect individuals' pro-social behavior. Second, to reinforce or induce socially warranted behavior, informal reputational mechanisms – for example the naming and shaming of alleged tax dodgers – may play an important role. The experience or already the fear of being visibly identified to the general public or to one's peers as non-cooperative and opportunistic can make individuals act more cooperatively.

Although often working together, moral loading and shaming are two distinct triggers for cooperative behavior. While a number of things are known about how these triggers work separately – moral framing through subtle nudges rather than by direct cues, and shaming through blatant exposure – their joint effects are still scarcely studied (see Section 3.2). Which one is stronger? Can they reinforce each other, or does one behavioral trigger crowd-out the other?

In this paper, we report an experimental study that separates and interacts the two triggers and analyzes their differential impact. Our experiment consisted of a public goods game that was played with two different but equivalent (at least within standard economic logic) descriptions: first, in a neutral form as a voluntary contribution mechanism and, second, as a morally loaded tax avoidance game where not paying taxes is presented as a legally adequate but possibly socially questionable behavior. Either variant was played both with and without shaming, i.e., disclosing to the other players the names and pictures of individuals whose contributions fell short of what is socially warranted.

We, first, show that shaming is an effective reputational mechanism towards socially cooperative behavior: with disclosure of an individual's lack of cooperation, contributions are between 60 to 120 percent higher than in treatments without disclosure. Both for the neutral and for the morally loaded setting we find that when shaming looms, participants seek to avoid it. The differences become smaller in later rounds, but remain significant until the end of the experiment.

Second, moral loading also increases pro-social behavior significantly. However, its impact pales against the shaming effect – and it evaporates and becomes insignificant in later stages of the experiment. In an extension to our initial 2×2 design we find further evidence for the principal effectiveness of moral loading: without framing tax avoidance as morally debatable, cooperation is similar to undisclosed voluntary contributions, while shaming is less abundant when tax avoidance was not morally loaded.

In sum, (the threat) of disclosing unwarranted behavior is an effective strategy for reducing tax avoidance and, more generally, for promoting pro-social behavior. The communication of moral arguments also works but is less effective and, once a shaming mechanism is in place, has no noticeable effect.

In the following, Section 3.2 of this paper reviews literature on relevant aspects of our topic. Section 3.3 outlines our hypotheses. Section 3.4 describes the experimental design in detail. Section 3.5 contains the experimental protocol and summary statistics of our sample of participants. In Section 3.6 we present and interpret the main results of our experiments. Section 3.7 concludes.

3.2 Related Literature

Framing. In our experiment we introduce framing by rephrasing an economically equivalent decision from a voluntary contribution to a tax payment. Public goods games are one point in case to show the efficacy of framing, for example by describing positive vs. negative externalities (Andreoni, 1995) or outcomes (Sonnemans et al., 1998; Boehm and Theelen, 2016), or by framing a community game as a stock market game (Ellingsen et al., 2012).

Studies relying on lab experiments also document that *moral motivations* generally matter when people make decisions (see, e.g., Fehr et al., 2013). A central objective of our experiment is to frame the question whether to avoid taxes or not as a moral duty and a civic obligation. We opt for a very salient moral appeal that informs and debates tax avoidance, but leaves broad liberties to participants on how to judge tax avoidance (see Section 3.4 for a detailed description). Thus, we decide against simple moral suasion or stating a behavioral rule, which find inconclusive support in lab experiments (see Luttmer and Singhal (2014) for a review) and field experiments on tax compliance.

For example Blumenthal et al. (2001) and Meiselman (2018) sent normative appeals to taxpayers in Minnesota respectively to non-filers in Detroit and found that such appeals had no effect, while messages on penalty salience and compliance costs raised taxed income. Hallsworth et al. (2017), in a large-scale field experiment in the UK, find that e.g. mentioning that most taxpayers are compliant has a significantly larger effect on payments of overdue taxes than norms appealing to social responsibility. Dal Bó and Dal Bó (2014), in a lab experiment, found positive but very short-lived effects of moral suasion.

A smaller number of field experiments find positive effects of moral appeals: Fellner et al. (2013) tested the effects of moral appeals on compliance with a mandatory but poorly enforced fee for public broadcasting in Austria. Moral appeals to pay the fee had a positive effect in municipalities where evasion was common. Bott et al. (2017) find that when tax authorities in Norway included a moral appeal in letters to potential tax avoiders, this on average doubled the self-reported foreign income.

Taxpaying might not only imply a moral duty, but at the same time also a *legal obligation* – even if the law is not enforced or when there are ways to legally circumvent it. Framing behavior as "illegal" arguably gives strong behavioral cues. In a lab experiment on tax paying, Blaufus et al. (2016) show that an economically equivalent decision was treated differently when it was framed as (admissible) tax avoidance versus (illegal) tax evasion. In the evasion scenario tax minimization was less pronounced, but the differences vanished once pecuniary consequences were introduced. Tyran and Feld (2006), in a lab experiment,

observed that exogenously imposed penalties did not raise cooperation when they were non-deterrent.[2] However, endogenously imposed sanctions did increase pro-social behavior.[3]

Shaming. Abandoning anonymity in economic games has increasingly attracted attention in recent years. In line with our results, most studies find large positive effects on contributions, and attribute this to the fear of being publicly called out and shamed for failing to cooperate.

In *neutral Public Goods Games*, e.g. Andreoni and Petrie (2004) used pictures to make donors and their contributions identifiable to fellow group members. Such visual identification led to significantly increased contributions to the public good. Interestingly, donations were highest when disclosure was a deliberate choice. Savihin Samek and Sheremeta (2014) displayed pictures plus names of participants who contributed less than the maximum possible amount to a public good. They observed significantly increased contributions resulting from this treatment. Rege and Telle (2004) conducted a one-shot public goods game where participants could constantly observe each other. This treatment significantly increased cooperation, but Noussair and Tucker (2007) show that this effect is not upheld when the game was played sequentially over 20 rounds. Bochet et al. (2006) dissolved anonymity by allowing face-to-face communication and chat-boxes. Participants who met and talked before the actual experiment started made significantly larger contributions than the anonymous control group. In field experiments, Ariely et al. (2009) and Ashraf et al. (2014) find that prosocial behavior increases considerably when individual effort is displayed publicly, relative to a control condition where effort remains private.

The effects of disclosure have also been studied in the context of *tax evasion*. Blaufus et al. (2017) and Casal and Mittone (2016) had public goods games played without confidentiality in a tax evasion setting; not declaring the full endowment

[2] For a local church tax in Bavaria with historically zero audits and fines, Dwenger et al. (2016) show that deterrence reduces tax evasion only by a fairly modest extent. Most tax payments seem to be driven by duty-to-comply preferences.

[3] Drouvelis et al. (2015) used a word-search puzzle with words related to collective action to *prime* cooperative behavior. In their public goods game, contributions among primed subjects were around 11 percentage points higher than in the control group.

(or income) was monetarily sanctioned if detected. Both studies find a positive effect of the picture treatments on tax-declared income. Casal and Mittone (2016) varied their experiment such that participants in one treatment got the option to pay for remaining anonymous. This option was frequently used and led to more abundant tax evasion. Fortin et al. (2007) and Coricelli et al. (2010) studied the effect of disclosure on tax evasion without the inclusion of a public good. Both studies find that disclosure led to significantly less tax evasion although such behavior did not harm others. Additionally, Coricelli et al. (2010) find that cheating was accompanied by emotional arousal under the threat of being publicly revealed. Alm et al. (2017), in a lab experiment on tax evasion without anonymity, distinguish between the decision to participate in tax evasion and between the amount evaded. They find that shaming foremost deters participation in tax evasion, and that shaming works regardless of differing social norms on compliance.

Our disclosure treatments also connect to *"real-world" shaming practices*: Dwenger and Treber (2018) analyze a recently implemented naming-and-shaming policy in Slovenia where tax delinquents (self-employed and corporations) were put on a publicly available list. The authors show that the threat of being placed on this list led to a reduction in tax debt by around 8.5%, whereas the effects of actually being shamed were comparably marginal. Bø et al. (2016) exploit a policy change in Norway in 2001, when information on tax returns became available on the internet. Following the policy change, reported taxable income increased by roughly three percent. Since the effect was largest in densely populated areas, Bø et al. (2016) conclude that it was driven mainly by the wish to avoid media attention or public shaming. Perez-Truglia and Troiano (2015) find evidence for reduced tax evasion in the US when tax delinquents were shamed by informing their neighbors. Hasegawa et al. (2013) find that Japanese taxpayers close to a threshold demanding for disclosure of individual tax returns systematically under-reported income so as to avoid public disclosure.

Interacting non-pecuniary triggers. Our experiment complements a small literature (albeit on distributive behavior) that disentangles and interacts different behavioral motivations for pro-sociality. Dellavigna et al. (2012) find that for in-

dividuals to make donations in a door-to-door fund-raising campaign, both moral motives and social and (self-)image motives are in fact at work. This is in line with what we find, too. Cappelen et al. (2017) study whether pro-social behavior, in the form of giving in a dictator game, is motivated by (intrinsic) moral or by (extrinsic) social motivation; the latter is manipulated by disclosing to recipients whether or not their money comes from a subject in a dictator experiment. The moral motivation is found to have a strong effect while the social motivation only matters when a moral motive justifying the behavior pre-exists. Hence, while social motivation is crowding-in with moral motivation, it becomes less relevant when there is no underlying moral argument for sharing. Our findings (derived in a tax compliance context) point into a different direction: social motivation may be effective, but "name and shame"-programs targeting tax avoidance would trump them.

3.3 Hypotheses

The previous section concluded that relying on simple moral appeals (e.g., stating behavioral or "golden" rules) to steer behavior finds rather inconclusive support in the literature. In our experiment we aim to frame reconsideration towards the morality of pursuing personal gains in a way that goes beyond presenting a straightforward behavioral rule. We combine the tax frame with a moralizing mock "newspaper commentary" which should trigger an implicit (moral) duty to comply when generally effective legal norms are not applicable. Without any sanctions in place, we assume that there is still a strong incentive to free-ride. Observing others' noncompliance should corrupt moral obligations in the long term:

Hypothesis I (Moral framing Effect): *When framing non-cooperation as morally debatable tax avoidance, contributions (or now, tax payments) will be significantly higher than in the baseline setting. We do not, however, expect moral framing to be binding.*

The literature review showed that the disclosure of non-cooperation led to significantly increased contributions (tax payments) regardless of whether voluntary contributions, tax evasion, or overdue tax payments were studied. Thus, in our experiment, we predict that (the threat of) disclosing pictures and information on individual's failed cooperation to act as a social punishment: being called out – and implicitly described as anti-social – reduces the temptation to reap personal gains through free-riding.

Hypothesis II (Shaming Effect): *When less-than-full compliance becomes publicly known, contributions to the public good/tax payments will be significantly higher than in the cases where decisions are not disclosed.*

This mechanism should work both in the neutral and in the framed setting. In the former case, free-riding means harming the group for personal gains. In the latter setting, tax avoidance additionally means visibly breaking the unwritten call to pay (all) taxes. Regardless of the scenario, we expect the differences between non-disclosing and shaming treatments to be sizable and long-lasting. Some participants might be ready to reveal themselves as free riders as the experiment goes on, but we do not figure contagion to be as widespread as to make the shaming effect disappear.

Our study is one of the first experiments that combines disclosure and moral framing. This shaming-moral framing interaction has different conceivable outcomes. The (threat of) shaming could be stronger when cooperation is felt as a moral duty that would be violated. Conversely, moral cues are perhaps more binding when disclosure could harm participants' reputation. For the combination of our non-pecuniary triggers moral framing and shaming we expect the following:

Hypothesis III (Interaction Effect): *Framing and shaming interact and influence each other. Specifically, we expect a positive interaction effect where the concurrent presence of moral framing and shaming has a greater impact on contributions than the two main effects alone.*

3.4 Experimental Design

Our 2×2 experimental design consisted of a linear public goods game played in four variants. Each variant drew on an identical contribution mechanism and identical payoff functions: each participant was provided with an endowment of $E = 100$ Experimental Currency Units (ECU). Of these 100 ECU, between zero and 40 ECU could be invested into a productive public venture.[4] The remaining ECU were going to a private account that did not yield any returns.[5] Groups consisted of $N = 5$ members and were fixed in composition over the ten rounds of the experiment.

Table 3.1: Experimental design

	No disclosure	Disclosure
Voluntary contribution	Baseline	Shaming
Tax avoidance	Moral framing	Moral framing×Shaming

The experimental payoffs for player i were $\pi_i = E - x_i + g_i$, where $x_i \in [0, 40]$ denotes the contribution to the public venture by player i and g_i is player i's payoff from the public account. This return is given by $g_i = (\gamma/N)(x_i + X_{-i})$, where X_{-i} is the sum of investments to the public good by the (four) other group members except player i, and γ is an efficiency factor (rate of return) of the public good. We chose $\gamma = 1.5$ in all treatments. The parameters described here resulted in the payoff matrix depicted in the instructions (see Appendix 3.C).

The type of treatment depended on whether there was moral framing, disclosure of low contributors, both, or none (baseline). This resulted in the 2×2 experimental design sketched in Table 3.1.

[4] The choice was discrete and made in steps of 5 ECU.

[5] We use the 60:40 split to simulate a (maximum) tax rate of 40 percent in our framed experiments (see below).

Moral framing. In the treatments *Moral framing* and *Moral framing×Shaming*, the public goods game was framed as a tax avoidance game with the moral loading that taxes are actually meant to be paid. As a lesson from the extant literature on the (in-)effectiveness of moral cues (see Section 3.2), we opted for a highly salient framing that still leaves high liberties to individuals what to do and how to judge. First, we altered the wording of the public goods game in the instructions. We replaced "endowment" by "taxable income" and "contribution" by "tax payments". The neutral option to invest up to 40 ECU into a profitable public project was changed into a linear income tax of 40% that *should be* paid and would finance a public project. Individuals had the option to reduce their personal tax burden by choosing any lower tax rate than the 40% stipulated by the law. We explicitly mentioned that this possibility was legal tax avoidance and not accompanied by any monetary punishments.

To make participants consider the moral dimension of their choices we presented to participants a short text on screen, laid out as a newspaper commentary.[6] Under the headline "Tax avoidance is legal, but can it ever be legitimate?", the text briefly defined tax avoidance as a legal way to reduce one's personal tax burden that might still not have been intended by the government. Thus, we insinuated that tax avoiders would not act in the spirit of the law, even if they technically did not violate it. Towards the end, we reminded readers that tax avoidance is a personal decision; whether it was seen as socially justifiable was deliberately left to participants' own judgment. Figure A3.1 in Appendix 3.A shows the newspaper commentary in German as well as its English translation.

Disclosure. After investment decisions, information on the own payment, the sum of the investments in the group, and the individual payoff in the respective round were presented to participants in all four variants of the game. In the treatments *Shaming* and *Moral framing×Shaming*, this information was followed by the photographs and the actual investment of those group members who con-

[6]The text was written by us, presenting a representative view of commentaries in German media following the Panama Papers leak. Presenting an actual commentary would not have satisfied this requirements, and even could have biased behavior by a specific political view of the media outlet.

tributed less than the possible 40 ECU or paid less than 40% taxes on their income. All group members were provided with the same information. Full contributions meant complete anonymity. That is, group members who did not free-ride were never mentioned. Figure A3.2 in Appendix 3.A shows the disclosure screen. If all group-members chose "40 ECU", a note reporting this outcome was displayed on the screen.

3.5 Experimental Protocol

The experiment was conducted at the computerized laboratory (LLEW) at the Leibniz University Hannover in August and September 2017. Participants were recruited from the general student population with the software hroot (Bock et al., 2014). A total of 215 subjects (112 male, 102 female, one subject made no statement) participated in the experiment. Earnings averaged around 11 Euro in approximately one hour. Additionally, participants received a lump-sum show-up fee of 4 Euro. We conducted 16 sessions and attempted to have 15 participants (i.e. three groups of five) in each session of our four treatments. Since a few invited students failed to show up, we ran three treatments with 10 participants in one of the sessions (N per treatment was 55) and the Baseline with 10 participants in two of the four sessions (N=50). The experiment was programmed with z-Tree (Fischbacher, 2007).

Before the start of a session, one of the four treatments was randomly selected and then played by all participants in that session. Subjects were randomly seated and then matched (according to their seat number) to groups of five by the experimental software. The participants' photos were taken right before the instructions (see Appendix 3.C) were handed out. To avoid differential expectational effects, we took photos also in the two treatments where decisions would not be disclosed. Participants gave written consent to shortly saving and potentially using their photo in the experiment (Appendix 3.C). If a subject would not sign the consent form, he or she was not permitted to participate but still received the show-up fee. This only happened in one case.

Before playing the experiment, participants had to answer a short computer-based comprehension test (Appendix 3.C). In the treatments framed as a tax avoidance game, the newspaper comment was presented to the subjects on-screen for two and a half minutes before the first decisions were made.

Table 3.2: Summary statistics of individual characteristics

Variable	Mean	Median	Standard deviation
Female	48%		
Economics Major	21%		
Bachelor degree	35%		
Employed	36%		
Tax declaration	62%		
Age	24.18	24.00	4.62
Income	344.53	300.00	257.87
Semester	7.03	6.00	4.01

Notes: Total number of subjects is 215. "Economics Major" indicates whether a subject studies economics or management. "Bachelor degree" takes the value of 1 if it is the subject's highest educational degree. "Employed" indicates whether a participant holds a job besides studying. "Tax declaration" takes the value of 1 if the subject has at least once in life filed a tax declaration. "Income" is monthly disposable income after deducting all fixed expenses.

