



# Perceptions of Unreported Economic Activities in Baltic Firms. Individualistic and Non-Individualistic Motives

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# Perceptions of Unreported Economic Activities in Baltic Firms. Individualistic and Non-Individualistic Motives

Jaanika Meriküll, Tairi Rõõm and Karsten Staehr\*

## Abstract

This paper analyses managerial dishonesty in the form of economic activity not reported to the authorities. We employ data from a survey of Baltic firm managers, who were asked to assess the prevalence of unreported profits, employment and wages in their industry and to give their views on a range of questions related to various reasons for dishonest behaviour. Unreported economic activities are perceived to be widespread, although their extent and composition vary across the three countries. We employ a principal component analysis of the survey answers and identify three clusters capturing both individualistic and non-individualistic motives for dishonest behaviour: 1) reciprocity towards government; 2) rational choice related motives; and 3) norms towards society as proxied by the tolerance of illegal activities. The econometric analysis indicates that all three motives are related to perceptions of unreported activities in the Baltic countries.

JEL Code: E61, F36, F41

Keywords: unreported economic activity, tax evasion, tax morale, norms, governance, social coherence, Baltic countries

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## Non-technical summary

This paper analyses managerial (dis)honesty in the form of economic activity not reported to the authorities. Management may decide to act in a dishonest way and leave profits, employment, wages, etc. unreported in order to evade taxes or government regulation and in this way attain economic benefits.

Two main strands of theories explain unreported economic activity. The first strand consists of theories that rely on the assumption that the decision-maker is individualistic and rational, i.e. behaves like *homo economicus*. The second strand posits that non-individualistic motives play a role. Management might see taxation as a reciprocal payment for government activities or might see tax payments as part of a social contract under which everybody has to contribute to society.

This paper investigates the linkages between unreported economic activities by firms operating in the Baltic countries and various explanatory factors that relate to individualistic and non-individualistic motives. The data are from 2010 and come from the SSE Riga survey, which covers firms operating in Estonia, Latvia and Lithuania (Sauka and Putnins (2011)). In the survey the managers interviewed were asked to assess the prevalence of unreported profits, employment and wages in their industry and to give their view on a range of questions relating to their firm and to societal matters.

In the SSE Riga survey, Latvia generally stands out as having the highest prevalence of perceived unreported activity in 2010, although the differences are not large across the Baltic countries. The shares of unreported profits were around 20% of total profits in Estonia and Lithuania and 26% in Latvia. The extent of unreported employment is fairly similar across the Baltic countries at around 14–17% of total employment. Finally, the share of undeclared wages in total wages was the smallest in Lithuania at 22%, slightly larger in Estonia at 24% and the largest in Latvia at 31%. These sample-weighted percentage shares are based on the perceptions of managers and are, evidently, very uncertain.

The empirical analysis consists of three parts. The first part employs a principal component analysis to map the explanatory variables into three different clusters. The first cluster contains variables which are related to perceptions of reciprocity towards government. The second cluster consists of variables that can be linked to rational choice motives. Finally, the third cluster comprises variables that depict the tolerance of various illegal activities such as tax evasion and bribery, and this cluster can be interpreted as capturing the perception of a social contract.

The second part of the empirical analysis involves regressions in which the perceived unreported activities are explained by various variables reflecting different motives for under-reporting. The analysis shows that a number of variables reflecting firm and management characteristics exhibit only weak explanatory power over the perceived extent of unreported activity. This is an indication that the respondents in the SSE Riga survey were indeed reporting their perception of unreported activity in their industry, not in their own firms.

In general, the regression results are supportive of all the theories of unreported activity which can be tested given the data. We find that the quality of various forms of government service is negatively related with the perceived extent of unreported activity. The importance of reciprocity towards government is also confirmed by the regression analysis. Four questions in the SSE Riga survey allow us to assess the extent to which the perceived unreported activity stems from rational choice motives. The estimations indicate that the variables capturing rational choice motives were positively related to the perceived extent of unreported activity. Finally, social norms or the perception of a social contract also seem to be of importance. In particular, managers' assessments of the prevalence of (negative) social norms, such as tolerance of tax evasion or bribery, are positively related to the perceived level of unreported activity.

The third part of the empirical analysis assesses the relevance of different motives for unreported activity in each of the three Baltic countries. The analysis uses the three clusters from the principal component analysis in order to assess the relative importance of social norms, reciprocity towards government and rational choice. The individualistic rational choice related motives are the most relevant for explaining differences in perceived unreported activity. The non-individualistic motives related to reciprocity towards government and the perception of a social contract also appear to be of importance, although to a lesser extent. Overall, the results highlight a complex interaction between individualistic and non-individualistic motives and the prevalence of unreported economic activity.

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“How selfish soever man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it except the pleasure of seeing it.”

Adam Smith (1767, p.1)

## 1. Introduction

This paper considers a specific manifestation of dishonest behaviour in management, namely unreported economic activities. The management of firms can choose to conceal employment, salary payments or profit data from the authorities in order to evade taxation or elude regulation. Such behaviour may lead to distortion of competition, misallocation of resources, lower tax revenues and ineffectiveness of government regulation. It is thus important to improve the understanding of this form of dishonesty, both from the management perspective and from the perspective of society as a whole.

The management practice of leaving economic activities unreported is chiefly motivated by a wish to reduce the cost of taxation, staff salaries, supplies or regulatory compliance (see Section 2). Economic theory posits that the extent of unreported activities is determined by the direct pecuniary benefits and costs of such behaviour being traded off. The baseline model of rational individualistic choice assumes that the costs are related to the possibility of being caught and the resulting pecuniary punishment. The decision is subject to many sources of uncertainty which makes the decision-making complex.

The baseline model of rational individualistic choice has traditionally dominated research on tax evasion and other forms of unreported economic activity. The assumption of purely individualistic behaviour as the only explanation of unreported activities has recently been questioned. The costs of unreported economic activities may also be affected by non-pecuniary factors related to moral convictions and perceptions of fairness in society (Alm et al. (2010)). Dishonesty in the form of tax evasion may thus be traced back to the *tax morale* or, even broader, *societal morale* in society, i.e. a multitude of non-individualistic preferences reflecting different cultural, governmental and societal contexts.

Numerous empirical studies have sought to ascertain the importance of both individualistic and non-individualistic factors on tax evasion and other forms of unreported economic activities (see Section 3). Most studies find at

least indirect support for individualistic factors playing an important role. Various firm characteristics such as the size, age and sector of the firm are of importance for the extent of unreported activity, presumably because they are related with the economic benefits and costs associated with it (Kirchler et al. (2010)). Other studies find that non-individualistic factors also play a role, in particular the satisfaction with government policies and perceptions of the social acceptability of tax evasion and corruption.

Most studies on the importance of non-individualistic factors on unreported activities are undertaken using data on advanced economies in Western Europe or the USA. Few studies deal with the former transition countries in Central and Eastern Europe and even fewer with the Baltic countries. Putnins and Sauka (2011) report results using the SSE Riga dataset and conclude that managers working in recently established firms or in the construction sector generally perceive unreported activities to be very prevalent in the Baltic countries. Moreover, managers perceive tax evasion to be more common when they are unhappy about tax levels and government performance, when tax evasion is perceived to be socially acceptable and when firms have economic problems. McGee et al. (2008) surveyed university students in Estonia and found that tax evasion was deemed more acceptable if the tax system is seen to be unjust, if tax rates are excessively high, if the government is corrupt or wasteful, or if the taxpayer faces economic hardship.

This paper considers the prevalence and determinants of different types of economic activity not reported to authorities by the management of firms operating in Estonia, Latvia and Lithuania. The main focus is on the linkages between the perceived extent of unreported activities and the prevalence of individualistic and non-individualistic behaviour by management. The individualistic behaviour relates to narrow rational behaviour as typically associated with *homo economicus*. Non-individualistic behaviour may stem from absolutistic views on honesty, satisfaction with government and various forms of societal norms.

We employ principal component analysis in order to determine how survey questions about managers' perceptions cluster into groups of individualistic and non-individualistic factors. Given our groupings, we seek to analyze how various theories of unreported activities are related with the perceived extent of unreported activities. The analysis is based on a survey that was conducted in 2010 by researchers at the Stockholm School of Economics in Riga (Sauka and Putnins (2011)). The SSE Riga survey is distinctive in the way information on unreported activities was collected. The survey asked managers of firms in the three Baltic countries to state what they *perceive* to be the extent of unreported activities by firms operating in the same industry as their own firm. Targeting the perceived unreported activities in the indus-



try rather than in the responding firm itself reduces the risk of the respondent understating the extent of unreported activities.<sup>1</sup>

The rest of the paper is organized as follows. Section 2 contains a review of the theoretical and empirical literature on the extent and determinants of unreported activities. Section 3 gives background information for the three Baltic countries in order to facilitate the interpretation of the empirical results. Section 4 presents the dataset used in the empirical analysis. Section 5 provides descriptive statistics on the perceived extent of unreported activities and the explanatory factors used in the regressions. Section 6 contains econometric analysis seeking to establish linkages between measures of tax morale and unreported activities. Finally, Section 7 summarizes the paper.

## **2. Unreported economic activity in theory and in empirical studies**

Management of firms may choose not to report employment, turnover or profits to the authorities for a number of reasons. Arguably the most important argument for not fully disclosing economic activities is to evade taxation, including value-added tax, social security contributions, labour income taxes and corporate income taxes. Other reasons may be that the activity is itself illegal, that the firm seeks to circumvent regulation of occupational health and safety conditions or that the required administrative and reporting procedures are considered excessive (Kirchgässner (2011)). In all cases, there is an economic incentive to leave economic activities unreported. We will generally not distinguish between these two reasons for unreported activities and typically use the terms “unreported activity” and “tax evasion” interchangeably.

### **2.1. Theories of tax evasion**

#### *Individualistic preferences*

The starting point is the theory of tax evasion as a model of individualistic rational choice. The theory, or at least the mathematical formalization of such a theory, dates back to Allingham and Sandmo (1972) and Yitzhaki (1974). The object of analysis is an economic entity that is legally entitled to report

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<sup>1</sup> Beyond arguably more precise estimates of tax evasion, the measures of perceived unreported activities may also reveal possible self-reinforcing dynamics as tax morale in a society is likely to be dependent on perceived tax evasion (Torgler and Schneider (2005), Frey and Torgler (2007)).

economic activities such as sales, value added, wage payments or profit to the authorities.<sup>2</sup> It is assumed that the decision-maker, e.g. management, acts as *homo economicus*, a rational and egoistic actor who makes decisions based only on monetary flows or stocks, and decides how much of an economic activity to report to the authorities.

The model of unreported activities or tax evasion implies a decision under uncertainty for which the possible benefit from evasion is weighed against the cost in utility terms (Sandmo (2005)). The benefit is the reduced tax payment, which depends on e.g. the tax rate, minus the direct cost of the evasion, e.g. from using cash instead of a bank transfer. The expected cost relates mainly to the disutility stemming from the possibility of being caught and subsequently punished, which depends on factors such as the intensity of auditing and the punishment following detection.

The baseline rational choice model assumes that the firm is risk neutral, in which case the expected cost of evasion is simply the probability of detection times the pecuniary cost incurred following detection. To the extent that tax rates, the direct cost of evasion, auditing intensities, fines etc. are similar across different firms, the degree of tax evasion could also be expected to be relatively similar across the firms. It is conceivable, however, that the direct evasion costs, auditing intensities and possibly also fines will vary across different sectors, firm sizes and other firm characteristics, in which case such factors may end up affecting the evasion decision.

The assumption of risk neutrality can be relaxed. In this case the expected cost of evasion will also depend on the degree of risk aversion of the firm, presumably the risk aversion of the owners, top management or the managers responsible for reporting to the authorities. More risk aversion entails a higher expected cost of evasion and therefore more truthful reporting of economic activity. Risk preferences may be seen as reflecting inherently individualistic preferences among owners or management, but they may also reflect non-individualistic features such as the performance of the firm. As an example of the latter, *moral hazard* may emerge in underperforming firms with a high probability of default in the immediate future; management may in this situation engage in tax evasion to increase the probability of the firm surviving.

The extent of tax evasion varies substantially across countries that share many common features. This observation has given rise to a theoretical literature stressing the possibility of multiple equilibria (Myles and Naylor (1996),

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<sup>2</sup> The model considers the decision-making of *one* entity. Some cases of tax evasion, such as undeclared wages, entail the involvement of two parties, the firm paying out and the employee receiving the wages. The interaction and possible conflicting interests between the two parties are typically not modelled in theoretical models.

Cule and Fulton (2009)). The probability of auditing and hence the probability of being caught evading tax is likely to be a decreasing function of the extent of tax evasion in society. Similarly, the social stigma of being caught may be a decreasing function of the prevalence of tax evasion. This implies that the incentive to leave taxes unreported is positively related to the size of the unreported economy and this makes possible multiple equilibria. If tax evasion is limited, there is little incentive to evade taxes, whereas if it is pervasive, the risk from evading taxes is small. Such models suggest that path dependence may be important; a country can experience relatively little tax evasion or alternatively be caught in a “high evasion trap”.

A particular form of tax evasion emerges when it is possible for the management or owners of firms to influence the probability of their being audited, the effectiveness of the audit, the fines, or other factors affecting the expected disutility from evasion. This may for instance be the case when firms can use bribes or political influence-peddling to interfere in the work of tax authorities and courts. This suggests that tax evasion and political and bureaucratic corruption may coexist and in some cases even reinforce each other (Escobari (2012)).

The models discussed so far assume a strictly rational approach to choices under uncertainty. Research within behavioural economics and economic psychology posit, however, that economic agents such as members of management may not make fully rational decisions when subject to a choice under uncertainty, but instead may make decisions based on rationality that is bounded in different ways (Hashimzade et al. (2012, Sec. 3), Webley et al. (1991, Ch. 4)).

The decision under uncertainty might depend on the *framing* of the problem at hand. The prospect theory of Kahneman and Tversky (1979) is one prominent theory of bounded rationality, building on the importance of the framing of the choice problem. Management may for instance make different decisions for problems entailing the same pay-offs depending on whether the adverse outcome is framed as a loss or just a reduced gain.

Framing is typically seen to be of particular importance when the decision problem is complex and includes uncertain factors for which no objective expectations are available. In such situations, economic agents may give up solving the problem under uncertainty and instead resort to “rule of thumb” decisions. One example of such bounded rationality is *inertial* decision-making, where the choice or behaviour from earlier periods is repeated (Webley et al. (1991, Ch. 4)).

### *Non-individualistic preferences and tax morale*

It has generally been assumed that benefits and costs stem entirely from pecuniary flows. It is possible, however, that the expected costs of being caught evading tax also include non-pecuniary costs that relate to non-individualistic preferences. This suggests that the extent of reporting to the authorities may depend on broader societal norms and attitudes (Kirschgässner (2011)).

One example is the cost from embarrassment, loss of reputation or social stigmatization when taxpayers are caught having left economic activities unreported. Such costs are likely to depend on the specific context, e.g. whether information is disseminated on evaders who have been discovered and how tax evaders are looked upon in society.

Even if there is no chance – or only a remote chance – of detection and subsequent punishment in the form of fines or stigmatization, firm management may still abstain from tax evasion. As management chooses to forsake essentially risk-free ways of improving profits or other performance measures, such behaviour implies that evasion is thought to be associated with a large disutility irrespective of the probability of auditing and detection. A number of factors could affect this psychic utility cost of tax evasion.

One factor is predicated on religious or moral convictions that laws and other requirements set out by government authorities should be followed in all cases, simply because it is “the right thing to do”. In this case tax evasion is associated with extreme psychic disutility and, hence, is unacceptable for firm management in all circumstances. This is an extreme or *absolutistic* case of *tax morality* stemming from strict adherence to authority or belief systems (Kirschgässner (2011), McGee et al. (2008)).

Another factor that may enhance tax compliance is the perception by taxpayers of *reciprocity towards government*. The government delivers services and income transfers, and the taxpayer sees taxation as the “price” paid for these government activities. If the government delivers the desired services and transfers, the taxpayer perceives an obligation of repayment in the form of tax payments and this may enhance tax compliance (Kirschgässner (2011)). In this view tax compliance is invoked by reciprocal behaviour and tax morale becomes intertwined with the performance of government. Schnellenbach (2010) uses the term *vertical reciprocity* to capture the reciprocity between the taxpayer and the government.

Another factor which may enhance tax compliance is the possibility that the individual taxpayer believes that other taxpayers abstain from evasion. The taxpayer may discern the existence of a *social contract* under which all

or most taxpayers act non-individualistically (Vihanto (2003)). In this context tax morale is a result of a social contract based on a high degree of generalized trust across society. Schnellenbach (2010) uses the term *horizontal reciprocity* to capture this perception of a social contract between individuals and firms in society.

A closely related motive for non-individualistic behaviour is that taxpayers believe that the economic system and the tax system provide fair outcomes. This may be of particular importance for personal income taxes, which typically entail redistribution. Tax compliance might suffer if individuals see the income distribution and the tax system as providing unfair outcomes. In this situation, individuals with low pre-tax income may see tax evasion as a means of reaching a more equitable – and presumably fairer – post-tax income distribution (Webley et al. (1991, Ch. 3)).

## 2.2. Empirical studies

The theoretical literature provides numerous reasons why management might engage in (dis)honest behaviour in reporting their activities to the authorities. The reasons can conveniently be divided into two strands. The first strand assumes individualistic behaviour, in which case honesty is entirely the result of self-interest. The behaviour takes into account direct pecuniary benefits and costs, e.g. tax rates, auditing schemes and fines, and also characteristics of management such as risk preferences and bounded rationality. The second strand assumes that management decisions may reflect non-individualistic preferences, in which case honesty may be the result of various components of tax morale. The tax morale may stem from absolutistic values, reciprocity towards government or perceptions of fairness in society.

The empirical literature can be divided into two parts. One part provides estimates of the extent of unreported activities, for instance in the form of production, employment or wages concealed from the authorities. Another part seeks to assess how different factors affect the prevalence of unreported activities. Space limitations demand that we focus only on the latter.

Studies generally find that a range of firm-specific variables, such as sector, firm size and performance, have substantial explanatory power. The extent of unreported activities is typically larger in sectors such as construction and services than in other industries. Different proxies of management's risk aversion similarly exhibit explanatory power in many studies (Schneider and Enste (2000)).

Meriküll and Staehr (2010) find for the Baltic countries that firm characteristics are correlated with the prevalence of unreported employment. Unre-

ported employment is more prevalent in the construction sector, in small firms and in firms with growing employment. Changes in sectoral composition, firm size etc. can, however, only explain a small part of the developments in unreported employment across time, which may suggest that changes in tax morale and broader societal developments may also be relevant. Kriz et al. (2008) show that company characteristics have substantial explanatory power for different forms of unreported activities in Estonia. Moreover, relatively disenfranchised individuals are the most likely to receive undeclared wages.

Such results lend support to the individualistic choice model, but it is clear that other factors must also be of importance. First, the extent of unreported economic activities varies substantially across countries that are in many other respects similar. Second, since the probabilities of audit and the levels of fines are low in practice and taxpayers are typically found to be only moderately risk averse, the individualistic rational choice model would predict much more tax evasion than is typically observed (Hashimzade et al. (2012)).

The literature survey in Kirschgässner (2011, Sec. 6) concludes that empirical studies have generally shown that tax morale is an important determinant of tax evasion. Religious observance, democratic rights, confidence in the government and many other factors may help to explain tax morale. It is underscored in the survey that it can be difficult to identify the exact channel through which a given factor affects tax evasion. A high auditing rate, for instance, will affect the expected cost of evasion, but it may also influence the reputational cost of being caught and the perception of a social contract.

Alm and Torgler (2006) observe that tax morale or the willingness to pay taxes differs substantially between the USA and many West European countries and attribute this to cultural differences. Torgler and Schneider (2006) use the data from the World Value Survey to ascertain the factors that shape tax morale in a number of European countries. They conclude that religion, culture, trust in the government, national pride and democratic orientation help to explain tax morale. However, the relative importance of these factors varies substantially across the countries surveyed. In a survey in Sweden, taxpayers stated the *perceived* evasion of different taxes and their trust in other taxpayers and the government as influential factors (Hammar et al. (2009)). The perceived tax evasion was negatively related to both types of trust, but trust in the government was the most important.

Turning to the post-communist countries, Torgler (2003) uses data from World Value Surveys undertaken immediately after communism was abandoned (1990–1993) and again five years later (1995–1997). The tax morale was higher in Central and Eastern European countries than in the countries emerging from the Soviet Union and this difference increased during the

five-year span. The tax morale depends *inter alia* on the trust in the legal system and in government in general. Hanousek and Palda (2004) analyze surveys of individuals in Central European countries and find evidence that their willingness to pay taxes depends in large part on the perceived quality of government services. They conclude that reciprocity is important for tax compliance.

The paper by Uslander (2010) is based on the 2002 and 2005 BEEPS surveys of businesses in a large number of transition countries and has substantial affinity to this paper.<sup>3</sup> Managers are interviewed and asked what share of sales the typical firm in their area of business reports for tax purposes. The results for the impact of auditing and control are ambiguous, possibly because such measures also lead to increased corruption, which facilitates tax evasion. The efficient provision of government services seems to be a very important factor for the tax compliance decisions of firms in transition countries.

### **2.3. Theory and empirical studies in review**

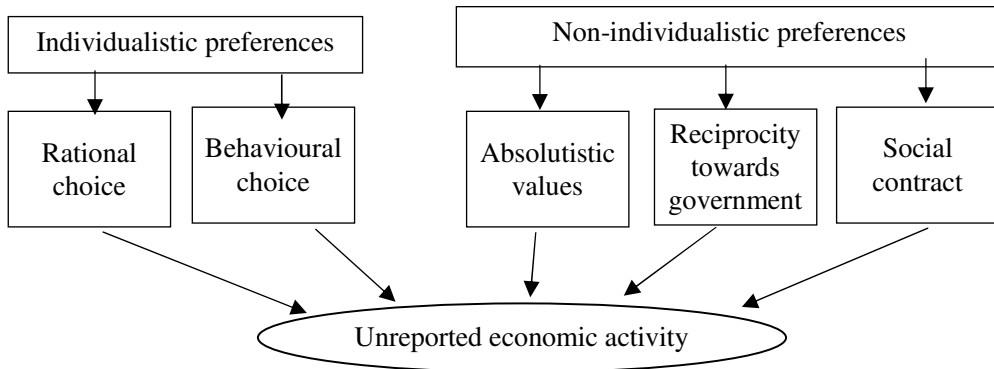
The starting point of theories explaining unreported economic activities is the assumption that management of a firm trades off benefits and uncertain costs. There are two main strands of theories; see Figure 1. The first strand consists of theories which generally assume that the decision-maker acts as *homo economicus*, i.e. the decision-maker is strictly individualistic and rational, and all benefits and costs are purely pecuniary. In some cases the decision-making problem may be very complex and entail uncertainty that is difficult to determine, and this may lead to a behavioural choice that is not strictly rational.