After the last decision had been made in round 10, the payoff of one round was randomly selected and paid in cash to the participants. Before payouts, we asked participants to answer a short socioeconomic questionnaire. The subjects' socio-demographics are summarized in Table 3.2: Our sample is quite balanced between female and male participants.[7] A relatively low share of 21% of participants was enrolled in an economics major program. 23% of the sample studied at the department of philosophy, 19% in an engineering-related major, and 12% were enrolled in a natural science program. With these numbers our sample represents quite a good cross-section of the student population in Hannover.

[7]Summary statistics separated by treatment can be found in Table A3.1 in Appendix 3.B.

3.6 Results

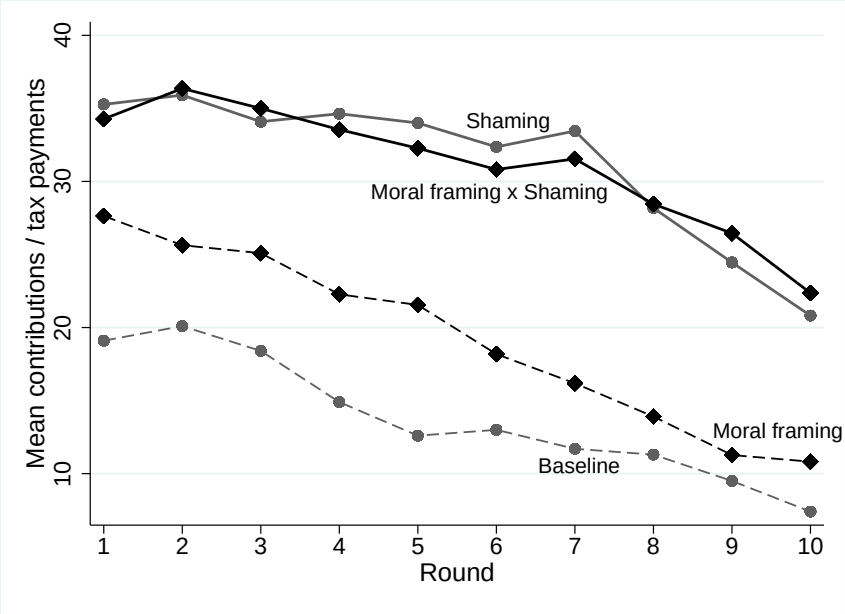
Our analysis focuses on two variables of interest: contributions to the public good (tax payments, respectively) and the share of participants who are fully compliant, i.e., who invest the maximum possible amount of 40 ECU into the public good. While the latter variable may not be very informative in a pure VCM game without disclosure, it becomes meaningful for the treatments. First, in the tax frame with its implicit call for full compliance, the decision on how much taxes to pay could be predated by a binary decision whether to avoid or not (see Alm et al. (2017) for a related approach). Second, as we chose to disclose pictures as soon as a person invests less than 40 ECU, full compliance is tantamount to keeping an untarnished reputation.

3.6.1 Descriptive analysis and ANOVA

Contributions. In the baseline, contributions to the public good on average amounted to 13.8 ECU over all rounds of the experiment. When pictures were disclosed in the neutral setting, average contributions rose by 126% over baseline to 31.3 ECU. With *Moral framing*, investments rose to 19.25 ECU, an increase of almost 40% over baseline. In the joint *Moral framing*×*Shaming* treatment, average tax payments were 31.1 ECU – an increase by 62% relative to *Moral framing*, but no improvement over *Shaming*.

Figure 3.1 shows how average individual contributions (tax payments) developed over time in the four treatments. In line with other public good games, participants contributed roughly half of what they could in the first three rounds of the baseline. The average investments dropped by around 10 ECU in the last three rounds, compared to the earlier stages. Overall, initial investments into the public good were noticeably higher in the framed treatment without disclosure: with *Moral framing* participants paid 65% of the due taxes in the first three rounds. In the final rounds, tax payments decreased by 14 ECU, approaching the numbers in the baseline.

Figure 3.1: Contributions/tax payments over time.



Between framed and unframed games with disclosure (solid lines), almost no differences are visible. Over the first seven rounds, payments were relatively stable at levels between 30 and 35 ECU. After round 7, contributions plummeted to slightly above 20 ECU in the last round.

On average, 25% of participants in the treatment *Moral framing* fully paid their taxes. This more than doubles the 12% reached in the baseline, where no moral duty was implied. With disclosure of decisions, average full contributions/tax payments are again very similar with and without framing: 68% [69%] of participants invested 40 ECU into the public good with *Shaming* [*Moral framing*×*Shaming*], which is a large increase over the baseline.[8]

ANOVA. In the first round of the experiment the 215 participants had no information of their fellow group members' decisions. Contributions in Round 1

[8]Figure A3.3 in Appendix 3.B shows time-series graphs for the share of full contributors in the four treatments. Interestingly, 42% of the participants in the *Moral framing* treatment did initially not cut their tax payments, although this would not have met with any consequences. This is a strong increase over the 18% in the baseline. However, the differences disappear almost completely in the last three rounds.

can thus be treated as independent, allowing for an ANOVA on the individual level as a first test towards the validity of our three hypotheses. In Round 1 we find significant main effects for *Moral framing* (F (1, 211) = 4.25, $p < .04$) and *Shaming* (F (1, 211) = 38.94, $p < .001$). We also find a significant interaction between shaming and moral framing, the effect size (F (1, 211) = 6.81, $p = .001$) lies above the framing main effect, but is trumped by the impact of shaming. Because the sum of the main effects is clearly larger than the interaction effect, we infer a negative interplay: shaming suppresses and dominates moral concerns. Post-ANOVA regressions show that introducing moral framing led to an increase in contributions (averaged over both states of disclosure) of 8.54 ECU ($p = .001$), while shaming led to an average increase in contributions of 16.17 ECU ($p < .001$).

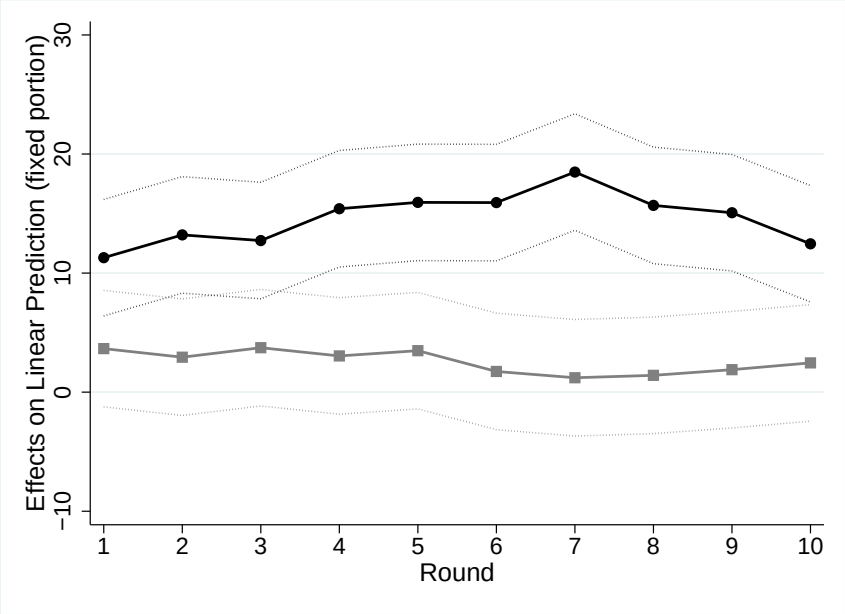
From Round 2 onwards, participants gathered information about others' behavior. Because individual decisions can no longer be assumed to be independent, we report an ANOVA for the 43 independent groups in the experiment for rounds 2-10. We generally confirm the result from round 1 and find significant main effects (Moral framing: F (1, 383) = 5.48, $p = .02$; Shaming: F (1, 383) = 199.35, $p < .001$) and the interaction effect (F (1, 383) = 6.03, $p = .015$).

To accommodate the fact that the size of the group account will be heavily influenced by observing others' decisions, we also report post-estimation ANOVA style tests of a mixed-effects linear regression for Rounds 2-10 with the 43 groups as random intercepts. Now, the moral framing ($\chi^2 = 1.07$, $p = .30$) and the interaction effect ($\chi^2 = 1.25$, $p = .26$) become insignificant. This could be seen as a signal that perceived morality of behavior is strongly influenced by others' actions. However, the threat of shaming proves to be an effective tool to enforce cooperative behavior ($\chi^2 = 33.59$, $p < .001$). Over the experiment's first three rounds, framing ($\chi^2 = 3.08$, $p = .08$) and the interaction effect ($\chi^2 = 2.87$, $p = .09$) are statistically significant.

Round effects. Not only the affiliation to a fixed group, but also the rounds played in the experiment will likely influence participants' decisions. We additionally ran a multilevel mixed effects model where we interacted moral framing, disclosure, and their interaction with the rounds played in the experiment. We

again use the 43 groups as random intercepts and report ANOVA-style hypothesis tests. The time passed in the experiment itself ($\chi^2 = 303.04$, $p < .001$) and the round-shaming interaction ($\chi^2 = 15.42$, $p = .08$) have a (large) impact on contributions. The moral framing-round interaction as well as the triple interaction are statistically insignificant.

Figure 3.2: Marginal effects of framing and shaming per round



Black line with circle markers: disclosure (averaged for both states of framing). Gray line with square markers: framing (averaged for both states of disclosure). 90% confidence intervals are depicted.

Figure 3.2 is a graphical representation of these results. The rounds played in the experiment have no significant impact on decisions in the framed treatments (averaged over both states of disclosure), contributions decrease slightly over time (gray line, square markers). Except for the experiment's first three rounds, contributions/tax payments in the disclosure treatments (black line, circle markers) lie always above those in the framing-scenario. Interestingly, repeatedly observing others' behavior in the group led to increasing contributions/tax payments, peaking in round 7. Only in the experiment's last three rounds, cooperation declined.

3.6.2 Multivariate analysis

Contributions/tax payments. In this section we report regression analyses for our dependent variable *Contribution*, analyzing the separate treatment effects (see Table 3.1). Using contributions as the dependent variable, we ran linear random effects regressions with the subject ID as the cross-sectional variable and the round number as the time variable. Specifically, the model is:

$$\begin{aligned} Contribution_{it} &= \beta_0 + \sum_{k=1}^{3} \beta_k Treatment_i + \beta_4 Round_t + \\ &\quad \sum_{l=1}^{m} \beta_l Controls_i + \varepsilon_{it} + u_i \end{aligned} \tag{3.1}$$

In Equation (3.1), contributions (tax payments) of subject i in round t depend on the assignment to one of the four treatments. The $Treatment$ variable takes a value of 1 if a participant was either assigned to *Moral framing*, *Shaming*, or *Moral framing*×*Shaming*. The Baseline is the reference category. Our treatment dummies are complemented by control variables gathered from the questionnaire at the end of the experiment. In Equation (3.1), u_i is the subject-specific error term, ε_{it} is the corresponding equation error term. To take the group-interdependencies into account we cluster standard errors on the group-level in all specifications.

Column (1) of Table 3.3 only takes into account the treatment dummies. The difference between baseline and *Shaming* is highly significant. The (threat of) disclosure increased contributions by 17.52 ECU over baseline. From Table 3.3 we cannot directly deduce the shaming effect in the tax avoidance setting. Therefore, we report post-estimation Wald-Tests and show that shaming in the framed setting has a highly significant and positive effect on contributions (null hypothesis: *Moral framing* (Mf) = *Moral framing*×*Shaming* (Mf×S). The size of the effect is $17.31 - 5.45$. Displaying pictures of tax avoiders leads to tax payments 11.86 ECU higher than with moral framing. Column (2) introduces the socio-economic control variables (see Table 3.2). Only a few do significantly influence contributions.

Table 3.3: Linear Random- and Mixed Effects Regressions

	(1) RE	(2) RE	(3) ME	(4) RE	(5) ME	(6) RE
Rounds	(1-10)	(1-10)	(1-10)	(1-3)	(1-3)	(8-10)
Moral framing	5.455	5.598*	5.218	7.586***	7.247**	2.372
	(3.428)	(3.100)	(3.334)	(2.895)	(2.997)	(3.019)
Shaming	17.52***	17.29***	16.48***	15.75***	15.40***	14.59***
	(3.394)	(3.126)	(3.453)	(2.214)	(2.326)	(4.185)
M.framing×Shaming	17.31***	16.35***	16.97***	15.51***	15.66***	14.87***
	(3.444)	(3.227)	(3.464)	(2.193)	(2.268)	(4.310)
Age		0.336*	0.141	0.342***	0.263**	0.304
		(0.193)	(0.155)	(0.127)	(0.114)	(0.325)
Female		−0.106	1.553	0.277	0.758	1.639
		(1.591)	(1.027)	(1.592)	(1.574)	(2.141)
Employed		−2.945**	−2.490*	−4.020**	−3.484*	−2.480
		(1.445)	(1.279)	(1.697)	(1.781)	(1.988)
Taxes filed		0.034	−0.429	−0.469	−0.515	−0.594
		(1.344)	(1.123)	(1.614)	(1.603)	(1.675)
Econ. Major		−5.048***	−4.069***	−2.363	−1.923	−6.310***
		(1.906)	(1.557)	(2.102)	(2.160)	(2.261)
Bachelor		2.112*	−0.521	2.506*	1.117	1.076
		(1.188)	(1.144)	(1.300)	(1.351)	(1.654)
Semester		0.084	−0.034	0.027	−0.010	0.173
		(0.208)	(0.177)	(0.199)	(0.199)	(0.275)
Income		−0.006**	−0.007***	−0.007**	−0.007**	−0.005
		(0.003)	(0.002)	(0.003)	(0.003)	(0.003)
Round		−1.584***	−1.584***	−0.386	−0.386	−2.600***
		(0.157)	(0.157)	(0.405)	(0.401)	(0.588)
Constant	13.80***	17.37***	23.33***	15.11***	17.39***	27.70***
	(2.384)	(5.103)	(4.988)	(4.397)	(4.508)	(8.897)
Observations	2150	2010	2010	603	603	603
N	215	201		201		201
R^2-within	0	0.169		0.002		0.059
R^2-between	0.352	0.398		0.320		0.272
R^2	0.201	0.298		0.240		0.218
Wald-Tests						
S = Mf	p<.001	p<.001	p=.002	p=.003	p=.004	p=.003
Mf = Mf×S	p<.001	p=.002	p=.001	p=.004	p=.003	p=.003
S = Mf×S	p=.952	p=.783	p=.894	p=.906	p=.896	p=.957

Notes: The dependent variable is the contribution to the public good/tax payment, measured in discrete steps of 5, with a minimum of 0 and a maximum of 40. Reference is the Baseline. See Table 3.2 for a description of the socio-economic covariates. Some participants did not provide answers for some of the questions. This results in a loss of 14 observations. RE: Random Effects; ME: Mixed Effects. Standard errors, clustered on the group-level, are in parentheses. Wald-Tests are reported. $^{*}: p < 0.1; ,^{**}: p < 0.05; ^{***}: p < 0.01$.

Being employed as well as studying economics leads to significantly less cooperative behavior, older participants contributed significantly more.[9] Contributions with Moral framing are around 5.6 ECU higher (and statistically significant in column (2)) compared to the Baseline.

Column (3) of Table 3.3 estimates a mixed effects model of specification (2) to further (beyond clustering standard errors) account for the influence of observing in-group behavior. The coefficients' magnitude is slightly reduced, while, except for *Moral framing* and *Age*, statistical significance remains unchanged.

Models (4) and (5) of Table 3.3 analyze only the experiment's first three rounds. In the early stages, *Moral framing* has a highly significant effect on Contributions, and the effect size is larger than over all 10 rounds. In the experiment's first phase, the rounds played had no effect on contributions, unlike over all 10 rounds. Comparing random-and mixed effects reveals almost no differences.[10] Lastly, column (6) shows a random effects regression for the experiment's last three rounds. As expected, simply framing and morally loading tax avoidance becomes "useless".

Full compliance. Our second dependent variable takes the value of 1 if a subject invested the maximum possible amount of 40 ECU into the public good and else zero. The variable's binary character allows for a non-linear probit regression model in Eq. (3.1) and thus to estimate the increase in the likelihood of becoming "fully compliant", conditional on being confronted with moral framing, shaming, or both. Because coefficients in nonlinear models cannot be meaningfully interpreted, we report partial effects in Table 3.4.

Model (1) of Table 3.4 shows the baseline results for all 10 rounds. Without disclosure we find a significant moral framing effect. Deciding about tax avoidance increases the likelihood of full compliance (paying 40 ECU) by 16.8 percentage

[9] As an additional test we excluded the 43 always-compliers (investment of 40 ECU in all 10 rounds) from our sample to explore only the behavior of (potential) non-compliers. This change left statistical significance unchanged, predicted contributions in the disclosure treatments decreased by 2 ECU (not reported in the Table).

[10] In Table A3.4 in Appendix 3.B the treatment-coefficients are interacted with the round measure. The results show that the progressing time in the experiment only exerts a significant downward pull on contributions in the *Moral framing*×*Shaming* treatment.