The second strand of theories posits that non-individualistic factors play a role in whether management chooses to leave economic activities unreported. We distinguish between three different underlying reasons. First, management might have absolutistic values that affect the psychic costs of tax evasion or other unreported activities. Second, management might see taxation as a reciprocal payment for government activities and therefore see its tax obligations as necessary and fair. Third, management might see tax payments as stemming from a social contract under which everybody is obliged to contribute to society and to follow the rules of society. The three explanations of non-individualistic preferences may together be seen to produce a *tax morale* under which decisions on tax evasion or other unreported activities are not driven only by narrow motives of self-interest.

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<sup>3</sup> The BEEPS is the Business Environment and Enterprise Performance Survey administered by the World Bank.

Figure 1: The determinants of unreported economic activity



Most empirical studies consider the theories of individualistic choice as an explanation for tax evasion, often somewhat indirectly. It is typically found that a number of firm characteristics such as industry, size and business performance are important explanatory factors, presumably because these factors determine the benefits and costs of unreported activities. Studies also suggest that factors depicting non-individualistic preferences are of importance, but there appears to be substantial heterogeneity across different countries, time periods and study methodologies. Overall, the theoretical and empirical literature makes it reasonable to hypothesize that both individualistic and non-individualistic factors play an important role in the prevalence of unreported activities in the Baltic countries.

### 3. The Baltic countries: tax systems, values and unreported activity

The Baltic countries constitute an interesting region for empirical research of unreported activities. The three countries regained their independence from the Soviet Union in 1991 and share much of their economic and institutional background. To facilitate the interpretation of the empirical results, this section presents key information on the three Baltic countries with special focus on the economy, the tax system, government effectiveness and trust in society.

In 2010 GDP per capita adjusted for differences in purchasing power reached 58.3% of the EU15 average in Estonia, 52.0% in Lithuania and 46.4% in Latvia (Eurostat 2012, code: *nama\_aux\_gph*). The countries faced very deep recessions in connection with the global financial crisis, leading to



corporate bankruptcies and rapidly increasing unemployment. In 2009 GDP fell by 14% or more in each of the countries; in 2010, the survey year, GDP growth was 2.3% in Estonia, 1.4% in Lithuania and -0.3% in Latvia (Eurostat (2012), code: *nama\_gdp\_k*).

The Baltic countries established tax systems in 1990–1992 whose basic components resembled those of Western Europe. Reforms of the tax systems have subsequently introduced a number of features that are not typically seen in Western Europe. The rates of social security contributions are high, but part of the contribution is transferred to individualized pension accounts. The countries have flat personal income taxes with relatively low tax rates and modest tax-free minimums. The corporate income tax rates are equal to the personal income tax rates in Estonia and Lithuania, but not in Latvia, cf. below. Value added taxation and excise duties are important contributors to the budget.

Although the tax systems have many similarities, there is an important difference regarding corporate income taxation. In Estonia, unlike in Lithuania and Latvia, the corporate income tax is applied only to dividend payments, i.e. retained profits are not taxed. Consequently, Estonia applies a relatively high tax rate on corporate income but has a narrow tax base. The flat statutory tax rate on corporate profits is 21% in Estonia, but 15% in Latvia and Lithuania.<sup>4</sup>

In 2010, the reference year for the empirical analysis, the total tax intake, including social security contributions, was 34% of GDP in Estonia and 27% of GDP in Latvia and Lithuania (European Commission (2012, p. 180)). The higher tax intake for Estonia is due to the fiscal consolidation initiated in 2009 and continued in 2010, whereas Latvia and Lithuania resorted to less austerity after the global financial crisis (Staeher (2010)).

The economic structures are relatively similar across the Baltic countries. In 2010, the rank correlation coefficients between NACE 2008 2-digit level industry shares were 0.94 between Latvia and Lithuania; 0.91 between Estonia and Lithuania; and 0.90 between Estonia and Latvia (based on employment shares across 33 industries; Eurostat 2012, code: *nama\_nace38\_e*). At the same time the rank correlation coefficients with the EU15 industrial structure were around 0.79–0.80 for all three Baltic countries.

Administrative and governance structures show substantial differences across the countries. The World Bank assessment shows that Estonia has better governance than Latvia and Lithuania within a range of indicators such as governance effectiveness, regulatory quality, the rule of law and control of

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<sup>4</sup> The tax bases to GDP are 24%, 29% and 34% respectively (European Commission (2012, p. 39)).

corruption. The World Bank (2010) reports data for 2010 and for the global sample and the indices range from  $-2.5$  to  $2.5$ , indicating low and high quality of governance respectively. In 2010 the score for the effectiveness of governance was 1.22 for Estonia, 0.72 for Lithuania and 0.70 for Latvia. The score for the quality of government regulation was 1.45 for Estonia, 0.97 for Lithuania and 0.98 for Latvia. Fabrizio and Mody (2008) reach similar conclusions regarding the quality of fiscal institutions in the three countries.

The assessments of government quality by the World Bank are in correspondence with the findings in the European Social Survey 2008, which is based on fieldwork done in the Baltic countries during late 2008 and early 2009 (European Social Survey (2011)). A question on the efficiency of the tax authorities in tasks like handling queries on time, avoiding mistakes and preventing fraud resulted in scores of 5.6, 4.8 and 4.8 for Estonia, Lithuania and Latvia respectively. The scores were allowed to range from 0 to 10, where the highest value 10 captured the opinion that the authorities were “extremely efficient”.

According to the same survey, social trust was also higher in Estonia than in the other Baltic countries. On a scale from 0 (“You can’t be too careful”) to 10 (“Most people can be trusted”), the average score for social trust was 5.4 in Estonia, 4.1 in Latvia and 4.4 in Lithuania.

McGee (2008) documents the attitude toward tax evasion among individuals in the Baltic countries and other post-communist countries around 1990 and 2000 using data from the Human Beliefs and Values Surveys. The main finding is that the tolerance of tax evasion in the Baltic countries is broadly comparable to levels observed in other transition countries. Surprisingly, while tax evasion becomes *more* acceptable in Estonia and Lithuania during the first decade of transition, this is not the case in Latvia.

The attitude towards cheating on taxes among individuals can be inferred from the World Values Survey but unfortunately detailed questions for the Baltic countries are only available from 1999. Latvia was the country with the lowest rate of acceptance of tax evasion; on a scale between never justified (1) and always justified (10), the mean score was 3.15 for Estonia, 2.36 for Latvia and 3.77 for Lithuania. Only Latvians found tax evasion less justified than the EU25 average (score 2.57), while Lithuanians were the most tolerant of tax evasion in the whole of EU25 (World Values Survey (1999)).

Torgler (2012) uses data from the European Values Survey of 1999 and 2008 and concludes that the tax morale of individuals has decreased in most of the 10 CEE countries between the two survey periods. Within the Baltic countries, the tax morale has increased in Lithuania and decreased in Estonia and Latvia. Unlike the study by McGee (2008) this study shows that tax mo-

rale is lower in the Baltic countries than in other CEE countries, while Latvia still has the highest tax morale in Baltic countries.

Only a few studies seek to estimate the prevalence of unreported economic activities in the Baltic countries, although in some cases the three countries are included in broader cross-country studies. There is no consensus about the size of the unreported or “shadow” economy. Schneider (2010) uses the indirect MIMIC method, which combines a number of observable indicator variables to produce estimates of the size of the unreported economy.<sup>5</sup> It is relatively stable over the period 2003–2010 and in 2010 amounts to 29.9% of *reported* GDP in Estonia, 27.3% in Latvia and 30.0% in Lithuania. These values are substantially above the average for the 27 EU countries which is estimated to be 20.0% of reported GDP.

Tafenau et al. (2010) also use the MIMIC methodology but find much lower shares for 2004 of 16.6% for Estonia, 20.4% for Latvia and 22.4% for Lithuania. Putnins and Sauka (2011, Table 1) estimate the size of the unreported economy using the SSE Riga dataset of perceived unreported economic activities and find that unreported GDP amounts to 19.4% of the *total of reported and unreported GDP* in Estonia, 38.1% in Latvia and 18.8% in Lithuania. The upshot is that the size of the unreported economy in the Baltic countries is relatively large, but the exact size and even the ranking within the three countries are difficult to determine.

Williams (2008, 2009) compares the prevalence of undeclared wages in the Baltic countries with their occurrence in other European countries using data from a Eurobarometer survey conducted in 2007 (European Commission (2007)). In total 7% of respondents in Estonia, 11% in Latvia and 17% in Lithuania stated that they had received undeclared wages within the preceding year. In comparison, the share receiving undeclared wages averaged 11% in the 10 CEE countries, but only 3% in the 15 “old” Western European EU countries (unweighted averages). The relatively low share of recipients of undeclared wages should be seen in the context of data being self-reported.

#### **4. The SSE Riga dataset**

The analysis in this paper draws on the SSE Riga survey, which is a micro-level dataset that was compiled by the Stockholm School of Economics in Riga. It is based on surveys of company managers conducted in the three Baltic countries of Latvia, Lithuania and Estonia. The survey fieldwork was carried out in March and April 2011. Firms were chosen by random sampling

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<sup>5</sup> The methodology is discussed in detail in Schneider (2005).

from among all active firms in the Baltic countries listed in the Orbis database managed by the Bureau van Dijk. For each country, five size groups were formed using the book value of assets and an equal number of contacts were randomly drawn for each size group. Since the response rates were unequal across these firm size groups, we use sample weights based on the data for the total population of firms. The final sample sizes were 591 firms in Latvia, 536 in Lithuania and 500 in Estonia.

The comparisons of the extent of the shadow economy across countries and sectors are based on weighted averages. The weights measure the inverse probability that a firm from the given size and industry group will appear in the database. Weights are calculated by dividing the number of firms in the population by the number of firms in the database in a given country, sector and firm size group. For this purpose we use six sectors (manufacturing, wholesale trade, retail trade, construction, services and other) and six size groups which are based on the number of employees (1–9, 10–19, 20–49, 50–99, 100–249, and over 249).<sup>6</sup>

The survey questionnaire consisted of five main blocks of questions (Sauka and Putnins (2011)). The first, introductory, block gathered information from managers on their satisfaction with various aspects of governance as well as their assessment of the tolerance of tax avoidance and bribery in their country. The second block was targeted at tax evasion. The size of the shadow economy was measured in three dimensions. Firms were asked about the perceived share of net profits, employees and salaries that are not reported to tax authorities. The third block covered various aspects of managerial orientation (risk aversion, innovativeness, etc.). The fourth block collected information on the characteristics of the business (sector, sales turnover, age, number of employees, etc.) and the manager who was answering the questions (level of education, years of business management experience). In the fifth and final part of the survey managers were asked to express their opinions about a variety of statements related to possible reasons why firms evade taxes.

The primary purpose of the survey was to collect information on tax evasion. Given the sensitivity of this topic, surveys asking managers directly about the size of unreported activities in their companies usually yield downward-biased estimates. In order to minimize the understatements of the true extent of the shadow economy, the related questions were formulated in an indirect manner. Instead of giving information on their own companies, managers were asked to assess the size of the shadow economy in the industry in which their firm operates. In addition, in order to increase the response

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<sup>6</sup> The number of firms in the population is based on data provided by the national statistical offices of the three Baltic countries.

rate and to “melt the ice”, the survey started with a block of questions which covered a more neutral topic – the quality of governance. This type of indirect and gradual approach should provide more truthful answers (e.g. Flexman (1997), Sauka and Putnins (2011)).

It should be noted that the indirect method of measuring the shadow economy used in the SSE Riga survey is also prone to measurement errors, insofar as the assessments of firm managers about the extent of the shadow economy in their sector do not coincide with its actual size. Although measuring economic variables with errors decreases the precision of the estimates, measurement errors do not cause biases in the estimation if they are not systematic.

We are not aware of any studies which try to assess the extent of erroneous reporting and potential biases caused by non-randomness of this type of measurement error. In particular, it is not known whether asking about the degree of unreported economic activity in the industry where the firm is operating rather than in the firm itself will still provide estimates which are downward biased and whether the extent of honest reporting will vary from country to country. So although we provide many comparisons between Latvia, Lithuania and Estonia in the following subsections, they are all based on an implicit assumption that biases caused by misreporting do not differ systematically between the three countries.

If firms’ assessments of others’ behaviour are influenced by their own actions, we should observe that firm-specific factors customarily explaining firm-level tax evasion can explain a firm’s estimation about the industry’s tax evasion. This is an indirect way of testing whether managers have their own company in mind or if they are really talking about the industry as asked by the questionnaire. We can also interpret these results as an indicator of data quality.

Biases in the perceived extent of the unreported activities may be caused by a non-random refusal to answer to the related questions. Approximately one fifth (22%) of respondents do not provide answers to the tax-evasion-related questions in the survey (questions 7, 9 and 11). This share is very similar across the three Baltic countries: 21% for Estonia, 24% for Lithuania and 21% for Latvia.<sup>7</sup> Thus, even when the biases mentioned above exist, we can assume that non-random refusals do not cause distortions in cross-country comparisons.

The respondents were asked to assess the extent of shadow economy in the two years preceding the survey, i.e. in 2009 and 2010. In this paper we only

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<sup>7</sup> Cases when a respondent has answered “0” to all three questions (the extent of unreported profits, employees and salaries) are also treated as non-responses.

use the information provided for 2010. Since this time period is assessed with a shorter lag, it can be assumed that the data referring to 2010 are more precise and up-to-date. However, the differences in assessments are relatively small between the two years surveyed (Sauka and Putnins (2011)).

## 5. Descriptive statistics

### 5.1. Overview of the sample variables

In this section we provide descriptive statistics of the SSE Riga shadow economy survey. The data collectors do not use weights in their report about the shadow economy in the Baltic countries (Sauka and Putnins (2010)). The sample coverage, however, differs substantially across the countries; small firms are for example significantly overrepresented in Estonia. We therefore present descriptive statistics using sample weights.<sup>8</sup> Summary statistics for all variables used in the empirical analyses are given in Table A.1 in Appendix A.

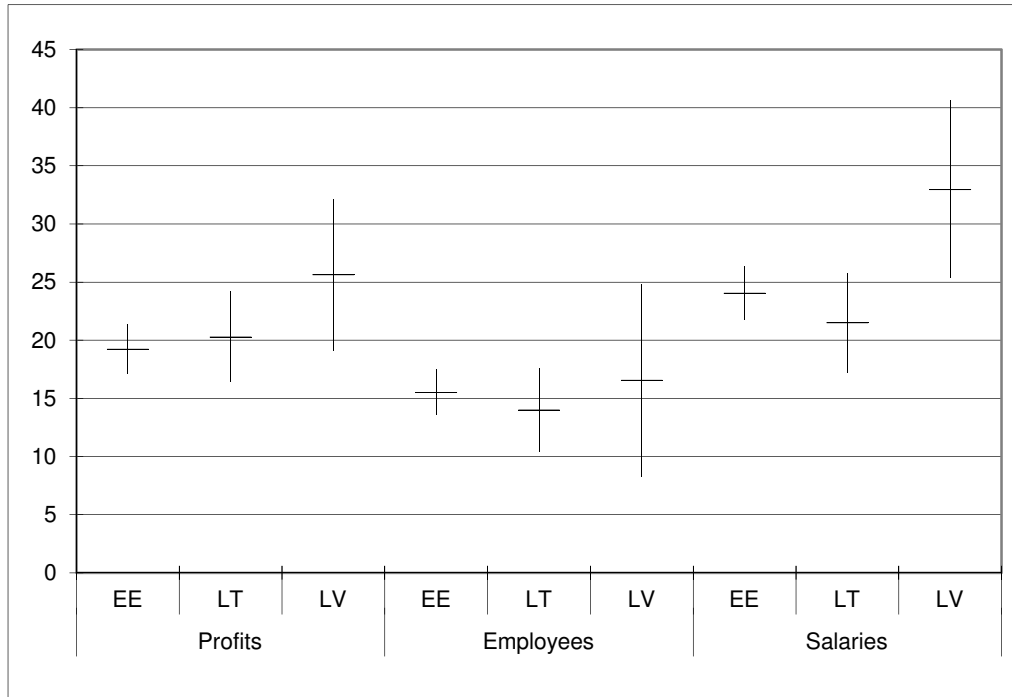
The survey estimates imply that the shadow economy is quite substantial. Figure 2 presents the weighted average estimates of the perceived extent of unreported activities in the three Baltic countries together with 95% confidence intervals. Firm managers believe that around one fifth to one fourth of company profits remain unreported to tax authorities (19%, 20% and 26% in Estonia, Lithuania and Latvia, respectively). This amount is larger in Latvia than in the two other Baltic countries, but the difference is not statistically significant. According to managers' assessment, the share of employees who do not have formal employment contracts is around 15% and does not vary much across Estonia, Lithuania and Latvia. The perceived share of undeclared wages is significantly larger in Latvia than in Estonia and Lithuania; the point estimates of the weighted average shares are 34%, 24% and 22%, respectively.

The confidence intervals tend to be the largest for Latvia and the smallest for Estonia, implying that the answers of Estonian managers have the lowest variation, followed by those from Lithuania and then those from Latvia. Latvian managers have the most varying views about the size of the shadow economy in their country. Interestingly, this regularity holds for other blocks of the survey questions as well: Latvian answers tend to have the largest and Estonian answers the lowest variation.

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<sup>8</sup> After the application of weights the cross-country differences in unconditional estimations in Figures 2 and 3 become lower than those reported in Sauka and Putnins (2010).

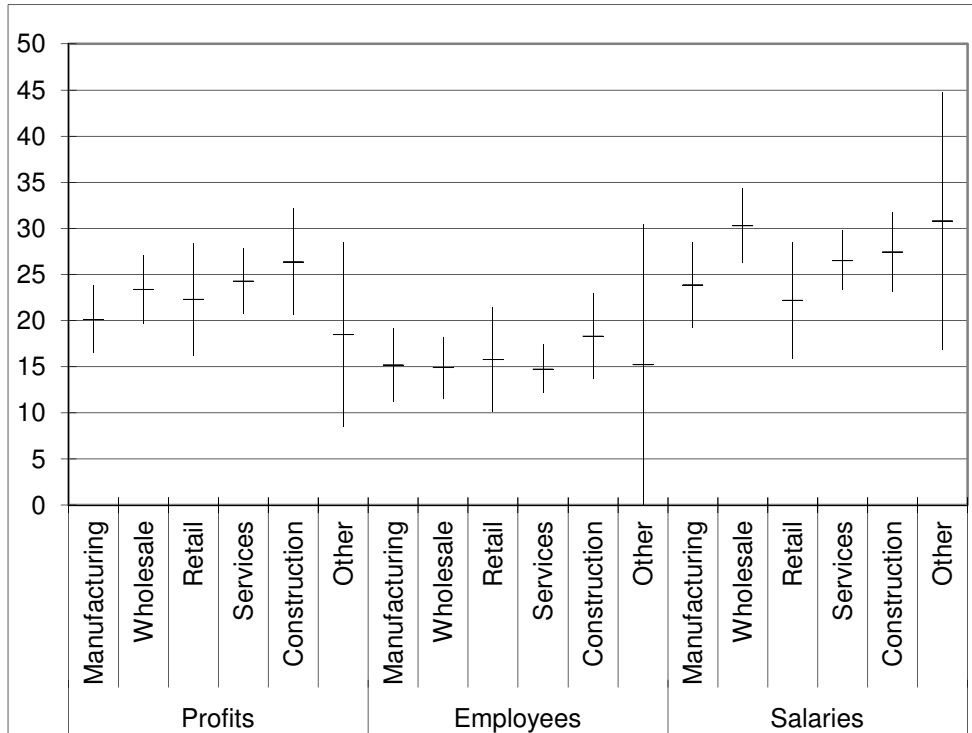
Figure 2: Share of perceived underreporting in Estonia (EE), Lithuania (LT), and Latvia (LV)



Notes: The figure depicts weighted average percentages of profits, employees and salaries not reported to tax authorities. Weighted means and 95% confidence intervals are shown.

Figure 3 presents the share of perceived undeclared activity in the same three dimensions (profits, employees and salaries) across six sectors: manufacturing, wholesale sales, retail sales, services, construction and other private activities. Previous empirical studies typically show that unreported activities are more prevalent in construction and services than in manufacturing (Schneider and Enste (2000), Meriküll and Staehr (2010)). The estimates based on the SSE Riga survey do not follow this pattern. Although the point estimates for the weighted shares of unreported profits and salaries are somewhat lower than the average for manufacturing, these differences tend to be not statistically significant. The estimated shares of unreported profits and employees are higher in construction than in all other sectors, but these differences are also not statistically significant. Overall, our survey estimates imply little variation in the extent of unreported activities across sectors.

Figure 3: Share of perceived underreporting across sectors in the Baltic countries

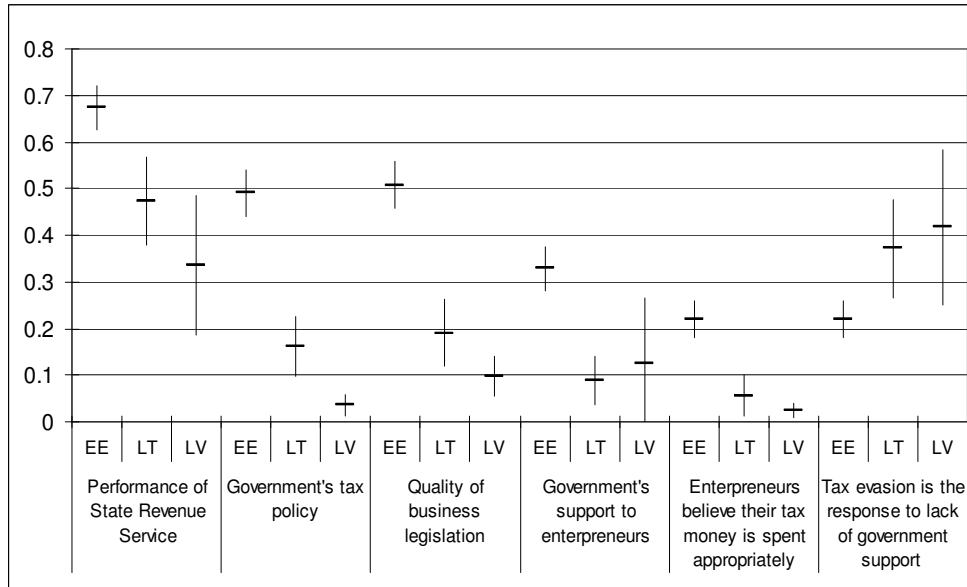


Notes: The figure depicts weighted average percentages of profits, employees and salaries not reported to tax authorities. Weighted means and 95% confidence intervals are shown.