Table 3.4: Probit Regressions for Full Compliance

	(1) RE	(2) RE	(3) ME	(4) RE	(5) ME	(6) RE
Rounds	(1-10)	(1-10)	(1-10)	(1-3)	(1-3)	(8-10)
Moral framing	0.168**	0.183**	0.152**	0.255***	0.227***	0.057
	(0.083)	(0.076)	(0.078)	(0.076)	(0.082)	(0.073)
Shaming	0.508***	0.512***	0.483***	0.508***	0.501***	0.407***
	(0.076)	(0.075)	(0.079)	(0.063)	(0.065)	(0.084)
M.framing× Shaming	0.530***	0.525***	0.507***	0.535***	0.522***	0.434***
	(0.077)	(0.076)	(0.078)	(0.061)	(0.062)	(0.085)
Age		0.009*	0.005	0.014*	0.012*	0.009
		(0.005)	(0.004)	(0.007)	(0.007)	(0.007)
Female		−0.023	0.028	0.011	0.040	0.0
		(0.045)	(0.039)	(0.057)	(0.059)	(0.047)
Employment		−0.058	−0.051	−0.076	−0.064	−0.051
		(0.042)	(0.034)	(0.051)	(0.052)	(0.055)
Taxes filed		−0.016	−0.044	−0.045	−0.047	−0.001
		(0.040)	(0.044)	(0.055)	(0.054)	(0.045)
Econ. Major		−0.053	−0.045	0.004	0.003	−0.103
		(0.049)	(0.039)	(0.060)	(0.061)	(0.060)
Bachelor		0.044	−0.025	0.036	−0.004	0.013
		(0.035)	(0.032)	(0.046)	(0.047)	(0.043)
Semester		0.008	0.003	0.009	0.009	0.009
		(0.006)	(0.004)	(0.007)	(0.007)	(0.006)
Income		−0 * *	−0 * *	−0 * *	−0*	−0.001*
		(0)	(0)	(0)	(0)	(0)
Round		−0.031***	−0.031***	−0.029*	−0.028	−0.053***
		(0.004)	(0.004)	(0.017)	(0.018)	(0.015)
Observations	2,150	2,010	2,010	603	603	603

Notes: The dependent variable takes a value of 1 if whenever a subject chose to invest 40 ECU (40% of her endowment) to the public investment. Marginal effects are reported. Standard errors, clustered on the group-level, are in parentheses. See Table 3.2 for the description of the socio-economic covariates. $^{*}: p < 0.1; ,^{**}: p < 0.05; ^{***}: p < 0.01$.

points, compared to a voluntary contribution.[11]

Shaming has not only a large effect on contributions, but also on the likelihood of investing the maximum possible share of the endowment. In the neutral context, disclosing pictures and information on decisions increases the probability of full compliance by around 51 percentage points. The effect size of adding shaming to our moral frame is $0.53 - 0.168 = 0.362$ (thus, 36.2 percentage points) and is highly significant (Wald-Test, not reported).

Adding controls, column (2) of Table 3.4 shows that the treatment effects remain very similar compared to specification (1). Of the socio-economic controls,

[11] Since both the dependent variable and the treatment dummies are binary, we get an increase in percentage points. For continuous variables, we measure an increase in %.

only *Age* has a statistically significant impact. Column (4) shows that the pure framing-effect in the experiment's first three rounds was markedly higher compared to all 10 rounds, while the differences for *Shaming* and *Moral framing*× *Shaming* are much smaller. In the last three rounds (column (6) of Table 3.4), the likelihood of becoming a full complier becomes insignificant with only moral framing.

Columns (3) and (5) of Table 3.4 show mixed effects probit regressions as an additional robustness checks. As in Table 3.3, effect sizes tend to decrease slightly, leaving statistical significance largely unchanged.

3.6.3 Framing and shaming without moral loading

Our findings so far show a positive (yet transitory) effect of framing a lack of cooperation as morally debatable tax avoidance. While being a fitting representation of the media response to the tax leaks described in the Introduction, our approach combined framing and a moral appeal. To separate and disentangle these manipulations we report results from two additional treatments with a total of 85 participants where we used the tax frame without moral loading, both with (*Framing*×*Shaming*, N=45) and without (*Framing*, N=40) disclosure of tax payments. The six additional sessions were conducted at the computerized laboratory (LLEW) at the Leibniz University Hannover in February 2019, the procedure followed the description in Section 3.5.[12]

Statistical tests. A first objection concerning our framing manipulation might be that the introduction of the tax context alone could suffice to raise cooperation above baseline, making moral loading less effective. This argument can be rejected. Contributions in the baseline (13.8 ECU) and the *Framing* treatment (14.0 ECU) are almost identical (p=.775, Mann-Whitney U-test). This result holds for the experiment's first three, five, and the last three rounds as well as for the share of full compliers (16% for the simple tax frame).

[12]For summary statistics of the new sample see Table A3.2 in Appendix 3.B.

Secondly, for cooperation in the experiment it might not matter whether tax avoidance is morally loaded. This concern can also be rejected. Except for the last three rounds, tax payments were significantly higher ($p < .001$, Mann-Whitney U-test) when the morality of tax avoidance was questioned in the newspaper commentary (19.25 ECU). For the share of full compliers this only applies in the experiment's first three rounds.

With disclosure of decisions we find that shaming is significantly less marked without moral loading. With 22.2 ECU, tax payments are around 9 ECU lower ($p < .001$, Mann-Whitney U-test) compared to both the *Moral framing*× *Shaming* and the *Shaming* treatment. The share of full compliers with moral loading is 27 percentage points above the 42% in the simple framing context. Shaming tax avoiders without informing about moral concerns has no lasting effect on tax payments. Differences in cooperativeness are statistically inseparable only in the experiment's first round.[13] Table A3.3 in Appendix 3.B shows random, mixed, and probit regressions for the two additional treatments; differences between *Moral Framing* and *Framing*×*Shaming* are not statistically significant (Wald-test).

ANOVA with the simple tax framing as the Baseline. Following the steps from the ANOVA in Section 3.6.1, for the first round (individual level) we find a significant main effect for the moral appeal ($F(1,191)=4.06$, $p=.045$), which is again outperformed by the threat of disclosing decisions ($F(1,191)=19.92$, $p < .001$). The *Moral framing*×*Shaming* interaction is not statistically significant ($F(1,191)=1.35$, $p=.247$).

Over the last nine rounds (group-level), the interaction effect is significant ($F(1,347) = 4.1$, $p=.044$), but pales against the impact of moral framing ($F(1.347)=38.37$, $p <.001$) and shaming ($F(1,347)=72.97$, $p < .001$). When controlling for the influence of others' behavior from round 2 onwards, post-estimation ANOVA-style hypothesis tests of a mixed-effects regression confirm the main effect of moral loading ($\chi^2=6.11$, $p=.014$) and shaming ($\chi^2=11.61$, $p < .001$). The interaction effect is not significant ($\chi^2=.65$, $p=.419$).

[13] Graphs on the development of tax payments over time can be found in Figures A3.4 and A3.5 in Appendix 3.B.

Controlling for the influence of time passing in the experiment on decisions by participants returns only a significant effect for the moral appeal-shaming interaction (χ^2=17.71, p=.039) and the Round measure itself (χ^2=244.87, $p < .001$). Interacting *Moral framing* × *Shaming* with the progressing time in the experiment is extraneous for participants' tax payments.

3.6.4 Leaders and Holdouts

How does observing widespread cooperation or rampant non-compliance affect contributions to the public good within groups? To explore this question we identify "Leaders" as subjects who always fully contributed in the experiment's first three rounds, setting a "good" example. Conversely, subjects who chose a consistent strategy of no cooperation (sum of contributions ≤45 ECU in rounds 1-3) are defined as "Holdouts".[14]

Table 3.5: Distribution of leaders and holdouts (% of subjects)

	Baseline	Moral framing	Shaming	Moral framing × Shaming	Framing	Framing× Shaming
Leaders	10.00	25.45	61.82	63.64	7.50	37.78
Holdouts	44.00	18.18	5.45	5.45	50.00	11.11

Table 3.5 shows that more than 60% of participants were fully compliant in the initial 2×2 shaming treatments. With the tax frame but without moral loading this number drops by around 25 percentage points. In the Baseline and the simple tax-frame treatment full compliance is a rare occasion, while about half of participants chose an uncooperative strategy in the first three rounds. With moral framing, the gap between Leaders and Holdouts is markedly smaller.

Table 3.6 shows the distribution of groups where the number of Leaders outweighed the number of Holdouts and vice versa. In the *Shaming* and *Moral framing*×*Shaming* treatments, 91% of groups were led by a majority of good example setters. In the Baseline and with simple framing, the distribution of Holdouts and Leaders is flipped. With *Moral framing* participants seemed to be

[14]This approach follows Andreoni and Petrie (2004) and their analysis of "leaders" and "laggards".

quite torn between compliance and self-interest. In the disclosure treatment without morally loaded tax avoidance, one third of the groups had an equal number of Leaders and Holdouts in the experiment's first three rounds.

Table 3.6: Distribution of Leaders and Holdouts (% of Groups)

	Baseline	Moral framing	Shaming	Moral framing × Shaming	Framing	Framing× Shaming
More leaders	10	54.55	90.91	90.91	12.5	55.56
More holdouts	80	36.36	9.09	0	87.5	11.11

If numbers do not add up to a 100%, Leaders and Holdouts in a group were equally distributed.

Table 3.7 shows the share of Followers fully contributing to the public good after round 3. Table 3.7 also analyzes Followers' behavior separately for groups with more Leaders/more Followers and thus provides answers for the most interesting question: how does the strength of Leaders and Holdouts and their observed behavior in the group influence the decisions of participants who did not pursue a clear strategy in the first three rounds?

Table 3.7: Share of followers fully contributing to the public good

	Baseline	Moral framing	Shaming	Moral framing × Shaming	Framing	Framing× Shaming
More leaders	4.76	20	45.92	52.04	42.86	38.57
More holdouts	1.68	3.30	14.29	–	14.29	0
p-value	.546	.001	.003	$< .001$	.009	$< .001$

Significance across the three classifications is tested with the Kruskal-Wallis test.

The behavior of these "Followers" is significantly influenced by the dominant strategy in a group. From round 4 onwards, around half of the Followers fully contributed to the public good in those treatments where the groups with more Leaders constituted the vast majority. In the treatments where Holdouts generally outweighed the Leaders, full compliance was a rare event. Especially in the disclosure treatments being grouped with a majority of holdouts is associated with a breakdown of (full) compliance. Shaming is only present in groups where a majority of participants abide by the implicit rule of full contributions.

The simple tax avoidance setting (without moral cues) reveals a very interesting result. While in almost all groups holdouts represented the majority, the rare

occasion of more leaders led to full compliance comparable to the shaming treatments. Perhaps, the observed high-compliance in the group was then understood as a duty or norm to also pay all taxes formed by the Leaders instead of being triggered by the newspaper commentary.

Whenever disclosure of decisions loomed, the Leaders remained very compliant also after round 3 (around 80% full contributions). In the framing treatments this number drops to around 36% percent, and plummets when Leaders faced a majority of Holdouts in their group. In the *Moral framing*×*Shaming* treatment on average 36% of Holdouts fully contributed (after round 3) when they were members of a group with a majority of Leaders (not reported in Tables).

3.6.5 Interpretation

In two of our four initial treatments, free-riding on the public good was private information and not bound with any consequences. The only change was to present the contribution mechanism in a different, morally loaded, context. With tax avoidance we find investments into the public good to be significantly higher, the share of full-contributors even twice as high as in the Baseline. This difference could be attributed to the implicit rule of taxpaying as a moral duty. Without moral framing, contributions indicate to the pure attitude towards pro-social (cooperative) behavior, which is not only very volatile, but also less pronounced than in the case where contributions are presented as an institutionalized service to the community and as a moral duty. However, with no enforcement or sanctioning mechanism in place, framing a decision as legal but morally ambiguous does not stabilize persistently high levels of cooperation. Customization and the observed free-riding on behalf of other group members (Section 3.6.4) eventually erodes the rule of taxpaying as a duty.

Section 3.6.3 shows that the newspaper commentary, activating deliberation about the moral aspects of tax avoidance rather than invoking direct behavioral rules, plays a crucial role here. Without moral loading, tax payments are identical to contributions in the baseline and significantly smaller than with moral framing.

In our disclosure treatments we name tax avoiders (non-contributors) by publishing their pictures and information on their payments. The results demonstrate that social pressure cannot only significantly increase cooperative behavior but can also make it persistent; free-riding is eliminated to a large degree.[15] In line with the literature, we attribute this effect to the anticipation of shaming (the feeling of being blamed by others), which individuals typically want to avoid. In the framed context, we interpret shaming as arising from visibly and recognizably violating the imperative of tax compliance. Interestingly, shaming is less pronounced (also in comparison with the neutral context) when there is no indication towards the immorality and harmfulness of tax avoidance. Table 3.7 indicates that in the *Framing*×*Shaming* treatment a smaller share of participants set out a good example. Tax compliance was not a strong implicit rule and consequentially the "Followers" were less reluctant to avoid, too. This can perhaps be interpreted as a sign that the term "tax" itself has a lesser moral connotation than a voluntary "contribution". Making the moral dimension salient can change this, but is short-lived without revealing non-compliance.

Framing and shaming also interact with and depend on each other. However, this interdependency mainly works in one direction; when threatened with disclosure, decisions in the neutral and the framed context became almost indistinguishable. We interpret this as follows: subjects in all initial treatments were aware of the social benefit of making high (or even full) contributions and of the material consequences resulting from free-riding. Without framing the voluntary contribution as a moral duty, however, there is no incentive to forgo individual gains. With shaming as a non-monetary sanction, participants are, as in the tax-avoidance scenario, not willing to be revealed as cheap profiteers. Without a social sanction in place, reflecting on the "right or wrong" of one's behavior plays a role, but it is much less binding than shaming.

[15] In the disclosure treatments cooperation drops in the last three rounds but remains significantly above the baseline and the framing treatments. Participants were aware that the experiment lasted 10 rounds. Thus, the drop in contributions could be the result of last round(s) effects. Yet, we cannot rule out that the shaming effects might vanish if the experiment had lasted 15 or 20 rounds.

3.7 Concluding Remarks

Our experiment tests and interacts two mechanisms that, in principle, help to promote pro-social behavior when pecuniary incentives (rewards or fines) or legal enforcement are not available: moral framing and shaming.

We, first, show that framing subjects into a specific setting with an implicit moral duty to cooperate leads to increased investments into a public good: participants are less likely to free-ride when they decide in the context of an legally admissible yet socially reprehensible behavior. However, without any enforcement such a behavioral standard might eventually erode quickly. We, second, show that social control (fear of being shamed) can significantly reduce free-riding and perhaps even stabilize cooperation: the fear of being blamed for selfish and socially irresponsible behavior is great – and, as our third result, even great enough to make cues to moral issues superfluous to steer individual decisions.

With our experimental design we cleanly identify the shaming effect since, in contrast to research on illegal behavior, the effect of disclosure is not confounded with elements of deterrence or strategical concerns resulting from the (moderate) risk of getting caught. Transferring our results to policy debates, the significant role of public exposure suggests that (the threat) of disclosing unwarranted behavior is an effective strategy for reducing tax avoidance and, more generally, promoting pro-social behavior. The communication of moral arguments also works – but less effectively and, once a shaming mechanism is in place, without noticeable effect.

In our experiment, shaming leaves subjects better off in terms of monetary payoffs. This does not imply, however, that the high social pressure it obviously induces is welfare-increasing in general (also see Dellavigna et al., 2012, for a related point). Moreover, pillorying could be questionable outside the lab and would quickly collide with concerns about privacy and human rights, especially when it sets in at the slightest incidence of wrong-doing. Concerning real-world equivalents, however, the concept of (institutionalized) shaming has recently received heightened attention in the context of taxation. Our results from the lab affirm the general (if transitory) efficacy of such measures. Whether such gains can outweigh the cost of the pillory obviously is a question that cannot be answered in a laboratory.

Appendices Chapter 3

3.A Screen messages

Newspaper article

Figure A3.1: Newspaper commentary

Steuervermeidung ist legal, aber ist sie auch legitim?

Kommentar

In der jüngeren Vergangenheit haben Whistleblower Steuervermeidung im großen Stil aufgedeckt. Beteiligt sind nicht nur multinationale Konzerne, sondern auch tausende Privatpersonen, die über Briefkastenfirmen Einkommen oder Vermögenswerte an den heimischen Steuerbehörden vorbeilenken. Diese Praxis ist in der Regel legal, rechtliche Konsequenzen drohen nicht.

Steuervermeidung ist in erster Linie keine Frage von Unrecht im juristischen Sinn. Es geht eher um die Moral in einem Wirtschaftssystem, dessen Kapital längst keine Grenzen mehr kennt, dessen Steuern aber an Länder gekettet sind. Verhält sich ein Steuerbürger moralisch, der das Gemeinwesen prima findet, wenn es Universitäten, Straßen oder Polizisten finanziert, der es aber, wenn es das eigene Einkommen betrifft, als Gegenspieler begreift?

Steuervermeidung ist eine Gesetzesumgehung mit legalen Mitteln. Steuervermeider mögen zwar im engeren Sinn gegen keine Steuergesetze verstoßen, sie handeln allerdings auch nicht im Geiste des Steuergesetzes. Vielmehr noch, Steuervermeider untergraben die Integrität des Steuersystems, denn oft war die von ihnen gewählte Steuergestaltung so vom Gesetzgeber nicht gewollt oder vorgesehen.

Jede und jeder Steuerpflichtige mit der Möglichkeit zur Steuervermeidung steht vor der persönlichen Entscheidung, ob sie oder er Steuervermeidung vor sich selbst und vor anderen rechtfertigen kann. Dies sollte allerdings unter Abwägung der gesellschaftlichen Konsequenzen geschehen: Steuervermeidung führt zu geringeren Steuereinnahmen und somit zu weniger Leistungen des Staates beziehungsweise zu einer ungleicheren Verteilung der Lasten.

Nicht alles was legal ist, ist auch legitim. *tas*

As presented to participants on screen prior to Round 1.

English translation:

"Tax avoidance is legal, but can it be legitimate?

In the recent past, whistle-blowers have uncovered large-scale tax avoidance. It not only involves large multinational corporations but also thousands of individual

taxpayers who use shell companies to hide income or assets from national tax authorities. Generally, these tax practices are lawful; no legal consequences are looming.

Primarily, tax avoidance is not a matter of wrongdoing in any legal sense. It is more a matter of morality in an economic system where capital flows know no boundaries while taxation is still chained to nation states. Does a taxpayer behave ethically when he cherishes public funding for universities, infrastructure, or the police but considers the state as an opponent as soon as funding affects his own purse?

Tax avoidance means bypassing the law with legal means. Tax avoiders might not violate tax laws directly – but they do not act in its spirit either. Moreover, tax avoiders undermine the very integrity of the tax system since the adopted tax strategy was neither wanted nor intended by the law-maker.

Every taxpayer with an opportunity to avoid taxes faces the personal choice whether he or she can make tax avoidance seem right - for himself/herself and for others. This choice, however, should be made with bearing the societal consequences in mind: tax avoidance leads to lesser government revenues and, thus, to fewer public services and a more unjust distribution of the tax burden.

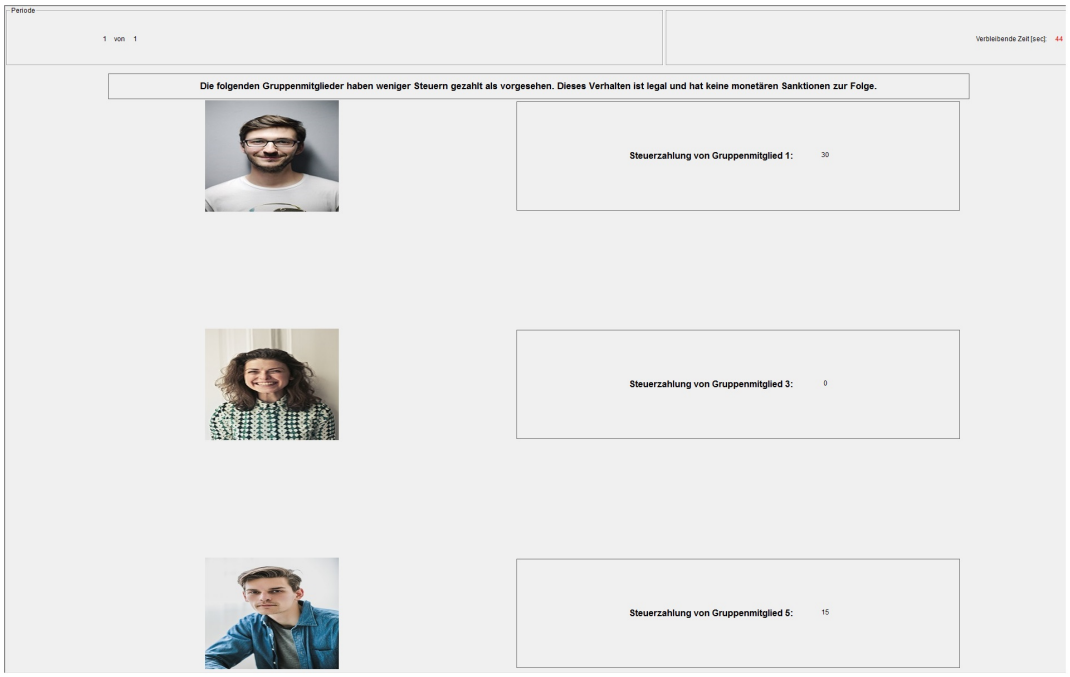
Not everything that is legal is also legitimate."

Differences in on-screen messages

The wording of the disclosure texts was slightly adjusted between neutral and framed treatments. In the *Shaming* treatment a message read "On the next page, those group members who contributed less than the maximum possible amount to the public good will be publicly disclosed". It was modified in the treatment *Moral framing*×*Shaming* to: "On the next page, those group members who paid less taxes than scheduled will be publicly disclosed by their picture and their respective tax payment. Due to the reduction of the individual tax burden, tax revenues decrease to the detriment of the whole group." In the framed disclosure treatment without the moral appeal (*Moral framing*×*Shaming*), the last moralizing sentence was not presented to the participants.

Disclosure screen

Figure A3.2: Disclosure screen with pictures and payment information



In this sample picture, group members 1, 3, and 5 avoid taxes. Their pictures, together with information about their tax payment are disclosed to all group members. Group members 2 and 4 did not avoid taxes and thus remain anonymous. The headline reads "The following group members have reduced their personal tax burden. Doing so is legal and not connected with monetary consequences". In the non-framed experiment, the message read "The following group members contributed less than the maximum possible amount of 40 ECU." The pictures do not show actual participants. The photos were retrieved from the website pexels.com, which provides free stock photos with a CC0 (Creative Commons Zero) license for private and commercial use.

3.B Additional tables and figures

Table A3.1: Summary statistics of socioeconomic items by 2×2 treatment

Variable	Baseline	Shaming	Moral framing	Moral framing × Shaming
Female	44%	55%	44%	47%
Economics Major	24%	25%	20%	15%
Bachelor degree	40%	29%	35%	36%
Employed	38%	35%	44%	28%
Tax declaration	72%	56%	69%	53%
Age	24.29	23.94	23.96	24.54
	[23]	[24]	[24]	[24]
	(3.07)	(3.12)	(2.57)	(7.64)
Income	299.85	341.64	321.98	409.72
	[300]	[300]	[300]	[355]
	(225.31)	(248.03)	(253.24)	(285.91)
Semester	7.06	6.51	7.09	7.45
	[6]	[6]	[7]	[6]
	(4.41)	(3.7)	(3.14)	(4.64)

Notes: Number of subjects in Baseline is 50. Number of subjects in the three treatments is each 55. See Table 3.2 for a description of the variables.

Table A3.2: Summary statistics of individual characteristics, sample extension

Variable	Mean	Median	Standard deviation
Female	51%		
Economics Major	18%		
Bachelor degree	47%		
Employed	31%		
Tax declaration	60%		
Age	24.28	23.00	2.97
Income	354.83	300.00	245.02
Semester	7.58	7.00	4.01

N=85; 40 participants in treatment *framing*, 45 participants in treatment *framing*×*shaming*.

Table A3.3: Multivariate analysis for all treatments (Baseline is the reference category)

	(1) RE	(2) ME	(3) RE	(4) ME	(5) Probit	(6) Probit
Rounds	(1-10)	(1-10)	(1-3)	(1-3)	(1-10)	(1-3)
Moral Framing	5.457*	5.198	7.550**	7.262**	0.183**	0.263***
	(3.226)	(3.355)	(2.986)	(3.041)	(0.077)	(0.081)
Shaming	17.10***	16.53***	15.82***	15.55***	0.514***	0.527***
	(3.144)	(3.403)	(2.276)	(2.353)	(0.079)	(0.072)
Moral Framing×Shaming	16.35***	16.91***	15.71***	15.74***	0.525***	0.549***
	(3.305)	(3.438)	(2.272)	(2.316)	(0.083)	(0.069)
Framing	0.014	0.168	−1.357	−1.320	0.057	0.050
	(2.811)	(2.940)	(2.714)	(2.771)	(0.070)	(0.073)
Framing×Shaming	8.435**	7.876**	10.10***	9.88***	0.319***	0.353***
	(3.918)	(4.030)	(2.500)	(2.531)	(0.095)	(0.076)
Age	0.358*	0.073	0.285**	0.146	0.009*	0.010*
	(0.188)	(0.143)	(0.114)	(0.114)	(0.005)	(0.006)
Female	−1.418	0.449	−0.703	−0.277	−0.073**	−0.048
	(1.239)	(0.916)	(1.303)	(1.330)	(0.036)	(0.047)
Semester	−0.033	−0.210	−0.097	−0.181	0.005	0.004
	(0.189)	(0.164)	(0.188)	(0.194)	(0.005)	(0.006)
Econ. Major	−4.485**	−4.233***	−3.006*	−2.954	−0.050	−0.022
	(1.774)	(1.441)	(1.788)	(1.812)	(0.048)	(0.053)
Bachelor	0.690	0.959	2.146	2.041	0.017	0.016
	(1.288)	(1.276)	(1.331)	(1.419)	(0.037)	(0.045)
Income	−0.007***	−0.006***	−0.008***	−0.007**	−0.0 * *	−0.0 * *
	(0.002)	(0.002)	(0.003)	(0.003)	(0)	(0)
Employed	−2.924**	−1.833*	−3.654***	−3.047**	−0.073**	−0.108**
	(1.244)	(1.087)	(1.351)	(1.438)	(0.036)	(0.045)
Taxes filed	−0.929	−1.667*	−0.329	−0.560	−0.019	−0.017
	(1.128)	(0.955)	(1.367)	(1.316)	(0.034)	(0.045)
Round	−1.563***	−1.563***	−1.290***	−1.290***	−0.029***	−0.045***
	(0.138)	(0.138)	(0.419)	(0.416)	(0.003)	(0.015)
Observations	2,810	2,810	843	843	2,810	843
Wald-Tests ($p =$)						
Framing = Moral Framing	.074	.112	.006	.008	.046	.007
Moral F.× S. = F.×Shaming	.051	.030	.012	.009	.040	.015
Moral F. = Framing× Shaming	.463	.518	.390	.382	.126	.280
Framing = Framing× Shaming	.023	.044	<.001	<.001	.002	<.001

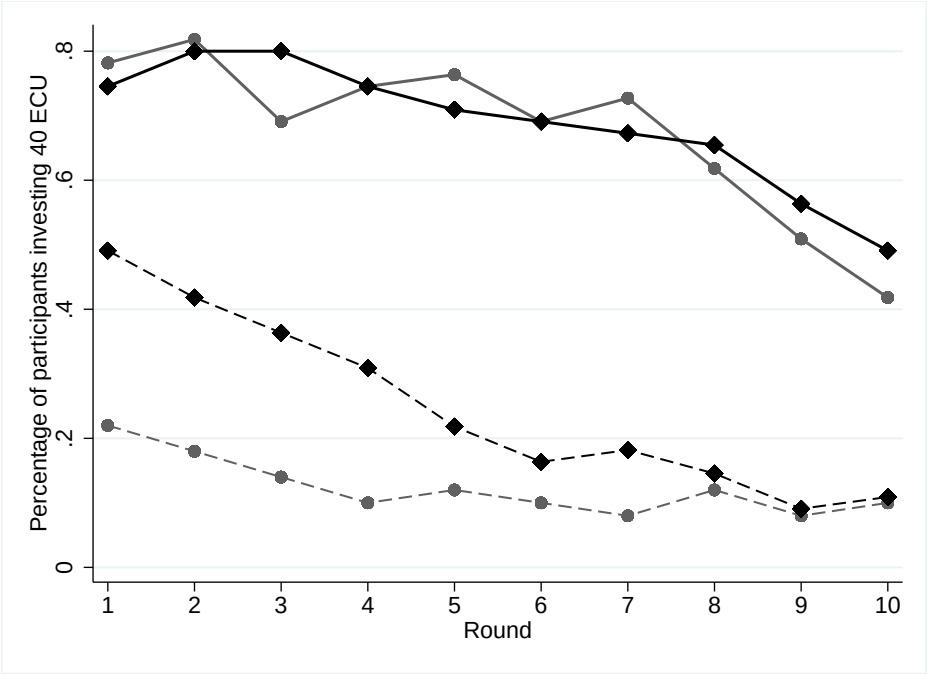
Notes: Specifications (1)-(4): the dependent variable are the discrete *Contributions* to the public good. Specifications (5) and (6): nonlinear regressions with the binary variable *Full Compliance* as the dependent variable. Marginal effects are reported for the Probit models. RE: linear random effects; ME: linear mixed effects. Wald-Tests are reported. For a description of the socio-economic variables see Table **??**. Standard errors, clustered on the group-level, are in parentheses. $^{*}: p < 0.1;$,$^{**}: p < 0.05;^{***}: p < 0.01$.

Table A3.4: Interacting Treatment and Round Effects

	(1) RE	(2) RE	(3) Probit
Moral Framing	8.963**	9.212***	1.481***
	(3.787)	(3.542)	(0.450)
Shaming	18.21***	17.96***	3.198***
	(2.670)	(2.401)	(0.533)
Moral Framing×Shaming	17.06***	16.40***	3.067***
	(2.630)	(2.539)	(0.515)
Framing	−0.265	−0.678	0.227
	(3.514)	(3.135)	(0.439)
Framing×Shaming	11.48***	10.74***	1.923***
	(2.917)	(2.751)	(0.420)
Round	−1.359***	−1.364***	−0.151***
	(0.201)	(0.204)	(0.043)
Round×			
Moral Framing	−0.638**	−0.683**	−0.088
	(0.301)	(0.291)	(0.057)
Shaming	−0.126	−0.156	−0.033
	(0.364)	(0.364)	(0.054)
Moral Framing×Shaming	0.045	−0.008	0.0
	(0.450)	(0.471)	(0.067)
Framing	0.121	0.126	0.023
	(0.415)	(0.417)	(0.068)
Framing×Shaming	−0.554	−0.418	−0.012
	(0.483)	(0.464)	(0.058)
Age		0.358*	0.053*
		(0.188)	(0.029)
Female		−1.433	−0.429**
		(1.240)	(0.217)
Employed		−2.924**	−0.432**
		(1.245)	(0.219)
Taxes filed		−0.929	−0.110
		(1.129)	(0.198)
Econ. Major		−4.485**	−0.294
		(1.775)	(0.281)
Bachelor		0.690	0.105
		(1.289)	(0.218)
Semester		−0.033	0.028
		(0.189)	(0.031)
Income		−0.008***	−0.001**
		(0.002)	(0)
N	3000	2810	2810
Number of Subjects	300	281	281

Notes: RE: linear random effects. Coefficients are reported for the probit regression. Standard errors, clustered on the group level, are in parentheses. $^{*}: p < 0.1; ,^{**}: p < 0.05; ^{***}: p < 0.01$.

Figure A3.3: Share of full contributors



Notes: Dashed gray line: Baseline; solid black line: Shaming; dashed black line: Moral framing; solid black line: Moral framing×Shaming.

Figure A3.4: Contributions/tax payments over time

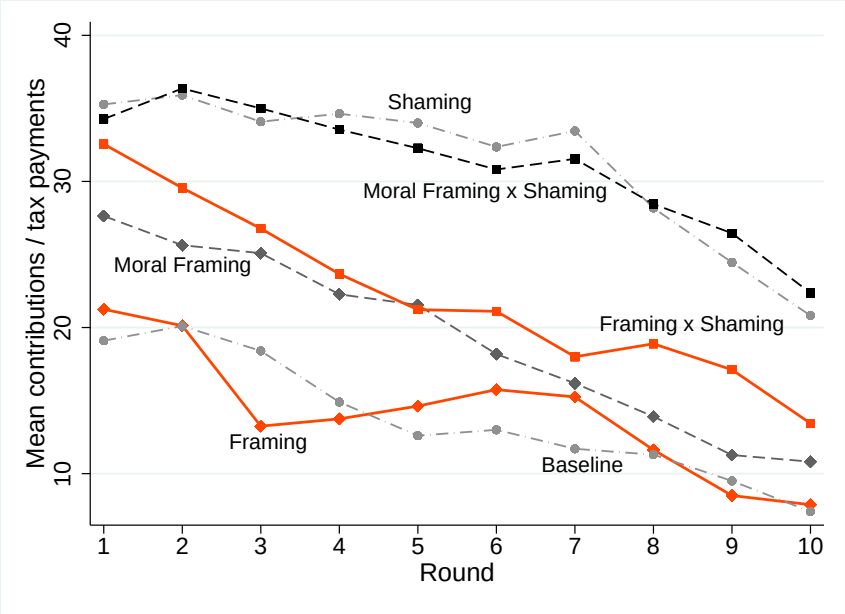
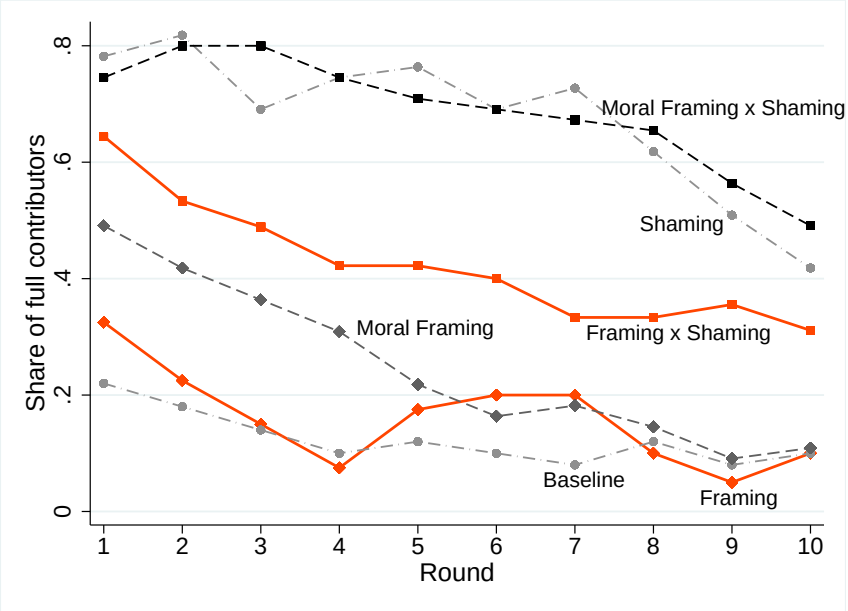


Figure A3.5: Share of full contributors over time



3.C Instructions

Instructions given to the participants in the experiments were originally in German. This Appendix presents their English translation. Distinct instructions were prepared for each experiment. In the following, the different versions are combined, with variations between treatments being marked by square brackets.