The first two figures presented in this section illustrated the perceived level of unreported activity. Next we give an overview of the variables which are later used in the regression analysis and shown to be related to the perceived extent of unreported activity. The first group of variables consists of managers' perceptions of various aspects of government performance in their country and their attitudes to how the quality of governance affects unreported activities (Figure 4). As discussed in Section 2, a perception of *reciprocity towards government* may influence the reporting of economic activities by firm managers.



Figure 4: Satisfaction with government services and reciprocity towards government



Notes: For the four measures of government quality, the figure presents weighted average percentages of firm managers stating that they are satisfied or very satisfied with a particular aspect of governance. For the two measures of reciprocity, the figure presents weighted average percentages of firm managers who gave 7 or 6 points on a 1–7 point scale, where 1 means “completely disagree” and 7 means “completely agree”. Weighted means and 95% confidence intervals are shown.

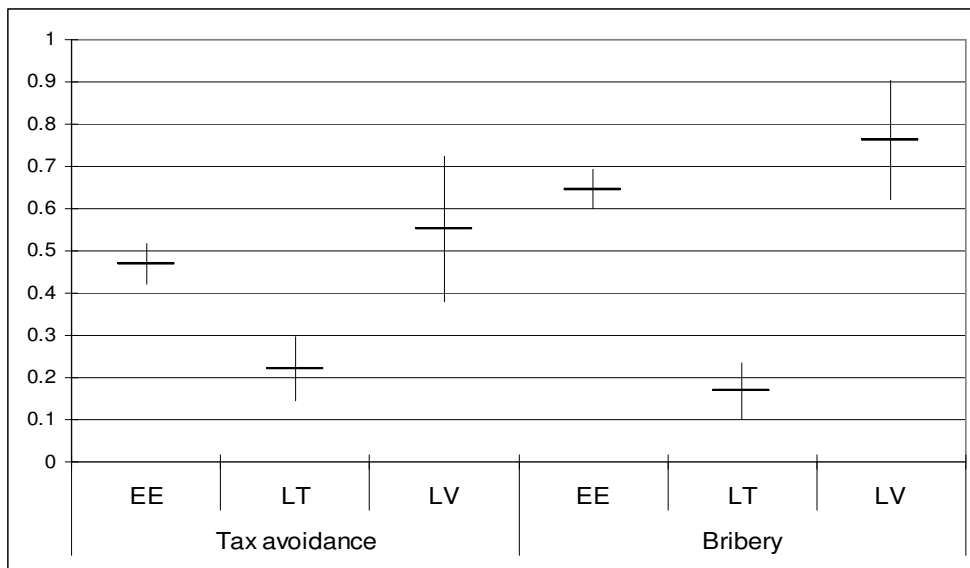
The level of satisfaction with government is significantly higher in Estonia than in Lithuania and Latvia (Figure 4). This holds for all four variables measuring different governance practices. Across the three Baltic countries, Latvian managers tend to be the least satisfied. Although the answers of the Latvian and Lithuanian managers are closer to each other, they are still significantly different for two out of four variables. The shares of managers satisfied with the government’s tax policy and the quality of business legislation are significantly lower in Latvia than in Lithuania. Only about 4% of Latvian business managers approve of the tax policy and 10% are satisfied with the quality of business legislation in their country. The same shares are about 50% and 51% in Estonia and 16% and 19% in Lithuania respectively.

The estimates in Figure 4 imply that Estonian managers are significantly more likely to agree with the statement that “Entrepreneurs believe that their tax money is spent appropriately” and significantly less likely to agree with the statement that “Tax evasion is the response to a lack of government support” than their Baltic neighbours. The comparison of the country-level shares of managers agreeing with different statements presented in Figure 3 gives support to the explanation proposed above that tax evasion is at least

partly driven by reciprocity towards government. We find that Estonian managers have the highest perception of the quality of government services and at the same time are also the least likely to state that taxes are evaded in response to a lack of government support. Conversely, Latvian managers have the lowest opinion of the quality of governance and are the most likely to support this statement.

The second group of variables, which are later used in the regression analysis, relate to the concept of a *social contract*, i.e. a perception of responsibility towards society at large. The SSE Riga survey includes two questions which make it possible to evaluate the views of managers towards business ethics and the general tolerance of corruption and illegal activities. The related statistics are presented in Figure 5.

Figure 5: The share of company managers disagreeing with the statement: “Tax avoidance / bribery is tolerated behaviour in your country”



Notes: The figure presents weighted average percentages of firm managers stating that they disagree or completely disagree with either statement. Weighted means and 95% confidence intervals are shown.

Company managers were asked whether they agree that illegal activities – tax avoidance and bribery – are tolerated in their country. Figure 5 depicts the weighted average shares of company managers in Estonia, Lithuania and Latvia who either disagreed or completely disagreed with these statements. We see a lot of variation across countries. The shares are significantly lower in Lithuania than in Latvia and Estonia, meaning the level of tolerance of the

two illegal activities seems to be higher in Lithuania than in the other two Baltic countries. The shares of managers disagreeing with either statement are the highest in Latvia, although they are not significantly different from the Estonian shares.<sup>9</sup>

The aim of the last group of the variables presented in this section is to capture explanations for tax evasion that stem from *rational choice*. In the following regression analysis, we aim to assess whether the perceptions about tax evasion can be explained by commonly used models of rational agents, where it is assumed that management acts as *homo economicus* – a rational and egoistic actor who makes decisions only based on individualistic and pecuniary motives.

Figure 6 gives an overview of the extent to which firm managers agree with statements that can be linked to causes of unreported activity based on rational behaviour. The first two variables depicted in Figure 6 capture whether company managers agree with the notion of tax evasion as rational optimizing behaviour which all firms use regardless of economic necessity and the quality of the government's performance. The last two variables focus on the notion that unreported activities are related to economic hardship: firms are more likely to evade taxes when this is necessitated by low profits or a threat to survival. This concept can also be linked to rational choice since it is likely that during economic difficulties, and especially when a firm is facing bankruptcy, the expected economic benefits of tax evasion outweigh the expected costs, the latter stemming from the possibility of being caught and subsequently punished.

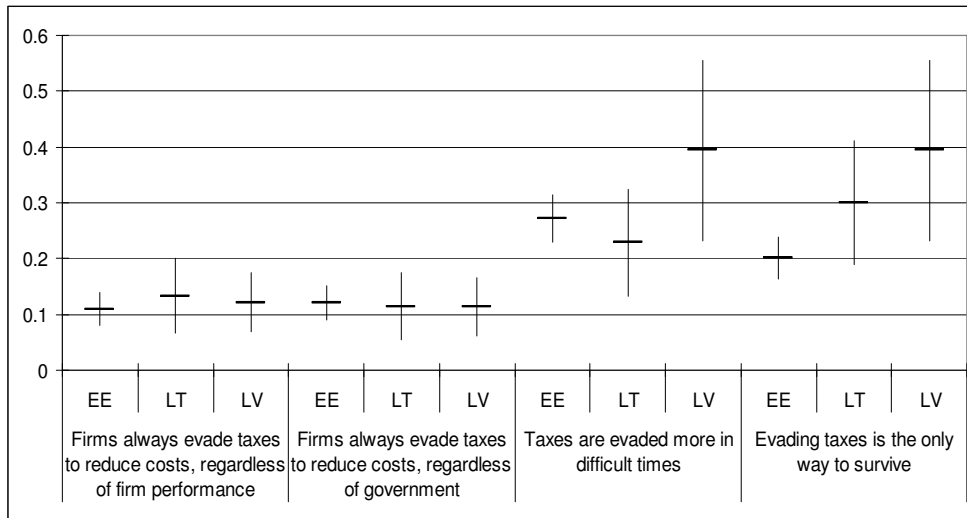
Agreement with the last two statements in Figure 6 suggests that a respondent is favoring rational choice-based arguments for unreported activities. In contrast, disagreement with these statements suggests that the respondent is supporting the social-contract view outlined in Section 2. If taxes are paid as part of a social contract, this would imply that the willingness to pay taxes and to support society is *stronger* during economically difficult times, which is the opposite of the statements in Figure 5.

The summary statistics presented in Figure 6 show that only a minority – about 10% of the firm managers – support the entirely rationalistic view that firms should evade taxes whenever possible because this reduces the costs of running the business. It is also interesting to note that the shares of firm managers agreeing with the first two statements presented in Figure 6 are almost identical across the three Baltic countries.

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<sup>9</sup> The estimates of the SSE Riga survey correspond to the results of the World Values Survey (McGee (2008)) and the European Values Survey (Torgler (2012)) in the sense that Latvia holds the highest tax morale in Baltic countries. The order of Lithuania and Estonia varies across the surveys.

Figure 6: Reasons for tax evasion related to the rational choice model



Notes: The figure presents weighted average percentages of firm managers who gave 7 or 6 points on a 1–7 point scale, where 1 means “completely disagree” and 7 means “completely agree”. Weighted means and 95% confidence intervals are shown.

There are no significant differences across the three Baltic countries for the proportion of managers agreeing with the statement that taxes are more likely to be evaded in difficult times, although the point estimate for the average proportion is much higher in Latvia than in Estonia and Lithuania. The perceived sensitivity of profits to tax evasion is stronger in Latvia and Lithuania than in Estonia: firm managers in the first two countries are significantly more likely to agree that company profits are strongly affected by tax evasion.

## 5.2. Principal component analysis

As discussed above, it is possible to relate the viewpoints of the managers in the survey to a particular theory of tax evasion or unreported activity, cf. the literature review in Section 2. The variables reported in Figure 4 may thus capture reciprocity towards government, i.e. the notion that managers that are satisfied with government are willing to contribute taxes. The variables in Figure 5 regarding tolerance of tax evasion and bribery may proxy perceptions about societal norms and can therefore be linked with the social contract explanation. The extent of agreement with the statements presented in Figure 6 may capture individualistic rational choice motives.

The argument above would suggest that the 12 variables are correlated within each of the three groups, reciprocity towards government, social contract and rational choice. The matrix of Spearman correlation coefficients for all 12 potential explanatory variables is shown in Appendix B. In general the pair-wise correlations are higher within the three groups than between the groups, which would suggest that the division into three groups of variables related to the three different theories of tax evasion is reasonable.

We examine whether the variables above form groups or clusters of the statements above using principal component analysis based on eigenvalue decomposition of the covariance matrix. The principal components are the weighted averages of the variables entering the analysis and the weights or factor loadings are chosen so that the first principal component captures as much of the variability in the data as possible, the second principal component captures as much of the remaining variability as possible, etc. The factor loading of each variable reflects the importance of the variable for the principal component considered. In this way the factors of most importance for each principal component are derived, and it is possible to identify groups or clusters of co-varying variables.

Table 1 reports the factor loadings of different variables under the assumption of three principal components.<sup>10</sup> The principal component analysis confirms that our proposed grouping of variables is reasonable. As expected, the first six variables have the largest factor loadings related to the first principal component (PC1) and therefore can be grouped together. It is noticeable that all these variables capture satisfaction with government institutions or firms' reciprocal behaviour dependent on the quality of government institutions as a possible explanation for leaving activities unreported. The last four variables also form a related group of variables since they all share the common feature of having the largest factor loadings associated with the second principal component (PC2). All these variables are related to rational choice based reasons for tax avoidance. Finally, the two variables measuring tolerance of tax evasion and bribery can be assigned into a third group since they have the largest factor loadings in the third principal component (PC3).