General Information [common to all treatments]

Thank you for participating in today's experiment. Upon completion of the experiment you will receive a participation fee of 4 euros. This fee is independent of the experiment's events. In the experiment you have the chance to earn additional money. The amount will depend on your decisions and on the decisions of your fellow players. The total payoff constitutes of your earnings in the experiment plus the participation-fee. Today's experiment consists of a total of 10 rounds.

Please observe the following:

- Please read the instructions thoroughly. If you do not understand certain aspects, do not hesitate to ask. However, do not ask your question audibly. Instead, please raise your hand.
- Seats are provided with a visual cover. Verbal communication with fellow participants is not permitted. You also must not leave your seat.
- Please turn off your mobile phone or other electronic devices and store them in your bag.
- The pencil on your desk can be used. On the instructions, you may make markings or take notes.
- The program with which the experiment is carried out must not be closed. Please do not open any other programs on the computer.
- Standby times might occur because participants proceed at different speeds.

- At the end of the experiment with a total of 10 rounds, one of the rounds will be randomly selected for your payout (in cash).
- You will receive your total earnings at the end of the experiment. Please return the instructions to the experimenter.

Proceedings

In the experiment you will be part of a group consisting of exactly 5 group members. The composition of the group is fixed over the course of the experiment. The 10 rounds are independent.

Initial endowment and decision [Baseline, Shaming] In each of the 10 rounds, you (and each member of your group) have an endowment of 100 ECU (Experimental Currency Unit) at your disposal. Of the 100 ECU, a maximum of 40 ECU can be invested in a profitable public venture. However, you can also decide to invest less or nothing at all. Depending on your decision, at least 60 ECU and maximum 100 ECU go to a private account which does not yield profits. The exchange rate from ECU to euro is 1:10, i.e., 10 ECU equals 1 euro.

Initial endowment and decision [Framing, Moral framing, Framing× Shaming, Moral framing×Shaming] In each of the 10 rounds, you (and each member of your group) are endowed with a taxable income of 100 ECU (Experimental Currency Unit). The linear tax rate is 40%, that is, you have to pay 40 ECU taxes. Your tax payment and the taxes of your fellow group members will be invested in a profitable public venture.

However, you have the legal possibility to reduce your individual tax burden: in each round of the experiment, you decide how much tax you pay. This simultaneously determines the rate with which your endowment is taxed. If you do not use the possibility to reduce your tax burden, the tax rate remains at the scheduled 40%. Reducing the tax burden is legal and, thus, not connected to any monetary sanctions. Depending on your decision, at least 60 ECU and maximum 100 ECU

go to a private account which does not yield profits. The exchange rate from ECU to euro is 1:10, i.e., 10 ECU equals 1 euro.

Earnings and payoffs

[Baseline, Shaming:] Revenues from the public venture depend on the contributions of all group members. The following applies: the more a group member contributes, the higher the returns for each group member.

[Framing, Moral framing, Framing×Shaming, Moral framing×Shaming] Revenues from the public venture depend on the tax payments of all group members. The following applies: the more taxes a group member pays, the higher the returns for each group member.

Payoffs in each round emerge as follows:

Payoffs = Stock of private account + revenue from the public venture.

Table 1 [here: Figure A3.6] exemplifies some payoffs, conditional on your own contribution and the contributions of the other four group members.

Please note:

- [in Baseline, Shaming::] For simplicity, you cannot select an arbitrary contribution between 0 and 40 ECU. You choose from the series of values depicted on your screen.
- [in Framing, Moral framing, Framing×Shaming, Moral framing×Shaming:] For simplicity, you cannot select an arbitrary tax payment between 0 and 40 ECU. You choose from the series of tax payments depicted on your screen.
- [in Baseline, Framing, Moral framing:] Your decision about your contribution [tax payment, treatments Framing, Moral framing] will not be disclosed. The group members will not learn how much you invested into the public venture.

Figure A3.6: Payoff table

Sum of contributions/tax payments of the other four group members (in ECU)	Own contribution/tax payment (in ECU)								
	0	5	10	15	20	25	30	35	40
0	**100,0**	**96,5**	**93,0**	**89,5**	**86,0**	**82,5**	**79,0**	**75,5**	**72,0**
5	**101,5**	**98,0**	**94,5**	**91,0**	**87,5**	**84,0**	**80,5**	**77,0**	**73,5**
10	**103,0**	**99,5**	**96,0**	**92,5**	**89,0**	**85,5**	**82,0**	**78,5**	**75,0**
15	**104,5**	**101,0**	**97,5**	**94,0**	**90,5**	**87,0**	**83,5**	**80,0**	**76,5**
:	:	:	:	:	:	:	:	:	:
30	**109,0**	**105,5**	**102,0**	**98,5**	**95,0**	**91,5**	**88,0**	**84,5**	**81,0**
:	:	:	:	:	:	:	:	:	:
45	**113,5**	**110,0**	**106,5**	**103,0**	**99,5**	**96,0**	**92,5**	**89,0**	**85,5**
:	:	:	:	:	:	:	:	:	:
60	**118,0**	**114,5**	**111,0**	**107,5**	**104,0**	**100,5**	**97,0**	**93,5**	**90,0**
:	:	:	:	:	:	:	:	:	:
75	**122,5**	**119,0**	**115,5**	**112,0**	**108,5**	**105,0**	**101,5**	**98,0**	**94,5**
:	:	:	:	:	:	:	:	:	:
90	**127,0**	**123,5**	**120,0**	**116,5**	**113,0**	**109,5**	**106,0**	**102,5**	**99,0**
:	:	:	:	:	:	:	:	:	:
105	**131,5**	**128,0**	**124,5**	**121,0**	**117,5**	**114,0**	**110,5**	**107,0**	**103,5**
:	:	:	:	:	:	:	:	:	:
120	**136,0**	**132,5**	**129,0**	**125,5**	**122,0**	**118,5**	**115,0**	**111,5**	**108,0**
:	:	:	:	:	:	:	:	:	:
135	**140,5**	**137,0**	**133,5**	**130,0**	**126,5**	**123,0**	**119,5**	**116,0**	**112,5**
:	:	:	:	:	:	:	:	:	:
150	**145,0**	**141,5**	**138,0**	**134,5**	**131,0**	**127,5**	**124,0**	**120,5**	**117,0**
155	**146,5**	**143,0**	**139,5**	**136,0**	**132,5**	**129,0**	**125,5**	**122,0**	**118,5**
160	**148,0**	**144,5**	**141,0**	**137,5**	**134,0**	**130,5**	**127,0**	**123,5**	**120,0**

- [in treatments Shaming, Framing×Shaming, Moral framing×Shaming:] Your decision about your contribution [tax payment, Framing×Shaming, Moral framing×Shaming] will be disclosed. The group members will learn how much you invested into the public venture.

Information at the end of any round

After each group member has decided about their own contribution [tax payment], your individual contribution [tax payment], the total group contributions [tax revenue] and your personal payoff in the respective round will be displayed to you on your screen.

[Addendum for treatment Shaming:] Additionally, those group members who invested less than 40 ECU to the public venture will be disclosed at the end of each round. In this case, the picture and the contribution of the respective group members will be presented to all group members. Who contributes the full amount will remain anonymous.

[Addendum for treatments Framing×Shaming, Moral framing×Shaming:] Additionally, those group members who paid less than the scheduled 40 ECU taxes will be disclosed at the end of each round. In this case, the picture and the tax payment of the respective group members will be presented to all group members. Who did not reduce the individual tax burden will remain anonymous.

Final Information [common to all treatments]

After reading these instructions we ask you to answer some questions on your computer. Answering these questions only checks comprehension and is not relevant for payoffs. The experiment will start upon completion of the comprehension test.

After the experiment we ask you to answer a few questions. For this purpose a short questionnaire will start automatically. The questionnaire is not relevant for payoffs either. [Added in treatments Shaming, Framing×Shaming, Moral framing×Shaming: The answers will not be disclosed.]

Declaration of consent

For today's experiment it is necessary to take your picture and to save it digitally for a short time. Dependent on the events in the experiment it might happen that your photography is presented to you and other participants on screen.

Upon completion of the experiment your photo will be deleted from the camera and the computer. Continued use outside the lab or circulation of your data is foreclosed.

With your signature you consent to the possible use of your photography in today's experiment.

In case you refuse the possible use of your picture you cannot participate in today's experiment. Yet you still receive the participation fee of 4 euros.

Comprehension test

Question A1. A group consists of exactly 5 group members (Yes/No).

Question A2. The composition of the group changes during the experiment (Yes/No).

Question A3. Your decisions remain anonymous (Yes/No (correct in the disclosure treatments)).

Question A4. All group members receive the same return from the public good (Yes/No).

Question B. What is your income if you invest 20 ECU and the four other group members invest in sum 120 ECU into the public venture?

Question C. What is your income if you invest 30 ECU and the four other group members invest in sum 60 ECU into the public venture?

Chapter 4

Trust in Government: Determinants and Ties to Economic Growth

4.1 Introduction

Institutions and governments which implement and execute laws and policies, protect property rights and warrant an independent justice system as well as a level playing field for citizens and businesses, are regarded as crucial for economic development (Acemoglu et al., 2001, 2002, 2005; Easterly and Levine, 2016; LaPorta et al., 1999; Rodrik et al., 2004). Indeed, countries with high-quality institutions are much more successful in collecting revenues to provide public goods and services, and in investing in their *rule of law* to discourage self-interest, corruption, and free riding (Besley and Persson, 2013). Without efficient and reliable institutions, high transaction costs in economic exchanges harm growth and exacerbate public good production, making protection of property rights expensive (North, 1990, 1998; Olson, 1996).

Another widely shared view in all disciplines of the social sciences is that the more reliable and efficient institutions are, the trustworthier they appear, and the more trust economic agents consequentially put in these institutions. Yet, cultural and economic factors as well as social norms have a considerable influence on trust, and the extent of trust in government varies markedly between countries. In a

worldwide comparison, the puzzling finding of an inverse relationship between trust in government and institutional quality (see Figure 4.1 in Section 4.4) sets out the first central research objective in this paper: focusing on different regime types (democracies vs. autocratically ruled countries) and how they approach citizens, a number of potential contributors – ranging from government control over the flow of information and fear of retaliation to corruption, pluralism, and political cultures – for this (seemingly) paradoxical relationship will be analyzed.

Besides being an indicator for institutional quality, the OECD (2017) sees trust in government also as a driver of economic development, in particular by "stimulating investment and consumption" (p. 214). Until now, however, this claim on the connection between trust and economic growth lacks empirical evidence. The second central research objective is thus to explore both direct and indirect repercussions of confidence in government on countries' economic development. The direct link might be at work when citizens, based on shared norms and values, believe that the government pursues policies which are beneficial and important for the people.[1] If citizens feel confident about the government's motives, they might even support policies that lead to (short-term) detriments, or involve violations of accountability and property rights. As argued by the OECD (2017), trust in the reliability and efficiency of institutions might positively affect the overall economic climate (e.g. investments, fiscal capacity, or consumption), which subsequently leads to increased growth rates.

For a sample of up to 68 economies worldwide in the time period 1980-2010, a 2SLS estimator is modeled to explore the direct link between trust and growth. Within the 2SLS approach, trust in government is instrumented by predetermined between-country differences in the political system and cultural aspects. The 3SLS approach is used to estimate potential indirect effects: a country's growth rate is regressed on the proposed growth-intermediaries, which have been predicted by the (instrumented) trust in government.

The analysis in this article finds three main results: first, high trust in government and an arguably uncritical attitude towards authorities is influenced by the polit-

[1] See, for example, Gangl et al. (2012) and their elucidations on trust in authorities and its interplay with the "power" authorities exert on citizens.

ical system, that is, whether a country is a democracy or an autocracy. Possible explanations provided in this paper are the potential fear of (openly) criticizing leaders of an oppressive regime, but also deeply rooted pro-state, nationalistic or collectivist norms propagated for decades. Rothstein (2000) describes "different cultures of trust around the world" (p. 486) and argues that trust would build on information about moral standards (in the society), professional norms, and the government's trust-history. Indeed, government-controlled or biased media are strongly positively associated with trust. Second, when the regime type and other cultural noneconomic forces are accounted for, trust in government can have a direct positive effect on economic development, although its magnitude is negligible. Third, this paper does not find indirect growth-enhancing effects of confidence in government via increased investments, consumption, or tax revenues. Trust in government does not seem to translate into social trust (see Section 4.3 for a review and discussion on social trust and its links to trust in government) without functioning institutions that warrant economic equality and opportunities, personal freedoms, and equality before the law.

4.2 A brief definition of trust in government

Going beyond a standard-economic, game theoretic view of trust as an agent A being sufficiently confident that B has no incentive to engage in an action X to the detriment of A, Levi (1998) describes trust as an umbrella term for a "variety of phenomena that enable individuals to take risks in dealing with others" to "solve collective action problems" (p. 1). Transferring her description to the institutional level, Levi (1998) defines government trustworthiness as "procedures for selecting and constraining the agents of institutions so that they are competent, credible, and likely to act in the interests of those being asked to trust the institution" (p. 3). Levi further emphasizes that trust per se is (normatively) neither good nor bad, because it would not be necessarily beneficial for an individual or the society as a whole.

For the USA and Europe, studies find a steady decline in trust in government in the past decades. Frequently reported reasons are worries about the economy and social decline, crime, political scandals, and perceived increases in corruption and deceit (Chanley et al., 2000; Dalton, 2005; Pew, 2015; OECD, 2017). As Dalton (2005) reports for advanced industrialized economies, the better educated are more likely to distrust the government.

Complementing Rothstein's (2000) notions on the connection of trust to culture and norms, Citrin (1974) commented on the declining trust in the USA as "a current *zeitgeist*, which legitimizes, even encourages, the expression of anti-political rhetorics" that "makes it fashionable to demigrate politicians and to criticize established institutions" (p. 975).[2]

In the present article, trust in government is measured with an item from the World Values Survey (WVS, waves 2 (1990-1994) to 6 (2010-2014)) polling for the level of "confidence in the national government", which respondents could assess on an ordinal scale from 1(=none at all) to 4(=a great deal). The individual responses on trust in government are aggregated by calculating the share of persons whose trust is 1, ..., 4 per country. In this paper, having confidence in government is defined as the share of surveyed individuals responding with 3(=quite a lot) or 4(=a great deal) of confidence. This definition of trust is chosen to allow for some skepticism towards the government ("quite a lot"), but not to an extent where hesitation (answer category 2=not very much confidence) might outweigh trust. Some countries were surveyed in two or more waves. In this case, the mean shares over the 2+ waves were calculated. Throughout the analysis, the quality of institutions is measured by the World Governance Indicator (WGI) "Rule of law" (Kaufmann et al., 2010). Zero-centered, the indicator evaluates the strength of the rule of law based on a large array of sub-indices.[3]

[2]While trust in government in the industrialized Western economies is comparably low, a positive correlation with institutional quality is found ($r = .58$, $p < .001$). The reverse is the case in former Soviet Republics, where especially Central Asian autocracies drive this association with high values for trust in government and low measures for institutional quality. The correlations hold when conditioned on average per capita GDP.

[3]The "Rule of law" estimates can range from -2.5 to +2.5 (greater values imply better governance) and are updated on a yearly basis, starting in 1996. In this paper, the average point estimate in the time period 1996-2010 is calculated for all countries in the sample.

4.3 Trust in government and social trust

Rothstein, in his 2000 paper "Trust, Social Dilemmas and Collective Memories", argues in favor of a mechanism where trust in society begins with trustworthy institutions and trust, in a manner of speaking, trickles down to the interpersonal level, creating social trust and facilitating the production of *social capital* in a society. The theory of social capital took off with the influential book *Making democracy work* by Putnam (1993), in which he defined social capital as "features of social organization, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated actions" (p.167). Putnam argued that such differences in cooperativeness, shared norms or values would explain long-term growth differences between the northern parts of the country and the economically less developed Southern Italy.

Putnam's definition can in principle be transferred to the government as a specific (formal) agency that plans and coordinates policies, rules, and behavioral as well as legal norms. Relating to Rothstein (2000), authorities, with their actions and appearance, will likely set the ground and the guiding principles for the development of social trust. Rothstein describes this precept by recounting a chat with a Russian tax official, who argued that tax evasion in Russia was rampant not because taxpayers did not want to comply, but because they, firstly, did not trust the corrupt bureaucracy to use the revenues for beneficial causes and, secondly, they did not trust the government's ability to thwart others' tax evasion. Thus, a lack of trust in government spread out to a lack of interpersonal trust – a classic social dilemma.

Knack and Keefer (1997) found significant positive associations between social trust and confidence in government (WVS data); a one percent increase in social trust correlated to a .5 percentage point increase in trust in government. The authors also found positive associations of increases in social trust with bureaucratic efficiency, protection of property rights, and the enforceability of contracts.