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<sup>10</sup> We have rescaled the answers to the questions (5)–(6) and (9)–(12) in Table 1 so that the principal component analysis would not yield erroneous results due to different scaling of the variables. To ensure this the scale from 1 to 7 is converted into a scale from 1 to 5, i.e. the same scale that is used for the first 4 variables and variables 7 and 8 presented in Table 1. The same converted scale is used in the rest of the paper.

Table 1: Grouping of explanatory variables into three groups by principal component analysis

Variable	PC1	PC2	PC3
(1) Satisfaction with State Revenue Service <sup>a</sup>	0.287	0.156	0.026
(2) Satisfaction with government tax policy <sup>a</sup>	0.413	0.231	0.154
(3) Satisfaction with business legislation <sup>a</sup>	0.368	0.258	0.006
(4) Satisfaction with government support to entrepreneurs <sup>a</sup>	0.382	0.215	0.033
(5) Entrepreneurs in my country believe their tax money is spent appropriately <sup>b</sup>	0.322	0.151	0.069
(6) Tax evasion is the response to a lack of government support <sup>b</sup>	-0.307	0.012	-0.128
(7) Tax avoidance is tolerated behaviour <sup>a</sup>	-0.175	-0.017	0.622
(8) Bribery is tolerated behaviour <sup>a</sup>	-0.146	-0.089	0.654
(9) Taxes are evaded more in difficult times <sup>b</sup>	-0.230	0.357	-0.212
(10) Evading taxes is the only way to survive <sup>b</sup>	-0.300	0.320	-0.220
(11) Firms always evade taxes to reduce costs, regardless of firm performance <sup>b</sup>	-0.209	0.506	0.134
(12) Firms always evade taxes to reduce costs, regardless of government performance <sup>b</sup>	-0.174	0.542	0.167

Notes: Sample weights are not applied.

<sup>a</sup> Questions are assessed on a scale from 1 = “very unsatisfied” to 5 = “very satisfied”.

<sup>b</sup> Questions are assessed on a scale: from 1 = “completely disagree” to 5 = “completely agree”.

Using the theoretical framework summarized in Figure 1 and the groups suggested by principal component analysis, we compress the 12 explanatory variables reported in Table 1 into three composite measures. Principal component analysis can also be used to reduce the dimensionality of the explanatory variables. Such a reduction in the dimensionality is beneficial if the survey contains sets of variables which are similar in nature and tend to measure the same motive or type of behaviour. As demonstrated above, this is indeed the case in the SSE Riga survey used in this paper.

To compute the three composite explanatory measures we run a second round of principal component analyses. This involves computing the first principal component for each of the three sets of variables highlighted in Table 1. Appendix C shows the results of the second round of principal component analysis. The three first principal components (one for each group of variables) are effectively weighted averages of the variables in each group, where the weight of each variable is based on its relative contribution to the total variation.

## 6. The econometrics analysis

### 6.1. Perceived unreported activities and various firm characteristics

The aim of the analysis presented in this subsection is to shed light on the effect of traditional firm-level explanatory variables on different measures of perceived unreported activities. For each specification we run three regressions using the managers' perceived shares of unreported profits, employees and salaries as dependent variables. The regressions include various firm characteristics (size, sector, sales turnover, age and average wage) and the tenure and education of the manager who is responding to the survey as explanatory variables. We employ OLS regressions with heteroscedasticity-robust standard errors. The estimation results are reported in Appendix D. We do not apply sample weights since our regression specifications include controls for firm characteristics, including firm size and sector that were used for the construction of the weights. In any case, the use of sample weights would reduce the precision of the estimated marginal effects.

Since the dependent variables are limited continuous variables that vary from 0 to 100 and many observations are clustered on round numbers (5, 10, 15 etc.), we also experimented with an alternative estimation method as a robustness check. We created categorical variables from the original measures of unreported activities, allowing them to take values from 1 (for no unreported activity) to 5 (when unreported activity exceeds 30%). Thereafter we ran ordered probit regressions where we used the categorical variables of unreported activity as the dependent variables. The implications from these regressions were very similar to the OLS regressions and are therefore not reported.

We run two regression specifications for each dependent variable. In the first specification all coefficient estimates are constrained to be the same across the three Baltic countries. The regression results for this specification are reported in Table D.1 (Appendix D). In the second we allow the estimated effects for firm size and sector to vary across the countries by interacting country dummies with sector- and size-related variables.<sup>11</sup> The results for the second specification are reported in Table D.2 (Appendix D). The interac-

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<sup>11</sup> The second regression specification is the benchmark specification to which additional control variables are added in the analysis described in the following subsections. We also carried out regressions where all the included variables were interacted with country dummies. Since the coefficients of these interacted variables (besides sector and size) were insignificant and the inclusion of additional interactive variables did not alter the other estimated coefficients substantially, the results are not reported.

tion terms also control for the cross-country differences in the sample composition (different company sizes, fields of activity etc).

The estimations for country dummies are statistically significant and substantial in magnitude for the share of unreported profits and salaries, whereas the estimated coefficients of other explanatory variables tend to be insignificant with only a few exceptions. The regression estimates for sectoral effects are mostly insignificant and no clear pattern emerges from them. This result does not correspond with the usual finding from the empirical literature that unreported activities are more prevalent in construction and services. Another traditionally important explanatory variable in studies of tax evasion or unreported activities, firm size, also fails to become statistically significant. The only explanatory variable that has a statistically significant effect in all regression specifications is the experience of the manager who is responding to the survey. The managers' experience measured in years is negatively related to perceived unreported activities. The lack of explanatory power of the usual firm characteristics is a strong indication that the company managers interviewed for the survey are not describing their own firm, but are actually reporting their perception of unreported activities for sector as a whole.

We also experimented with including in the regressions various variables that capture the extent of risk aversion. We were able to assess the relative risk aversion from the management practices of individual firms. According to the models of tax evasion based on behavioural choices, risk aversion is potentially an important driver of tax evasion or other forms of unreported economic activity. The regression results indicated that the level of risk aversion in a given company was not related with the perceived levels of unreported activity and the related estimates are therefore not reported. We interpret this result as yet another indication that the respondents were not describing their own company in their answers, even implicitly, but had in mind the overall level of unreported activity in the industries where their firms operated.

## **6.2. Perceived unreported activities and reciprocity**

Next, we employ regression analysis for evaluating the extent to which company managers' assessments of the scope of unreported economic activities can be explained by their perceptions of the quality of government services and reciprocal behaviour towards government. For this purpose, we add the variables describing satisfaction with various aspects of governance and



reciprocity to the regression specifications presented in Table D.2 in Appendix D.<sup>12</sup> The regression results are shown in Table 2.

Table 2: The extent of perceived unreported activities and satisfaction with government activities

<b>Dependent variable →</b>	<b>Profits</b>	<b>Employees</b>	<b>Salaries</b>
Satisfaction with state revenue service	-1.421** (0.721)	-1.775*** (0.655)	-1.292 (0.795)
$R^2$	0.109	0.073	0.112
No. of obs.	960	957	961
Satisfaction with tax policy	-0.929 (0.646)	-0.690 (0.591)	-1.171* (0.677)
$R^2$	0.108	0.067	0.112
No. of obs.	965	963	966
Satisfaction with business legislation	-2.441*** (0.745)	-2.386*** (0.621)	-3.495*** (0.709)
$R^2$	0.121	0.080	0.132
No. of obs.	961	959	962
Satisfaction with support to entrepreneurs	-0.323 (0.649)	-0.952 (0.608)	-2.101*** (0.660)
$R^2$	0.106	0.070	0.120
No. of obs.	945	942	945
Entrepreneurs in my country believe their tax money is spent appropriately	-1.068* (0.575)	-0.891* (0.488)	-1.881*** (0.616)
$R^2$	0.109	0.068	0.118
No. of obs.	964	962	965
Tax evasion is the response to lack of government support	1.976*** (0.512)	1.353*** (0.447)	1.610*** (0.542)
$R^2$	0.120	0.074	0.118
No. of obs.	957	955	958
First principal component: reciprocity towards government	-1.603*** (0.467)	-1.524*** (0.420)	-2.392*** (0.469)
$R^2$	0.119	0.081	0.134
No. of obs.	920	917	920

*Notes: The table presents OLS regressions where the dependent variable is the perceived average percentage of profits/employees/salaries unreported to the tax authorities in the industry of a given firm. Heteroscedasticity-robust standard errors are reported in parentheses below the estimated coefficients. \*\*\*, \*\*, and \* denote significance at 1%, 5%, and 10%, respectively.*

<sup>12</sup> We also estimated the relationships between the quality of government services and perceived tax evasion separately for the three Baltic countries. The country-by-country regression results yield the same implications as the pooled regressions. The links are weakest for Latvia, where most of the estimated effects are insignificant.

The theoretical and empirical survey in Section 2 suggests that reciprocity towards government may make firms more likely to evade taxes when the public sector is less efficient and the government does not support entrepreneurial activity. The estimation results presented in Table 2 provide a similar picture for the Baltic countries.

We do not add all of the six explanatory variables that relate to reciprocity towards government motives into the regression simultaneously, because, with slight variations, all six of these variables are related to the same motives. Consequently, they tend to be highly correlated, cf. also Appendix B. The estimations containing simultaneously all these explanatory variables are likely to yield imprecise estimates because of multicollinearity. Instead, we include in the regressions the first principal component of the six variables that relate to reciprocity towards government, cf. Table C.1 in Appendix C. The estimated slope coefficient of the principal component is shown in the last row of Table 2. (The coefficients of the control variables are not reported.)

As a validity check, the regression estimates where the explanatory variables are added one-by-one are also presented in Table 2. The included variables are similar in nature. The first five are varying measures of the quality of government services and the sixth variable tries to capture directly the reciprocal motives towards government tax policy. Consequently, they should yield similar estimated effects. The regression estimates imply that the effects are indeed similar in magnitude when they are significantly different from zero.

The first five explanatory variables in Table 2, which measure the perceived quality of different aspects of government services, tend to have negative estimated slope coefficients. The estimated slope coefficients can be interpreted as a percentage point change in the perceived share of unreported activity associated with a one-point increase in the level of satisfaction on a scale ranging from 1 = “very unsatisfied” to 5 = “very satisfied” (i.e. from 1 to 2, 2 to 3 etc.). For example, it follows from Table 2 that in comparison to the firm managers who are unsatisfied with the performance of the State Revenue Services, those who have a neutral opinion believe that the average unreported share of profits is 1.4 percentage points lower, *ceteris paribus*.

The negative relationship between the quality of government services and the perceived extent of unreported activities confirms the relevance of the theory of reciprocity towards government in the Baltic countries. The estimations imply that company managers who have a more favourable opinion of government services also tend to believe that unreported activities are less prevalent.

Some aspects of governance are more relevant than others. The estimated slope coefficients are negative and statistically significant for the following variables: performance of the State Revenue Service; quality of business legislation; and entrepreneurs' belief that their tax money is spent appropriately. These factors are equally important for all three aspects of unreported activities, i.e. unreported profits, unreported employees and unreported salaries. The estimated effects are mostly insignificant for the remaining measures of the quality of governance, i.e. government tax policy and support to entrepreneurs.

The estimated coefficient of the sixth variable is significantly positive in all three regressions, which indicates directly that reciprocity is an important factor influencing the perceptions of unreported activities in the Baltic countries. The estimated coefficients imply that managers agreeing with the statement: "Tax evasion is the response to a lack of government support" also tend to perceive higher levels of unreported activity.