Arguably, social trust has the advantage (over trust in government) that it is not directed at a specific institution, especially if it actively aims at influencing citizens' perceptions, either by threats and oppressive tendencies or by manipulating

the information reaching the public. When the *stated* trust in government does not coincide with the *actual* perception, lacking social trust (expressed e.g. through tax evasion or private investments in security) might approximate governments' deficiencies.[4] Yet, inspecting trust in government promises to be worthwhile regardless of whether it is truly felt or not. In the former case, policy decisions (even if they violate property rights or equity concerns) might be supported with admiration. In the latter case they might not be endorsed, but also not questioned or opposed.[5]

For social trust, several influential studies have analyzed its ties to economic growth: Knack and Keefer (1997), in their seminal cross-country study, find a significant positive correlation between interpersonal trust, civic norms, and economic activity. Zak and Knack (2001), in their cross-country analysis, find that a low-trust environment reduces investments, and is connected to a large social distance between agents and to weak institutions, adversely impacting economic growth. Bjørnskov (2012) aimed at establishing causal links between social trust and growth with a 3SLS approach. Instrumenting trust with exogenous noneconomic forces, he finds that trust directly affects schooling decisions and the quality of institutions, which in turn raised growth rates and gross investments.

Attention has also been directed at the determinants of social capital. Bjørnskov (2006) finds that only social trust, but not social norms or associational activities are underlying the positive effects on governance and life satisfaction. Rothstein and Stolle (2003) asked why social capital has been particularly high in Scandinavia (compared to e.g. the USA) and find high economic equality, low levels of patronage and corruption, and non-discriminatory welfare programs as important contributors. Bjørnskov (2007), in a cross-country study, identifies income inequality, ethnic diversity, and living in a post-communist country as negative

[4]Trust in government within countries is also more volatile and responsive to political and economic shocks than social trust, which is found to be quite stable over time (Uslaner, 2002, 2008; Tabellini, 2008). Comparing different countries at different points of time becomes an issue, which is not eradicated, but alleviated by including regional dummies and additionally WVS wave dummies as a robustness check in the empirical analysis (Section 4.8).

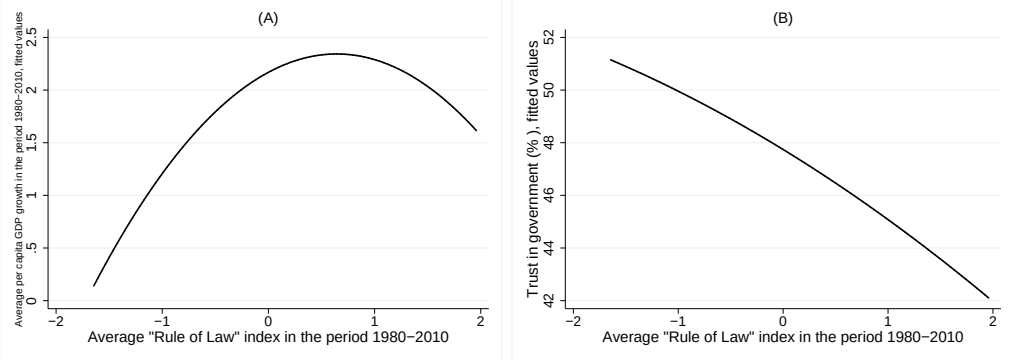
[5]Fitting examples are infrastructure projects like dams or highways built directly through residential areas. Such projects are profitable investments, a fortiori if the government is not forced to ask for permission, does not need to fear lawsuits, or can react with expropriations and violence to sparking resistance.

determinants of social trust, while protestantism and living in a monarchy – a symbol of political stability and unity – enhanced social cohesion. Alesina and LaFerrara (2002) used individual level data from US localities on interpersonal trust and find that it was reduced by recent traumatic experiences, perceived discrimination, low education, and by low income.

4.4 Trust in government and the political system

Panel (A) of Figure 4.1 plots a quadratic fit of the average per capita GDP growth in the period 1980-2010 against the World Governance Indicator "Rule of Law".[6] The plot shows that growth initially steadily increases with better institutional quality. Only for those countries with the strongest rule of law, growth is predicted to decrease.

Figure 4.1: Growth, trust, and the quality of institutions.



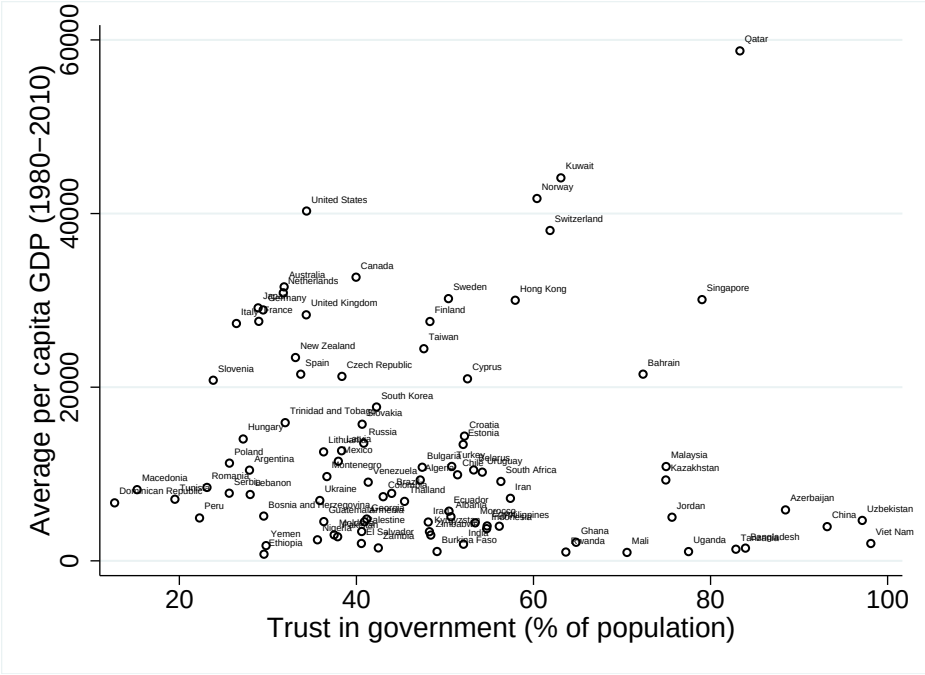
A straightforward explanation for this picture is that those countries with the highest institutional quality are predominantly also the most developed economies, with the historically longest periods of strong and steady economic growth. At this point, a certain saturation occurs, and average growth rates decline. Panel (B) of Figure 4.1 shows the negative relationship (quadratically fitted data) between

[6]Data for GDP and GDP growth are retrieved from the Penn World Tables, release 9. Table A4.1 in the Appendix gives an overview over all data (and their source) used in this paper.

trust in government and institutional quality in the years 1980-2010; the correlation is only moderate, but in stark contrast to the strong positive association between social trust and the quality of institutions (see Section 4.3).

High-quality institutions are not only positively associated with economic development, but also highly correlated with per capita GDP ($r = .8$, $p < .001$); the poorer a country, the worse its rule of law. Figure 4.2 plots countries according to their trust in government and their average per capita GDP between 1980-2010. Those countries with the highest confidence in government are predominantly transitioning or developing economies, whose institutions do not live up to the standard of trustworthiness defined above. The proposed positive relationship between trust and GDP (institutional quality) exists only for OECD countries, for example when comparing Eastern European to Southern European states, and the latter to the Scandinavian countries in this sample.

Figure 4.2: Per capita GDP and trust in government



The associations found in Figures 4.1 and 4.2 can be largely attributed to the political system, i.e., whether a country is governed democratically or ruled by an autocratic regime. In the latter group, around 54% of the population have

"quite a lot" or even "a great deal" of confidence in their government. This tops trust in democracies by around 15 percentage points (p <.001, two-sided t-test). This disparity upends what one could expect: people trust their government if it behaves trustworthy, i.e., if institutional qualities are well-developed. In fact, the difference in trust in government is driven by stating maximum (thus, practically unconditional) confidence in government. Across all WVS waves, 21% of respondents in autocracies stated "a great deal" of confidence, opposed to only 7% in democracies (p <.001, two-sided t-test).

Living in an autocratically ruled country and trust in government are positively correlated (r=.4, p <.001), which is in opposition to generalized trust (r= -.18, p=.09).[7] Compared to confidence in government, the differences between democracies and autocracies are smaller (28% vs. 23%), with citizens in democracies slightly more trusting (p=.09, two-sided t-test).

Table 4.1: Trust and economic growth by geo-political region

Region	Trust (%)	Trust (range)	Autocracy (share)	Growth rate (%)
South- and South-East Asia	61.1	28.9 - 98.1	77%	3.77
Sub-Saharan Africa	56.4	29.6 - 82.9	91%	1.27
Middle East and Northern Africa	50.8	19.5 - 83.3	87%	1.20
Eastern Europe and Central Asia	43.1	15.2 - 97.1	58%	1.92
Western countries*	38.9	26.4 - 61.9	0	1.62
Latin America	38.5	12.7 - 54.2	25%	1.21

* Western countries include European countries which have never been Socialist and/or allied with the Soviet Union, the USA, Canada, Australia, and New Zealand.

In Table 4.1, 92 countries (with data for trust in government) are grouped into six geo-political regions and sorted according to the share of respondents stating trust in their government. Trust is highest in South(-east) and Southern Asia, followed by Sub-Saharan Africa and the Middle East. Again, this upends scores in institutional quality as well as per capita GDP. The range of trust in government across countries is very large, and top values are reached exclusively in closed

[7] In the WVS, generalized trust is a binary choice ("Most people can be trusted" vs. "Need to be very careful"). Here, responses were aggregated per country (and across waves), returning a share between 0 and 100.

autocracies. In Western countries, confidence in government is highest in the Scandinavian countries (Finland, Norway, Sweden). With a low share of autocratically ruled countries (Western economies, Latin America), trust in government drops significantly.

The connection to economic growth is less obvious. South- and South-Eastern Asian countries experienced on average far higher growth in the period 1980-2010 than the other geo-political regions. The Middle East and Sub-Saharan Africa experienced less growth than European countries, closely resembling Latin America in this respect. Using simple statistical tests, differences in growth rates across countries are found to be statistically insignificant. Democratic countries are wealthier, incomes are distributed more equally, and per capita consumption as well as gross investment rates are higher.

The different demeanor of autocratic versus democratic governments is expressed in control over the media and the public opinion, the occurrence of corruption, and the protection of civil and personal rights and freedoms. The rich Varieties of Democracy (V-Dem) database (V-Dem, 2018), which aims to measure and conceptualize democracy as a multidimensional and complex system of rule, collates a wide array of indicators on the quality of government for all countries of the world. The V-Dem measures used in this paper are either indices running from 0-1, or reflect expert opinions on an ordinal scale. Most measures are available on a yearly basis. In this study, an average value for the time period 1980-2010 is calculated for each country.

Especially government censorship of the media is found to be important for respondents' trust in government. With such practices, information about misbehavior or shortcomings will seldom reach the public. On the contrary, the media might turn towards a pro-government propaganda. Correlating trust in government with an array of V-Dem indicators on censorship efforts and biases of the media (see Table A4.3 in the Appendix) returns highly significant Pearson-correlations in the range from about -.4 to -.45. Because higher values indicate more freedom, trust in government declines with a more pluralistic press. Unsurprisingly, liberty of the press heavily depends on the regime type. Correlating V-Dem measures on bribery and corruption in the public sector with trust in government returns

insignificant coefficients. Again, the richer a country in economic terms, the less corruption occurs. As for media freedoms, there is no noticeable correlation with economic growth.

The V-Dem dataset also features a variety of indices on the quality of democracy and the protection of pluralistic societies (e.g. achieving ideals of democracy, freedom of expression and religion, see Table A4.3). For all items, the familiar result is that autocracies and less developed countries score worse than democracies, and that the indices are (consequentially) negatively correlated with trust in government. Pearson-correlations lie in the range of -.3 to -.4 and are highly significant.

Within the four categories, the V-Dem indicators are highly correlated. With a Principal Component Analysis (PCA), scores for media freedom, corrupt activities, the quality of democracy, and protection of personal freedoms are calculated (see Table A4.4 in the Appendix). Predicted scores for the first principal component in each of the four categories (Eigenvalue >1) are then transformed to an index running from 0(worst) to 100(best) and regressed on the dependent variable trust in government, also controlling for average per capita GDP.

Table 4.2: Determinants of trust in government, conditional correlations

	Free media	No corruption	Democracy	Pers. freedoms	GDP p.c.
trust	-.386**	.233*	-.278	.114	.0
	(.151)	(.102)	(.150)	(.145)	(.0)

$N = 92$, $R^2 = .327$, Standard errors in parentheses. $^*p < .1$, $^{**}p < .05$

The result of this simple conditional correlation is shown in Table 4.2. Independent and critical media have a negative association with trust in government, while less corruption is associated with more trust. A better achievement of democratic ideals (Table A4.3) is negatively correlated with trust in government, but just misses statistical significance. A better protection of personal freedoms returns a positive coefficient, but the standard error is very large. Per capita GDP has no connection to trust in government.

4.5 Determinants of trust in government

The four components used in Table 4.2 must be considered as endogenous to trust in government; government-control over the media is one example: a government might censor the freedom of expression because it is aware that its approach towards the citizens is not an objectively trustworthy one. Perhaps, the government distrusts the people and fears open opposition and resistance. Regarding corruption, a reciprocal relationship will be at work as well. Recall Rothstein (2000) and his recount of the conversation with the Russian government official, who argued that tax officers wanted to be honest, but did not comply because they figured that their colleagues and the taxpayers were not either.

However, corruption, oppression, censorship, or violence can all be considered as outcome measures of undemocratic regimes that base policies not on a rule of law, but rather on a strict policy doctrine (Rothstein, 2015). Considering the countries analyzed in this paper, the decision whether a country became a democracy or not dates back (at least) decades prior to the time period studied in this paper.[8] The earliest possible observation for trust in government comes from 1990. At this point, subjective assessments of trust had been exposed and shaped by the political system and its appearance for years.

This long-term exposure gives the regime type (as a determinant of between-country differences in trust) exogeneity in this specific sense. Other potential determinants of trust in government are noneconomic cultural forces, approximated here by the average share of Muslims and Catholics residing in a country. These influences have also been predetermined well prior to the period studied in this article, and rest on the findings by Berggren and Jordahl (2006) and Bjørnskov (2007) that hierarchical religions are generally associated with less trust. Finally, countries' legal origins (LaPorta et al., 1999) are included as an additional instrument to acknowledge potential persistent differences in the structure and quality of institutions. The instruments and the 2SLS/3SLS approach are used to tackle

[8]The exceptions are the former Soviet and Yugoslavian republics in Europe and Central Asia who gained their independence not before 1991. In the empirical analysis these countries are dropped from the sample.

reverse causality and simultaneity issues as far as it is feasible at all in a simple cross-country context.[9]

Table 4.3 presents the first stage results of the 2SLS approach to test the direct ties of trust in government and economic growth (see Table 4.4 in Section 4.6). The instruments in columns (1) and (2) of Table 4.3 are the *Autocracy* dummy, which takes the value 1 if a country is classified as an electoral or as a closed autocracy[10], and the share of Muslims and Catholics in a country (CIA, 2018). In column (2) (and later in column (3)), a reduced sample is used: observations drop out when some covariates, especially growth rates of per-capita GDP in 1980, were not available.

Table 4.3: First-stage regressions for trust in government

Trust in gov.	(1)	(2)	(3)	(4)	(5)	(6)
Autocracy	10.91**	13.65***	14.90***	7.732**	9.837**	10.80***
	(4.198)	(4.725)	(4.669)	(3.748)	(4.191)	(3.907)
Communism				54.44***	51.18***	59.73***
				(3.357)	(3.686)	(5.630)
Muslim share	0.036	−0.037	−0.009	0.087	0.029	0.095
	(0.070)	(0.077)	(0.116)	(0.062)	(0.067)	(0.092)
Catholic share	−0.098*	−0.176***	−0.118	−0.073	−0.138**	−0.022
	(0.054)	(0.062)	(0.124)	(0.053)	(0.059)	(0.101)
Legal origin, UK is the base category						
French			−4.306			−9.713
			(7.740)			(6.592)
German			−3.805			−9.307*
			(6.806)			(5.002)
Scandinavian			6.866			7.405
			(5.199)			(4.971)
Observations	91	68	68	91	68	68
F-statistic	7.264	8.387	5.265	112.0	92.17	53.46
Adj. R^2	0.159	0.238	0.217	0.277	0.361	0.387

Notes: OLS regressions. In specifications (2), (3), (5), and (6) observations are excluded when no estimate for per capita GDP in 1980 was available. This applies first and foremost to former Soviet and former Yugoslavian states. When the *Communism* dummy is included (China and Vietnam), the two countries are not included in the *Autocracy* dummy. Robust standard errors are in parentheses. $^{*}: p < 0.1; ,^{**}: p < 0.05; ^{***}: p < 0.01$.

The results confirm the finding that living in a repressive political system (with the side effects of being poorer and being confronted with worse institutions) is

[9]The rationale behind the choice of the instruments, and the 2SLS/3SLS approach to estimate effects of trust on growth are related to Bjørnskov (2012), who used social trust as the variable of interest.

[10]Regimes of the World (RoW) measure, retrieved from the V-Dem dataset.

associated with significantly more trust in the authorities of the political system. A larger share of Muslims has no influence on trust, while Catholics tend to distrust the government, although the effect size is small. Column (3) uses the legal origin of a country (with the Anglo-American Common Law as the reference category) as an additional instrument. The legal origin is found to be insignificant and does not improve the explanatory power of the model.