Given that the variables presented in Table 2 are related to perceived unreported economic activities individually, their combination formed by principal component analysis can also be expected to have similar correlations with the dependent variables in the regressions. The last row of Table 2 presents the estimated results for factor loadings. The estimated effects are indeed strongly significantly negative, implying that reciprocal motives are important when company managers form their opinions about the perceived level of unreported activities. We abstain from trying to give an economic meaning to these estimated results, since the principal component is a combination of different measures of governance and reciprocal motives.

To conclude, the theoretical and empirical survey in Section 2 highlighted that the extent of unreported activities is reciprocal to a large extent: firms are more likely to evade taxes when the public sector is less efficient and the government does not support entrepreneurial activity. The estimation results presented in Table 2 provide a similar picture for the Baltic countries. Satisfaction with government matters is negatively associated with the perceived extent of unreported activity. Moreover, firm managers agreeing with the statement that "Tax evasion is the response to a lack of government support" tend to perceive higher levels of unreported activity. The results are the strongest both in statistical and economic terms for governance matters such as revenue services and business legislation and also for government effectiveness, while satisfaction with the tax policy seems to be of lesser importance.

### 6.3. Perceived unreported activities and the social contract

As indicated in the literature review in Section 2, the extent of unreported activities may also depend on the prevailing norms towards society at large, i.e. the presence of a social contract. The SSE Riga survey asked managers to evaluate the level of tolerance of tax avoidance and bribery in their country. We used regression analysis to estimate the relationship between either of these two variables and the perceived extent of unreported activity. For this purpose, we added these two variables as additional explanatory variables one-by-one to the regressions specifications in Table D.2 in Appendix D.<sup>13</sup> The regression results are presented in Table 3.<sup>14</sup>

Table 3: The extent of perceived unreported activities and the social contract

Dependent variable →	Profits	Employees	Salaries
Tolerance of tax avoidance	2.449*** (0.595)	1.298** (0.516)	2.323*** (0.599)
$R^2$	0.124	0.072	0.125
No. of obs.	960	960	962
Tolerance of bribery	0.921 (0.601)	1.205** (0.506)	1.036* (0.611)
$R^2$	0.104	0.071	0.110
No. of obs.	955	954	957
First principal component: social contract	2.274*** (0.662)	1.625*** (0.565)	2.260*** (0.668)
$R^2$	0.114	0.074	0.118
No. of obs.	952	952	954

Notes: See the notes for Table 2 for the description of regressions.

The results confirm our expectations: all the estimated slope coefficients of the individual tolerance variables and of their combination, are positive and statistically significant. This implies that managers who answered that tax avoidance or bribery is tolerated also perceived a high level of unreported

<sup>13</sup> We also estimated the relationships between the quality of government services and perceived tax evasion separately for the three Baltic countries. The country-by-country regression results yield the same implications as the pooled regressions. The links are weakest for Latvia, where most of the estimated effects are insignificant.

<sup>14</sup> We also performed the same analysis separately for each of the three Baltic countries. This indicates that a positive relationship between the perceived level of tax avoidance and tolerance of illegal activities is present for Estonia and Lithuania, whereas almost all the estimated coefficients are insignificant in the case of Latvia.

profits, salaries or number of employees. These findings indicate that managers' assessment of the social contract is related to their evaluation of unreported activity. This gives relevance to the theory of the social contract as an explanation for unreported activities in the Baltic countries.

Estimations containing simultaneously the two social contract variables would yield imprecise estimates because of multicollinearity. Therefore we include in the regressions the first principal component of the two variables that relate to the social contract motive, cf. Table C.3 in Appendix C. The estimated slope coefficients for this composite measure are presented in the last row of Table 3. They are highly significant and positive in all three regressions, giving further confirmation to the assertion that managers' assessments of the social contract are related to their evaluations of unreported activities.

#### **6.4. Perceived unreported activities and rational choice**

Tax compliance may also depend on the economic conditions facing the firms. Economic hardship may lead firms into a fight for survival in which it is beneficial for them to take more risks. The decision to leave activities unreported to evade taxation or other costs can be a rational choice if the probability-weighted expected cost of being caught evading taxes and subsequently punished is smaller than the expected benefit associated with such behaviour. Four questions in the SSE Riga survey allow us to assess the extent to which the perceived tax evasion can be explained by rational choices. The first two of these questions relate tax evasion to economic hardship, assessing to which extent managers agree with the statements that tax evasion is justified in cases of economic hardship or when there is a threat to survival. The next two questions identify rational choice as the reason for tax avoidance in absolute terms, regardless of firm or government performance.

Table 4 shows the regression results where the four variables described above are added to the benchmark regressions (presented in Table D.2. in Appendix D) one-by-one. The estimated effects are positive and statistically significant for all regression specifications. This implies that managers who: (1) think that taxes are evaded more in difficult times; (2) agree that evading taxes is the only way to survive; and (3 and 4) believe that taxes should be in any case evaded since this reduces business costs are also more likely to perceive that unreported activities are widespread. Interestingly, for all the variables reported the effect is the strongest for unreported salaries. This indicates that the rational choice based reasons have the strongest impact on this form of unreported activity, and that when there is economic hardship, salaries are the first to become unreported.

Table 4: The extent of perceived unreported activities and rational choice

<b>Dependent variable →</b>	<b>Profits</b>	<b>Employees</b>	<b>Salaries</b>
Taxes are evaded more in difficult times	1.883*** (0.510)	2.243*** (0.462)	3.401*** (0.548)
$R^2$	0.119	0.089	0.146
No. of obs.	962	960	963
Evading taxes is the only way to survive	2.569*** (0.496)	2.057*** (0.450)	3.418*** (0.533)
$R^2$	0.130	0.086	0.148
No. of obs.	963	961	964
Firms always evade taxes to reduce costs, regardless of firm performance	1.119** (0.541)	1.184** (0.481)	2.266*** (0.569)
$R^2$	0.110	0.071	0.122
No. of obs.	956	954	957
Firms always evade taxes to reduce costs, regardless of government performance	1.181** (0.544)	1.067** (0.483)	2.225*** (0.569)
$R^2$	0.111	0.070	0.122
No. of obs.	955	954	956
First principal component: rational choice	2.202*** (0.487)	2.152*** (0.418)	3.763*** (0.516)
$R^2$	0.126	0.089	0.157
No. of obs.	949	948	950

Notes: See the notes for Table 2 for the description of regressions.

The fifth set of slope coefficients presented in Table 4 is estimated for the composite measure of rational choice. The composite measure is the first principal component of the four variables that relate to the rational choice, cf. Table C.2 in Appendix C. The estimated effects for this variable confirm the implications from the regressions where different rational choice related measures were added one-by-one. Firm managers assigning more importance to rational choice based reasons for tax evasion also tend to believe that a larger share of economic activity is unreported. As in previous subsections, we abstain from trying to give any further economic meaning to the estimated results from this composite measure.

## **6.5. What explains the cross-country differences in perceived unreported activity?**

The regression estimations (presented in Appendix D) imply that there are significant differences between the three Baltic countries in the perceived level of unreported activity. The estimated effects for country dummies are significantly negative for both Estonia and Lithuania in regressions of unreported profits and salaries and insignificant in the third regression (unreported employees). This indicates that the perceived share of unreported activity tends to be larger in Latvia than in the other two Baltic countries for profits and salaries, but not for the reported number of employees.

The aim of this section is to see whether the cross-country differences in perceived unreported activities persist after controlling for the traditional firm-level control variables in regressions. Thereafter we test the impact of including additional control variables in the regressions, which capture various reasons for unreported activities: reciprocity towards government, a perception of a social contract, and variables capturing rational choice. We also assess which of these factors that can explain more of the unreported activities in the Baltic countries by including in the regressions factors formed by the principal component analysis in Appendix C.

Table 5 gives an overview of the cross-country differences in the extent of unreported activities after various controls have been included. We present the coefficients of Estonian and Lithuanian country dummies while holding Latvia as a control group. The first section of the Table shows the estimated effects for regressions which include country dummies as the only control variables. The results show that compared to the situation in Latvia, unreported activity is lower in Estonia and Lithuania for profits and salaries, while for employees only Lithuania differs statistically significantly from Latvia. The perceived level of unreported profits is about 10 percentage points lower in Estonia and Lithuania than in Latvia. This difference is approximately 9 percentage points for Estonia and 13 percentage points for Lithuania for salaries. Looking at the unreported share of employees, there is no significant difference between Estonia and Latvia, whereas the share of unreported employment is about 4 percentage points lower in Lithuania than in Latvia.

Table 5: Cross-country differences in perceived unreported activities

<b>Dependent variable →</b>	<b>Profits</b>	<b>Employees</b>	<b>Salaries</b>
<i>Country dummies only (Control group: Latvia)</i>			
Estonia	-9.792*** (1.483)	0.127 (1.302)	-8.482*** (1.531)
Lithuania	-9.630*** (1.359)	-3.584*** (1.142)	-12.784*** (1.356)
$R^2$	0.051	0.009	0.065
No. of obs.	1233	1239	1241
<i>Baseline estimation from Table D.2 (with country interaction terms)</i>			
Estonia	-19.850*** (6.309)	-7.355 (5.133)	-15.473*** (5.725)
Lithuania	-10.247** (4.947)	-4.575 (4.446)	-14.672*** (4.372)
$R^2$	0.106	0.065	0.109
No. of obs.	967	965	968
<i>Baseline estimation from Table D.2 (with country interaction terms) + explanations</i>			
Estonia	-15.644** (6.252)	-2.164 (5.374)	-5.211 (6.009)
Lithuania	-10.599** (5.335)	-3.731 (4.797)	-12.624*** (4.715)
First principal component: reciprocity towards government	-0.910* (0.487)	-0.948** (0.460)	-1.418*** (0.484)
First principal component: rational choice	1.583*** (0.516)	1.786*** (0.465)	3.188*** (0.562)
First principal component: social contract	1.593** (0.685)	0.878 (0.605)	1.374* (0.717)
$R^2$	0.130	0.097	0.169
No. of obs.	899	899	901

Notes: See the notes for Table 2 for description of regressions.

The second section of Table 5 presents results that also include firm and respondent characteristics and interactive terms as controls (control variables are similar to the benchmark regressions with interactive terms, see Table D.2. in Appendix D for the full set of control variables). The results imply that in comparison to the situation in Latvia, the perceived share of unreported profits is 20 percentage points lower in Estonia and 10 percentage points lower in Lithuania. For salaries, the estimated share is about 15 percentage points lower in Estonia and Lithuania than in Latvia. The results imply that the country-level differences remain present after controlling for differences in sampled business characteristics and respondent characteristics. Moreover, the estimated country effects become larger in the absolute value



when the firm- and manager-specific controls are added for two out of three estimated regressions, i.e. for underreporting of profits and salaries.

When we include the factors formed by variables capturing reciprocity towards government, social norms and rational choice into the regression, three out of six country dummies remain statistically significant. Controlling for tax morale explains differences between Estonia and Latvia in the shares of unreported employees and salaries, while the coefficient of the country dummy for Lithuania remains significantly negative for unreported salaries. The cross-country differences in unreported profits remain statistically significant. In addition, the statistically significant differences across countries remain sizeable.

In conclusion, the inclusion of various explanatory variables which are correlated with unreported activities helps to explain some part of the cross-country differences between the three Baltic countries for unreported activities but does not render all the estimated coefficients of the country dummies insignificant. This indicates that there are other possible explanations for cross-country differences in unreported activities that we could not capture in the current analysis.