Columns (4), (5) and (6) introduce an additional dummy for officially Marxist-Leninist countries, here namely China and Vietnam. This ideology is particularly pro-government, with a distinctive cult build around leaders, a dominant public sector (with de-facto state ownership of industry and resources), and the state as the central coordinator of the economy, culture, and norms – essentially everyday life. The results show that in China and Vietnam trust in government is well above 50 percentage points higher than in other countries, including other autocracies.

In the remaining autocracies (now excluding China and Vietnam), trust in government is still significantly higher than in democracies, but the effect size is smaller compared to columns (1), (2) and (3). The multiplied F-statistics and also the increased R^2 point to the importance of long-term state-glorifying norms, oppressive policies, and media bias for subjective trust in government. The effects of religious denomination and legal origins remain negligible in magnitude and are mostly statistically insignificant.

4.6 The direct effect of trust on growth

Figure 4.3 suggests a positive correlation in the time period 1980-2010. Panel (A) shows that the majority of advanced economies had moderate per capita GDP growth rates (between 1% and 2%). The positive slope of the quadratic fit in Panel (B) of Figure 4.3 is in large parts driven by dynamic emerging economies in Southern- and South-East Asia. In particular China and Vietnam, two officially Communist states, have both the highest average growth rate and the highest subjective trust in government.

Figure 4.3: GDP GROWTH AND TRUST IN GOVERNMENT

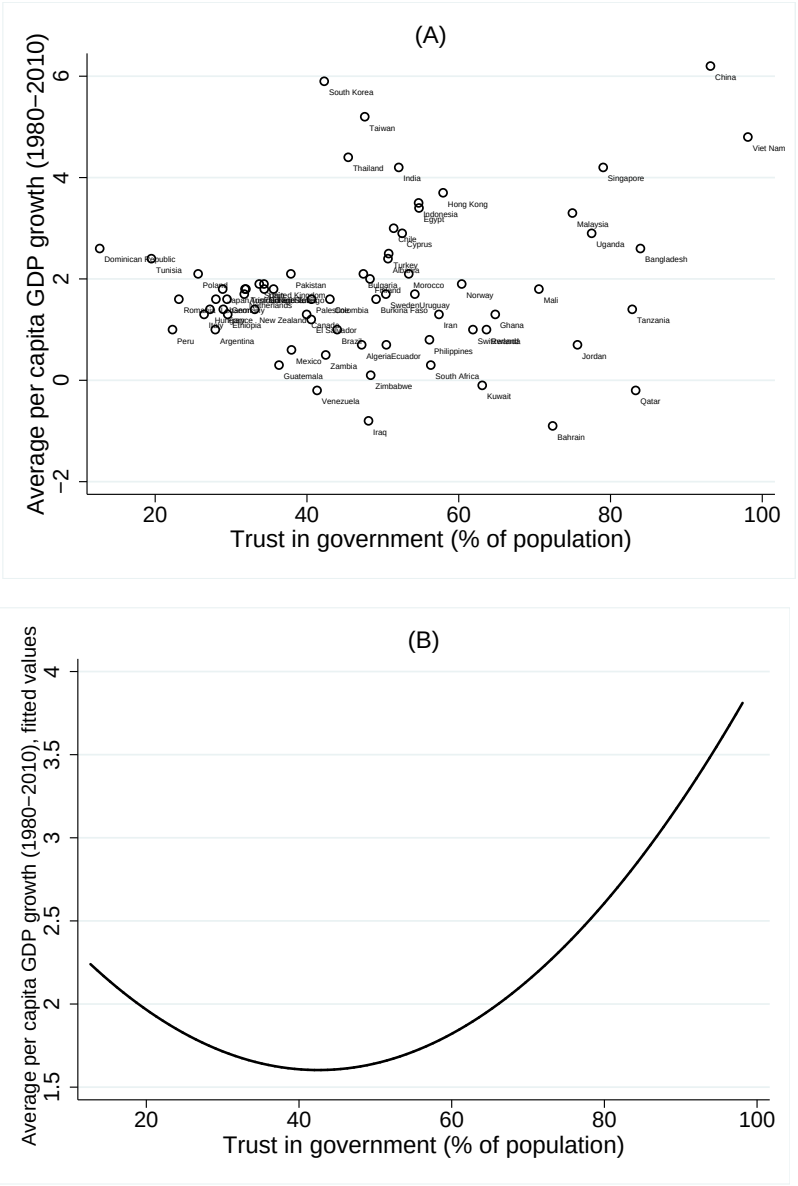


Table 4.4 presents the second-stage regressions of the 2SLS model, estimating the effect of the instrumented *Trust in government* on the average GDP growth rate. The latter is calculated in a standard Barro-type way as the difference between the logs to per capita GDP in 2010 and 1980, divided by 30. All GDP data were retrieved from the Penn World Tables (Feenstra et al., 2015).

Models (1)-(3) of Table 4.4 use only the *Autocracy* dummy as the regime-type instrument in the first stage, models (4)-(6) differentiate between autocracies and the two Communist countries in the sample. Furthermore, in columns (1) and (4), the legal origins are used as additional instruments in the first stage (see Table 4.3). All models in Table 4.4 use the log of per capita GDP in 1980 (losing observations of countries which were not sovereign in that year), the average fertility rate, and the average openness to trade as covariates (see Table A4.1 for descriptions). Regional effects are included in all specifications, with South- and (South-)East Asia as the reference region.

Table 4.4: Second-stage regressions for GDP growth rate

Growth Rate	(1)	(2)	(3)	(4)	(5)	(6)
Trust in gov.	0.021	0.016	0.011	0.024**	0.024**	0.021**
	(0.015)	(0.020)	(0.015)	(0.012)	(0.012)	(0.011)
log GDP (1980)	−0.903***	−0.905***	−0.939***	−0.901***	−0.901***	−0.933***
	(0.161)	(0.159)	(0.174)	(0.166)	(0.166)	(0.183)
Fertility	−0.863***	−0.851***	−0.658***	−0.870***	−0.871***	−0.706***
	(0.193)	(0.193)	(0.162)	(0.182)	(0.184)	(0.152)
Openness	−0	0	−0	−0	−0	−0
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Investment rate			0.041			0.033
			(0.031)			(0.032)
Rule of law			0.396**			0.363*
			(0.194)			(0.203)
Regional effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	62	62	62	62	62	62
F-statistic	14.32	15.22	17.07	17.31	16.67	20.88
Hansen J-stat., $p <$	0.411	0.124	0.665	0.537	0.197	0.755
Adj. R^2	0.622	0.640	0.682	0.609	0.607	0.638
1st stage F-stat.	3.48	3.41	2.65	12.99	18.36	14.31
Partial 1st stage R^2	0.139	0.111	0.120	0.347	0.331	0.364

Notes: 2SLS regressions, second stage results are reported. Specifications (4)-(6) use the *Autocracy* and the *Communism* dummies, specifications (1)-(3) use only the *Autocracy* dummy (including China and Vietnam) as an instrument. Besides the share of Muslims and Catholics in a country, specifications (1) and (4) use the countries' legal origin as an additional instrument. For the different geo-political regions, see Table 4.1. South- and east Asia is the reference category. Robust standard errors are in parentheses. $^{*}: p < 0.1; ,^{**}: p < 0.05; ^{***}: p < 0.01$.

Throughout all models of Table 4.4, the effect size of trust in government is fairly small; a one-percentage point increase in trust is predicted to raise economic growth by around .02%. When only the *Autocracy* dummy is used as an instrument for trust in government (columns (1)-(3)), the effect is not significant. This changes when including the *Communist* dummy gives the first-stage regressions more power, evident in the multiplied 1st stage F-statistic and the markedly in-

creased partial first-stage R^2. All models in Table 4.4 pass Hansen's J-test for overidentification, meaning that the instruments used in the first stage can be considered as exogenous (given that at least one of the instruments is *truly* exogenous). The coefficients for log GDP in 1980 and the fertility rate are highly significant and of the expected sign, while a higher openness to trade has no direct connection to economic growth in the specifications used in Table 4.4.

In columns (3) and (6) of Table 4.4, a country's average gross investment rate and the Rule of Law index are included as additional potential determinants of economic growth. While no effect is found for investments, higher institutional quality is significantly positively associated with economic development.

4.7 Indirect effects of trust on growth

Table 4.5 presents 2SLS estimations for the effect of trust on three measures which potentially affect economic growth: trust in the accountability and fairness of institutions might trigger investments by individuals or companies, subsequently facilitating growth. More trust in government might also lead to increased work in the official sector. Thus, the economy could grow by higher taxable activities, and also through less tax non-compliance. Lastly, as stated in OECD (2017), higher trust in government could stimulate consumption, leading to increased demand, and could support production and economic development.

In columns (1)-(3) of Table 4.5, the *Autocracy* dummy, together with the share of Muslims and Catholics and the countries' legal origin, are used as instruments. In columns (4)-(6), the *Communism* dummy is included as an additional instrument (see Table 4.3). The results indicate that trust in government has no significant impact on any of the three tested growth intermediaries. For social trust, Bjørnskov (2012), with a comparable 2SLS approach, finds positive effects of higher social capital on the rule of law and schooling, but also finds no effect on gross investments.[11]

[11] Testing the effect of trust on the Rule of Law in the 2SLS setting leads to a weak-instrument problem, because the political system as well as legal origins do not only determine trust but also the World Bank's governance indicators. The human capital index provided in the

Table 4.5: Second-stage regressions for growth intermediaries

	(1) Investment rate	(2) Tax Revenues	(3) Consumption	(4) Investment Rate	(5) Tax Revenues	(6) Consumption
Trust in gov.	0.079	−0.092	−68.39	−0	−0.073	−37.81
	(0.063)	(0.105)	(52.60)	(0.049)	(0.068)	(43.05)
log GDP (1980)	0.413	−0.971	4454.0***	0.329	−0.991	4486.5***
	(0.693)	(1.315)	(604.7)	(0.677)	(1.308)	(573.2)
Openness	0.012	−0.003	8.450	0.022**	−0	4.816
	(0.013)	(0.023)	(9.353)	(0.010)	(0.019)	(8.970)
Size of gov.	−0.172**	0.367**	3.811	−0.186***	0.363**	9.543
	(0.075)	(0.152)	(64.41)	(0.068)	(0.157)	(59.66)
Regional effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	58	58	58	58	58	58
F-statistic	9.42	4.64	48.03	12.70	5.21	50.46
Hansen J-stat., $p <$	0.315	0.532	0.120	0.147	0.578	0.127
Adj. R^2	0.337	0.254	0.871	0.502	0.272	0.902
1st stage F-stat.	3.87	3.87	3.87	9.94	9.94	9.94
Partial 1st stage R^2	0.146	0.146	0.146	0.285	0.285	0.285

Notes: 2SLS regressions, second stage results are reported. Specifications (4)-(6) use the *Autocracy* and the *Communism* dummies, specifications (1)-(3) use only the *Autocracy* dummy (including China and Vietnam) as an instrument. The other instruments are the shares of Catholics and Muslim in a country and the legal origin of a country. For the different geo-political regions, see Table 4.1. South- and east Asia is the reference category. Robust standard errors are in parentheses. $^{*}: p < 0.1$; ,$^{**}: p < 0.05$;$^{***}: p < 0.01$.

A more active and involved government (measured by the government expenditures as a share of GDP) has a significant negative effect on gross investments, and a positive effect on tax revenues across countries. All models in Table 4.5 pass the Sargan-Hansen J-test, first stage R^2 and F statistics are reported as well.

Table 4.6 shows the results from the 3SLS approach, regressing the average GDP growth rate on the estimated coefficients (see Table 4.5) of investment rate, per capita consumption, and in two specifications additionally on tax revenues (as a share of GDP). Columns (1) and (2) use only the *Autocracy* dummy (alongside the legal origin and the shares of Muslims and Catholics in a country) as instruments for trust in government in the first stage, columns (3) and (4) use both the *Autocracy* and the *Communism* dummy. When tax revenues are not included in the 3SLS estimation, countries with higher gross investments per capita (as a share of GDP) are predicted to experience higher growth, while increased con-

Penn World Tables and the share of the population with secondary or tertiary education were tested as a schooling-measure. While the latter and the human capital index are moderately correlated to trust in government, they have (in this sample) no connection to economic growth. Using the schooling measures returned no significant result in both the 2SLS and 3SLS setting (not reported in Tables).

sumption has no effect. When tax revenues are included, they are significantly positively associated with growth.

Table 4.6: Trust intermediaries and economic growth, 3SLS results

Growth rate	(1)	(2)	(3)	(4)
log GDP (1980)	-0.850^{*}	-1.058^{***}	0.759^{*}	-0.989^{***}
	(0.447)	(0.430)	(0.443)	(0.427)
Openness	-0	0.001	-0	0.002
	(0.003)	(0.002)	(0.003)	(0.002)
Fertility	-0.507^{***}	-0.600^{***}	-0.497^{***}	-0.595^{***}
	(0.195)	(0.171)	(0.191)	(0.170)
Investment rate	0.136^{**}	0.089^{*}	0.132^{**}	0.077
	(0.053)	(0.049)	(0.051)	(0.048)
Tax revenues	0.078^{*}		0.083^{**}	
	(0.043)		(0.042)	
Consumption	0	0	0	0
	(0)	(0)	(0)	(0)
Regional effects	*Yes*	*Yes*	*Yes*	*Yes*
Observations	57	57	57	57
R^2	0.459	0.633	0.448	0.644
χ^2	110.32	112.87	110.06	111.72

Notes: 3SLS regressions, third stage results are reported. Specifications (3) and(4) use the *Autocracy* and the *Communism* dummies, specifications (1)and (2) use only the *Autocracy* dummy (including China and Vietnam) as an instrument. The other instruments are the shares of Catholics and Muslim in a country and the legal origin of a country. For the different geo-political regions, see Table 4.1. South- and east Asia is the reference category. Robust standard errors are in parentheses. $^{*}: p < 0.1; ,^{**}: p < 0.05; ^{***}: p < 0.01$.

4.8 Robustness checks

The trust-growth link. An open question is the long-term consequence of the trust-growth link. The most-developed economies, which experienced the longest periods of economic growth, have also the "best" institutions, and the established point of view is that growth and the differences in countries' wealth is caused by persistent discrepancies in institutional quality. Glaeser et al. (2004) provide a rare exception to this prevailing view. Revisiting literature on the causal link between institutions and growth, they claim to find severe conceptual flaws and argue in favor of a reverse mechanism: poor countries can escape poverty by good policies, often introduced by autocratic leaders.

Table 4.7: Conditional correlations

Panel A: Connections of growth rate and trust in government

	Growth rate	Autocracy	Communism	Muslim share	Catholic share	Legal origin	F-statistic	R^2
(1) trust	1.997	14.60***		0.015	-0.079	Yes	4.35	0.306
	(1.855)	(4.298)		(.110)	(0.124)			
(2) trust	-0.242	10.777***	60.445***	0.093	-0.025	Yes	47.29	0.451
	(1.470)	(3.978)	5.927	(.094)	(0.109)			

Panel B: Connections of growth rate and institutional quality

	Growth rate	Autocracy	Communism	Muslim share	Catholic share	Legal origin	F-statistic	R^2
(1) Rule of law	0.014	-1.121***		-0.004	-0.011**	Yes	75.36	0.514
	(0.082)	(0.231)		(0.003)	(0.004)			
(2) Rule of law	0.058	-1.042***	-1.992***	-0.005	-0.012***	Yes	85.00	0.534
	(0.091)	(0.232)	(0.421)	(0.003)	(0.004)			

Panel C: Connections of institutional quality and economic growth

	Rule of law	log GDP (1980)	Openness	Fertility	Investment rate	Regional effects	F-statistic	R^2
(1) Growth rate	0.435**	-0.941***	-0.0	-0.588***	0.046	Yes	19.97	0.750
	(0.210)	(0.193)	(0.003)	(0.140)	(0.031)			

Note : OLS regressions. "Legal origins" and "Regional effects" are dummy variables, measured against a reference category. $N = 62$ in all specifications. Robust standard errors in parentheses. $^*p < .1$, $^{**}p < .05$, $^{***}p < .01$

The data used in the present paper suggests (without claiming to offer an answer to this debate) that a stricter rule of law is associated with higher growth rates (Panel C, Table 4.7), while the reverse case (Panel B) shows no significant correlations.[12] Panel A of Table 4.7 checks whether higher growth rates (besides the predictors introduced in Table 4.3) have a positive influence on trust in government. The results suggest that this is not the case. While higher trust in government can increase growth rates from a cross-country perspective, the reverse associations are not significant (p=.778 in model (1), p=.870 in model (2)).

Excluding extreme trust. Figure 4.3 suggests that the positive linkage between trust in government and economic development is perhaps driven by out-

[12] In Panel B of Table 4.7, institutional quality is estimated with the same predictors as trust in government, supplemented by economic growth. For explanations, see Section 4.5. Panel C uses the same covariates used to predict growth as in sections 4.6 and 4.7.

liers, especially those countries with very high trust, which mostly also experienced the strongest GDP growth in the period 1980-2010.

Table 4.8: Excluding extremely high and extremely low trust

Panel A: First-stage regressions

	Autocracy	Muslim share	Catholic share	Legal origin	N	R^2
(1) Trust	9.310**	0.108	0.008	Yes	61	0.302
	(3.866)	(0.091)	(0.102)			
(2) Trust	5.708	-0.040	-0.129	Yes	53	0.243
	(3.489)	(0.069)	(0.089)			

Panel B: Second-stage regressions

	Trust	log GDP 1980	Fertility	Openness	N	R^2
(1) Growth rate	0.053**	-0.911***	-0.911***	-0.006	55	0.524
	(0.023)	(0.246)	(0.258)	(0.005)		
(2) Growth rate	0.036**	-0.825***	-0.802***	-0.004	48	0.571
	(0.016)	(0.212)	(0.252)	(0.007)		

Panel C: Third-stage regressions

	log GDP 1980	Openness	Fertility	Investment rate	Tax rev.	Cons.	N	χ^2
(1) Growth rate	-0.567	-0.002	-0.441*	0.187**	0.110**	0	52	85.20
	(0.460)	(0.003)	(0.261)	(0.075)	(0.048)	(0.0)		
(2) Growth rate	-0.421	-0.001	-0.503*	0.106	0.095*	0	45	60.55
	(0.494)	(0.007)	(0.271)	(0.073)	(0.048)	(0.0)		

Specifications indicated with the number (1): countries are excluded if trust in government exceeds a value abover 80% or under 20%. Specifications indicated with the number (2): countries are excluded if trust in government exceeds a value abover 65% or under 25%. Explanatory variables in Panel A are used as instruments to estimate the effect of trust in government on growth in Panel B. Panel C reports the results of the 3SLS approach. Robust standard errors in parentheses. *$p < .1$, **$p < .05$, ***$p < .01$

Table 4.8 reports first, second, and third stage regressions for a sample where those countries with trust in government (1) below 20% and above 80% (see Table A4.2) respectively (2) below 25% and above 65% were excluded. Among these countries are also China and Vietnam, therefore the *Communism* dummy will not be used to instrument trust in government. For the countries in which trust lies between 20% and 80% the *Autocracy* dummy remains significant, trust in autocracies is 9 percentage points higher than in democracies. In the even more restrictive categorization in specification (2) of Panel A in Table 4.8, 45% of countries are

classified as an autocracy, compared to 51% in (1). The *Autocracy* dummy is now no longer statistically significant. Concerning the legal origin of a country, Scandinavian countries are statistically significantly more trusting compared to the Common Law countries.

The 2SLS results in Panel B show that the direct impact of trust in government on the GDP growth rate remains significant also after the exclusion of high-trusting countries. Particularly in model (1) the effect size increases compared to Table 4.4, albeit on a low level.[13] As in Section 4.7, trust in government does neither positively affect gross investments nor tax revenues or per capita consumption. Yet, Panel C of Table 4.8 shows a positive influence of the former two (in specification (1)) on the growth rate.

OECD countries only. Table 4.9 repeats the first- and second stage with the 19 OECD countries covered in the data. Because all countries (including Turkey) are rated as democracies, the *Autocracy* dummy cannot longer be used as an instrument. In Panel A, a larger share of Muslims in a country is associated with more trust in government. This finding is driven by Turkey; in all other countries the average size of the Muslim population does not exceed 5%. For the OECD countries the estimated impact of trust in government on the growth rate is very similar to the estimate in Table 4.4. Regional effects are not used in Panel B of Table 4.9 – the OECD itself is treated as a geopolitical interest group. Because of the low N, a 3SLS model (requiring nearly as many parameters) is not estimated in Table 4.9.

Controlling for WVS wave-effects. The observations for trust in government in this paper often originate from different time periods. For example, it happens that trust in country A in year 1995 is compared to trust in country B in year 2010. To account for this, I ran the first stage regression with dummy variables for the WVS survey waves 2-6 as further controls for trust in government. The dummy took a value of 1 for the wave where a respective country was surveyed. In the first stage, none of the WVS wave controls was statistically significant. In the

[13] Both specifications pass the Hansen-J test: (1) p=.594, (2) p=.414.

2SLS and 3SLS regressions coefficient sizes, statistical significance, F-statistics, and R^2 were largely unaffected compared to Tables 4.4 and 4.6.

Table 4.9: OECD countries only

Panel A: First-stage regression

	Muslim share	Catholic share	Legal origin	N	R^2
Trust	0.156*	-0.028	Yes	19	0.400
	(0.085)	(0.108)			

Panel B: Second-stage regression

	Trust	log GDP 1980	Fertility	Openness	Region effects	N	R^2
Growth rate	0.028*	-1.660***	-0.907	-0.007	No	18	0.648
	(0.014)	(0.629)	(0.622)	(0.007)			

The independent variables in Panel A are used as instruments for trust in government in Panel B. The Hansen-J statistic is 0.150. Robust standard errors in parentheses. Due to the low number of observations, estimating a 3SLS model is not applicable. *$p < .1$, **$p < .05$, ***$p < .01$

4.9 Discussion and concluding remarks

Across countries, trust in government (counter-intuitively) tends to increase as a government's trustworthiness (in terms of institutional quality) decreases. The first central finding in this study was that the political regime and its repercussions on everyday life in terms of restrictiveness, violence, and manipulation can account for this divergence. In the most-trusting countries, the media are often heavily controlled by the government. When reports about failed policies, corrupt officials, accidents, or caprice are suppressed or censored, or when only good news (real or fabricated) are disseminated, citizens perhaps have no apparent reason or incentive to openly distrust their government.

The result that the political system twists the expected positive relationship between quality of institutions and trust people put in them amends the description of different trust-cultures spread by political scientists. In autocratic regimes, the government (or a specific leader) often is the sole setter of the political and societal agenda. The norm (and rule) is to trust and to not question the leaders, and

is enforced with retaliation and intimidation. In (liberal) democracies, the reverse is the case. Encouraged and used to question those in power, trust in government is in some cases lower than objectively "deserved", based on its actions.

The media, international organizations (e.g. OECD, 2017) and political scientists argue that trust in government plays an important role for countries' economic development, in particular by stimulating investments, consumption, and tax compliance. Until now, however, these claims have not been empirically analyzed, and this paper is the first to provide some (albeit not definite) answers.

This study finds that trust in government can have positive direct ties to economic growth. In the period of 1980-2010, especially dynamic (emerging) economies with fast-improving living conditions have trusted governments, while in many rich and saturated economies, skepticism (despite well-working institutions) predominates. Possible reasons might be the fear of social and economic descent in an increasingly globalized world, while in emerging economies people rather perceive chances for advancement. The direct links between trust and economic development might lie in the lapse of legal hurdles and tedious democratic decision-making processes. When the government and its decisions are not or cannot be challenged by citizens, investment decisions (e.g. infrastructure) can be processed quicker and without considering workplace safety or health concerns, or competitive tendering procedures.

The economic impact of trust on growth is negligible. Perhaps the more insightful formulation of this result is that trust in institutions – although it might not be truly felt, deserved, or justified by authorities' actions – does not harm economic development. Complementing the finding in this paper, Rothstein (2015) discussed what he called in the paper's title the "Chinese Paradox of High Growth and Low Quality of Government" and argued that the paradox could be solved when it was accepted that not only the Western model based on the rule of law, but also a system "marked by high commitment to a specific policy doctrine" (p. 533) can be suitable for effective policy implementations and economic development.

Indeed, it is debated whether institutions are sclerotic (in their quality), or, paraphrasing Glaeser et al. (2004), whether the quality of government will increase

as a consequence of citizens becoming wealthier, more educated, informed, and mobile. Rothstein (2015), on the other hand, argues in favor of a third option: countries like China, Vietnam, or Malaysia might have found a way where increased economic openness combined with socially restrictive governments leads to economic development without high-quality institutions in a Western sense.

The present paper does not find support for the claim that trust in government positively impacts economic growth via intermediaries like investments or increased consumption. Following arguments from political sciences, it seems likely that trust in government does not automatically translate into social trust, which has found to be of some importance for economic growth (see Section 4.3). Rothstein and Uslaner (2005) argue that social trust is caused by authorities that are able to promote and secure equal opportunities and social cohesion, and are able to reduce economic inequality. This is the case in developed economies, but rarely observed in developing or emerging economies.

Trust in government is prone to manipulation and shaped by deeply rooted norms and policy doctrines. Arguably, social capital is ultimately more important for a country's economic development because it represents how well a government performed in creating a societal environment where equality, security and dependability enabled strangers to trust each other in daily interactions and transactions. Trust directed at specific powerful institutions can be biased by fear, hatred, or admiration. This relationship between government and citizens should, however, not be ignored, since connections are often enough quite direct (think about paying taxes or interactions with the bureaucracy), and the consequences of interactions important for economic and social outcomes.

Appendix Chapter 4

Table A4.1: Sources and Descriptions of the data

Variable	Source	Description
Trust in government	World Values Survey (waves 2-6)	Share of respondents answering with "quite a lot" or "a great deal" to the question "How much confidence do you have in your national government".
"Rule of Law" index	World Governance Indicators (World Bank)	Yearly estimates provided since 1996. Values for a country can range between -2.5 & +2.5 and are zero-centered (for all countries per year).
GDP data	Penn World Tables, release 9	Available on a yearly basis, averages for the period 1980-2010 were calculated. **GDP growth:** the difference to log per capita GDP in 2010 and 1980, divided by 30.
Religious denomination	CIA World Factbook (2018)	Share of population identified as Catholic, Protestant, Muslim, etc.
Legal origins	La Porta et al. (1999)	Dummy-coded. Categories are: UK, French, German, Scandinavian
Fertility rate	gapminder.org via V-Dem, v8	30 year average of the expected mean number of children born to a woman over her lifetime.
Openness to trade	World Bank	30-year average of the sum of imports and exports of goods and services (as a share of GDP)
Government expenditures	World Bank	30-year average of total government expenditures as a share of GDP
Tax revenues	World Bank	30-year average of overall tax revenues as a share of GDP
Investment rate	World Bank	30-year average of the gross capital formation in a country (share of GDP)
Consumption	Penn World Tables, release 9	30-year average of per capita consumption (share of GDP)
Politico-geographic regions	Quality of Government Standard Dataset via V-Dem (2018)	dummy-coded, regions features as described in Table 4.1.
Regime type	Regimes of the World (RoW) measure, via V-Dem (2018)	Four types: Closed- and electoral autocracy, electoral- and liberal democracy. In this paper, both autocracy types are combined in the *Autocracy* indicator

Note: The V-Dem indicators introduced in Section 4.2 are described separately in Table A4.3.

Table A4.2: List of countries

Country	Trust (%)	Growth (%)	Regime type	Country	Trust (%)	Growth (%)	Regime type
Albania	50.68	2.4	EA	Libya	26.79	–	CA
Algeria	47.21	0.7	CA	Lithuania	36.30	–	LD
Andorra	33.00	–	–	Malaysia	74.98	3.3	EA
Azerbaijan	88.46	–	EA	Mali	70.56	1.8	EA
Argentina	27.92	1.0	ED	Mexico	37.96	0.6	EA
Australia	31.84	1.8	LD	Moldova	37.49	–	ED
Bahrain	72.38	-0.9	CA	Montenegro	36.66	–	EA
Bangladesh	83.94	2.6	EA	Morocco	53.14	2.1	CA
Armenia	40.91	–	EA	Netherlands	31.74	1.7	LD
Bosnia and Herzeg.	29.53	–	EA	New Zealand	33.12	1.4	LD
Brazil	43.98	1.0	ED	Nigeria	35.60	1.8	EA
Bulgaria	47.44	2.1	EA	Norway	60.39	1.9	LD
Belarus	53.23	–	EA	Pakistan	37.88	2.1	EA
Canada	39.96	1.3	LD	Peru	22.28	1.0	ED
Chile	51.42	3.0	ED	Philippines	56.14	0.8	EA
China	93.17	6.2	CA	Poland	25.66	2.1	ED
Taiwan	47.62	5.2	EA	Puerto Rico	49.54	–	–
Colombia	43.02	1.6	ED	Qatar	83.32	-0.2	CA
Croatia	52.20	–	ED	Romania	23.12	1.6	EA
Cyprus	52.55	2.9	ED	Russia	40.83	–	EA
Czech Republic	38.36	–	ED	Rwanda	63.65	1.0	CA
Dominican Republic	12.69	2.6	ED	Serbia	25.64	–	EA
Ecuador	50.46	0.7	ED	Singapore	79.04	4.2	EA
El Salvador	40.56	1.2	EA	Slovakia	40.65	–	LD
Ethiopia	29.56	1.3	EA	Viet Nam	98.10	4.8	CA
Estonia	52.06	–	LD	Slovenia	23.83	–	LD
Finland	48.30	2.0	LD	South Africa	56.32	0.3	ED
France	28.97	1.4	LD	Zimbabwe	48.40	0.1	EA
Georgia	41.17	–	EA	Spain	33.71	1.9	LD
Germany	29.47	1.6	LD	Sweden	50.40	1.7	LD
Ghana	64.81	1.3	EA	Switzerland	61.87	1.0	LD
Guatemala	36.32	0.3	EA	Thailand	45.44	4.4	EA
Hong Kong	57.94	3.7	CA	Trinidad and Tob.	31.95	1.8	LD
Hungary	27.21	1.4	ED	Tunisia	19.50	2.4	EA
India	52.10	4.2	ED	Turkey	50.77	2.5	ED
Indonesia	54.71	3.5	EA	Uganda	77.52	2.9	EA
Iran	57.39	1.3	EA	Ukraine	35.86	–	EA
Iraq	48.11	-0.8	CA	Macedonia	15.23	–	ED
Italy	26.44	1.3	LD	Egypt	54.77	3.4	EA
Japan	28.89	1.8	LD	United Kingdom	34.33	1.9	LD
Kazakhstan	74.95	–	EA	Tanzania	82.86	1.4	EA
Jordan	75.65	0.7	CA	United States	34.37	1.8	LD
South Korea	42.27	5.9	ED	Burkina Faso	49.11	1.6	EA
Kuwait	63.09	-0.1	CA	Uruguay	54.22	1.7	LD
Kyrgyzstan	48.25	–	EA	Uzbekistan	97.13	–	CA
Lebanon	28.00	1.6	EA	Venezuela	41.33	-0.2	ED
Latvia	38.32	–	LD	Yemen	29.79	–	EA
				Zambia	42.47	0.5	EA

The growth rate is reported as missing when per capita GDP was not available in 1980. Autocracies: no de-facto multiparty elections. CA: closed autocracy; EA: electoral autocracy, de-jure multiparty elections; ED: electoral democracy; LD: liberal democracy, rule of law and liberal principles fully satisfied.

Table A4.3: V-Dem democracy indicators

Indicator name	Type	Mean (democracy)	Mean (autocracy)	Correlation with trust
Government control over media and media bias				
Media censorship efforts	EO (0-4)	3.16	1.48	-.395***
Internet censorship efforts	EO (1-4)	2.88	2.28	-.375***
Independent & critical press	EO (0-3)	2.54	1.60	-.438***
Pluralistic media	EO (0-3)	2.58	1.52	-.459***
Pro-government bias	EO (0-4)	2.35	1.39	-.426***
Self-censorship	EO (0-3)	3.35	1.97	-.463***
Corrupt activities				
Bribery on executive level	EO (0-4)	2.67	1.45	-.151
Corruption (public sector)	EO (0-4)	2.65	1.43	-.126
Rent-seeking (public sector)	EO(0-4)	3.03	1.75	-.144
Gov. working for the common good	EO (0-4)	3.06	2.60	-.135
Clientelism	IX	.73	.45	-.019
Ideals of democracy				
Electoral democracy	IX	.75	.32	-.433***
Liberal democracy	IX	.65	.21	-.376***
Participatory democracy	IX	.52	.17	-.405***
Egalitarian democracy	IX	.62	.24	-.367***
Clean elections	IX	.83	.34	-.327***
Quality and protection of personal rights and freedoms				
Equality before the law	IX	.86	.55	-.299***
Freedom of academic expression	EO (0-4)	3.22	2.00	-.424***
Freedom of speech	EO IX	.85	.49	-.431***
Freedom of religion	EO (0-4)	3.61	2.70	-.303***
No political killings	EO (0-4)	3.36	2.34	-.112

All indicators are 30-year averages of the period 1980-2010. EO: expert opinion, IX: index, running from 0 to 1. Higher values indicate better achievement of media freedom, accountability, democratic ideals and the protection of rights and freedoms. The numbers in parentheses indicate the range. ***: $p < .01$.

Table A4.4: Principal Component Analysis (V-Dem)

Indicator name	Loading	Unexplained
Government control over media and media bias		
Media censorship efforts	.416	.103
Internet censorship efforts	.358	.338
Independent & critical press	.421	.079
Pluralistic media	.419	.089
Pro-government bias	.413	.116
Self-censorship	.419	.089
Eigenvalue = 5.186; ρ = .864		
Corrupt activities		
Bribery on executive level	.474	.133
Corruption (public sector)	.484	.097
Rent-seeking (public sector)	.476	.127
Gov. working for the common good	.332	.574
Clientelism	.452	.211
Eigenvalue = 3.857; ρ = .771		
Ideals of democracy		
Electoral democracy	.451	.024
Liberal democracy	.453	.017
Participatory democracy	.448	.036
Egalitarian democracy	.446	.045
Clean elections	.437	.083
Eigenvalue = 4.794; ρ = .959		
Quality and protection of personal rights and freedoms		
Equality before the law	.475	.078
Freedom of academic expression	.466	.115
Freedom of speech	.473	.088
Freedom of religion	.422	.274
No political killings	.395	.362
Eigenvalue = 4.083; ρ = .817		

Unexplained is the variance (in %) left unexplained by the first principal component.

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