A comparison of the statistical importance of the three first principal components capturing different motives of unreported activity indicates that all the factors are related to unreported activity. The effect of the rational choice factor is most precisely estimated, while the effects of reciprocity towards government and social norms are less precisely estimated.<sup>15</sup> In conclusion, both individualistic and non-individualistic preferences are relevant for explaining perceived unreported activities in the Baltic countries.

## 7. Final comments

This paper analyses managerial (dis)honesty in the form of economic activity not reported to authorities. Management may decide to act in a dishonest way and leave profits, employment, wages, etc. unreported in order to evade taxes or government regulation and in this way attain economic benefits. Evidently, such dishonesty has important implications for government operations and for society at large.

There are two main strands of theories explaining unreported economic activity. The first strand consists of theories relying on the assumption that

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<sup>15</sup> It is noticeable, however, that the support for the rational choice motive is very low among Baltic managers: only about 10% of them supported the view of tax evasion as a purely rational choice in absolute terms (Figure 5).

the decision-maker behaves as *homo economicus*. The decision-maker is strictly individualistic, rational and only concerned about pecuniary measures. Some of these theories recognize that the decision-making problem may be very complex and entail uncertainty that is difficult to determine, and this may lead to a behavioural choice which is not strictly rational.

The second strand of theories posits that non-individualistic factors play a role in the decisions of management to leave economic activities unreported. It is possible to distinguish between three, arguably related, reasons. First, management might have absolutistic values that affect the psychic costs of tax evasion. Second, management might see taxation as a reciprocal payment for government activities and therefore consider tax obligations as necessary and fair. Third, management might see tax payments as relating to a social contract under which everybody has to contribute to society. The three explanations for non-individualistic preferences may together be seen to encapsulate a tax morale or, more broadly, societal morale under which decisions regarding tax evasion or other unreported activities are not driven entirely by narrow motives of self-interest.

The theory of tax evasion makes it reasonable to hypothesize that individualistic as well as non-individualistic motives are of importance for the extent of unreported activity. This paper investigated the linkages between unreported economic activity by firms operating in the Baltic countries and various explanatory factors related to individualistic and non-individualistic motives. The analysis was based on the SSE Riga survey from 2010, which covers firms operating in Estonia, Latvia and Lithuania (Sauka and Putnins (2011)). In the survey the managers interviewed were asked to assess the prevalence of unreported profits, employment and wages in their industry and to give their views on a range of questions relating to their firm, sector or country.

The three Baltic countries share many features. They have seen rapid, although unstable, economic growth since 1991, but were in 2010 still among the countries in the European Union with the lowest per capita income levels. They were strongly affected by the initial phase of the global financial crisis, but 2010 was a year of stabilization. The industrial structures of the economies are broadly comparable. The tax systems are quite similar although the Estonian corporate tax system differs from those in the other two countries by only taxing distributed profits. The formal framework of regulation and governance is similar among the countries as they are all members of the European Union, but administration and governance are typically rated to be more effective in Estonia than in Lithuania and Latvia.

According to the SSE Riga survey, Latvia generally stands out as having the highest prevalence of perceived unreported activity in 2010, although the

differences are not substantial across the Baltic countries. The shares of unreported profits were around 20% of total profits in Estonia and Lithuania and 26% in Latvia. The extent of unreported employment is relatively similar across the Baltic countries at around 14–17% of total employment. Finally, the share of undeclared wages in total wages was the smallest in Lithuania at 22%, slightly larger in Estonia at 24% and the largest in Latvia at 31%. These sample-weighted percentage shares are based on the perceptions of managers and are, evidently, estimated with substantial uncertainty.

The empirical analysis consisted of three parts. The first part employed the principal component analysis in which the explanatory variables were mapped into three different clusters. The first cluster included the set of variables which were related to perceptions of reciprocity towards government. The second cluster consisted of variables that can be linked to rational-choice motives for unreported activities. Finally, the third cluster was formed of variables capturing social norms and tolerance of various illegal activities such as tax evasion and bribery.

The second part of the empirical analysis involved regressions in which the perceived unreported activities were explained by various variables reflecting different motives for underreporting. The analysis showed that a number of variables reflecting firm and management characteristics exhibit only little explanatory power for the perceived extent of unreported activity. This is an indication that the respondents in the SSE Riga survey were indeed reporting their perception of unreported activity in the industry, not in their own firms. In the following regressions, firm and management characteristics were included as control variables without any particular interpretation.

In general, the regression results supported all the theories of unreported activity which we were able to test given the data limitations. We found that the quality of various forms of government service was negatively related with the perceived extent of unreported activity. The importance of reciprocity towards the government services was also confirmed by the regression analysis. Four questions in the SSE Riga survey allowed us to assess the extent to which the perceived unreported activity stems from rational choice motives. The estimations indicated that the variables capturing rational choice motives were positively related to the perceived extent of unreported activity. Finally, the social norms or the perception of a social contract also seem to be of importance. In particular, managers' assessments of the prevalence of (negative) social norms, such as tolerance of tax evasion or bribery, were positively related to the perceived level of unreported activity.

The third part of the empirical analysis sought to assess the relative importance of the different motives for unreported activity in each of the three Baltic countries. The analysis employed the clusters suggested by the principal

component analysis in order to assess the relative importance of social norms, reciprocity towards government activities and rational choice-related factors. We opted to use the factor loadings of the principal component analysis instead of the whole set of explanatory variables since the answers to the individual survey questions tended to be strongly correlated and the survey included a relatively low number of observation points for each country.

The reasons linked to individualistic rational behaviour turned out to be the most relevant for explaining differences in perceived unreported activity. Also relevant, although to a lesser extent, appeared to be the set of variables reflecting reciprocity towards government and social norms. Overall, the results highlight a complex interaction between unreported economic activity and individualistic and non-individualistic motives.

## References

- ALLINGHAM, M. AND A. SANDMO (1972): "Income tax evasion: a theoretical analysis". *Journal of Public Economics*, Vol. 1, Nos. 3–4, pp. 323–338.
- ALM, J. AND B. TORGLER (2006): "Culture differences and tax morale in the United States and in Europe". *Journal of Economic Psychology*, Vol. 27, No. 2, pp. 224–246.
- CULE, M. AND M. FULTON (2009): "Business culture and tax evasion: why corruption and the unofficial economy can persist". *Journal of Economic Behaviour & Organization*, Vol. 72, No. 3, pp. 811–822.
- ESCOBARI, D. (2012): "Imperfect detection of tax evasion in a corrupt tax administration". *Public Organization Review*, Vol. 12, No. 4, pp. 317–330.
- EUROPEAN COMMISSION (2007): "Undeclared work in the European Union". Special Eurobarometer, No. 284.
- EUROPEAN COMMISSION (2012): *Taxation trends in the European Union*. Eurostat.
- EUROPEAN SOCIAL SURVEY (2011): ESS4 – 2008 Documentation Report, Edition 4.0, <http://ess.nsd.uib.no/ess/round4/surveydoc.html>.
- EUROSTAT (2012): Statistics Database, Eurostat, <http://epp.eurostat.ec.europa.eu>.
- FABRIZIO, S. AND A. MODY (2008): "Breaking the impediments to budgetary reforms: evidence from Europe". IMF Working Paper, WP/08/82, International Monetary Fund.
- FLEXMAN, B. (1997): "Canadian attitudes towards taxation", in O. Lippert and M. Walker (eds.): *The Underground Economy: Global Evidence of Its Size and Impact*. The Fraser Institute, pp. 53–74.
- FREY, B. AND B. TORGLER (2007): "Tax morale and conditional cooperation". *Journal of Comparative Economics*, Vol. 35, No. 1, pp. 136–159.
- HAMMAR, H.; S.C. JAGERS AND K. NORDBLOM (2009): "Perceived tax evasion and the importance of trust". *Journal of Socio-Economics*, Vol. 38, No. 2, pp. 238–245.
- HANOUSEK, J. AND F. PALDA (2004): "Quality of government services and the civic duty to pay taxes in the Czech and Slovak Republics, and other transition countries". *Kyklos*, Vol. 57, No. 2, pp. 237–252.
- HASHIMZADE, N.; G.D. MYLES AND B. TRAN-NAM (2012): "Applications of behavioural economics to tax evasion". *Journal of Economic Surveys*, forthcoming.

- KAHNEMAN, D. AND A. TVERSKY (1979): "Prospect theory: an analysis of decisions under risk". *Econometrica*, Vol. 47, No. 2, pp. 263–291.
- KIRCHGÄSSNER, G. (2011): "Tax morale, tax evasion and the shadow economy", Ch. 10 in F. Schneider and J. Kepler (eds.): *Handbook on the Shadow Economy*. Edward Elgar Publishing.
- KIRCHLER, E.; S. MUEHLBACKER; B. KASTLUNGER AND I. WAHL (2010): "Why pay taxes? A review of tax compliance decisions", in J. Alm, J. Martinez-Vazquez and B. Targler (2010, eds.): *Developing Alternative Frameworks for Explaining Tax Compliance*. Routledge, Ch. 2.
- KRIZ, K.; J. MERIKULL, A. PAULUS AND K. STAEHR (2008): "Why do individuals evade payroll and income taxation in Estonia?", Ch. 10 in M. Pickhardt and E. Shinnick (eds.): *Shadow Economy, Corruption and Governance*. Edward Elgar Publishing, pp. 240–264.
- MCGEE, R.W. (2008): "Trends in the ethics of tax evasion: an empirical study of ten transition economies", Ch. 9 in R. W. McGee (ed.): *Taxation and Public Finance in Transition and Developing Countries*. Springer, pp. 119–136.
- MCGEE, R.W., J. ALVER AND L. ALVER (2008): "The ethics of tax evasion: a survey of Estonian Opinion", Ch. 24 in R.W. McGee (ed.): *Taxation and Public Finance in Transition and Developing Countries*. Springer, pp. 461–480.
- MERIKÜLL, J. AND K. STAEHR (2010): "Unreported employment and envelope wages in mid-transition: comparing developments and causes in the Baltic countries". *Comparative Economic Studies*, Vol. 52, No. 4, pp. 637–670.
- MYLES, G. AND R. A. NAYLOR (1996): "A model of tax evasion with group conformity and social customs". *European Journal of Political Economy*, Vol. 12, No. 1, pp. 49–66.
- PUTNINS, T. AND A. SAUKA (2011): "Size and determinants of shadow economies in the Baltic States". *Baltic Journal of Economics*, Vol. 11, No. 2, pp. 5–25.
- SANDMO, A. (2005): "The theory of tax evasion: a retrospective view". *National Tax Journal*, Vol. 58, No. 4, pp. 643–663.
- SAUKA, A. AND T. PUTNINS (2011): "Shadow economy index for the Baltic countries 2009 and 2010". Report, Stockholm School of Economics in Riga, [http://www.sseriga.edu/download.php?file=/files/news/shadoweconomyindex\\_report.pdf](http://www.sseriga.edu/download.php?file=/files/news/shadoweconomyindex_report.pdf).
- SCHNEIDER, F. AND D. ENSTE (2000): "Shadow economies: size, causes and consequences". *Journal of Economic Literature*, Vol. 38, No. 1, pp. 77–114.

- SCHNEIDER, F. (2005): “Shadow economy around the world: what do we really know?”. *European Journal of Political Economy*, Vol. 21, No. 2, pp. 598–642
- SCHNEIDER, F. (2010): “Size and development of the shadow economy of 31 European countries from 2003 to 2010 (revised version)”. Mimeo, Department of Economics, Johannes Kepler University, <http://www.econ.jku.at/schneider>.
- SCHNELLENBACH, J. (2010): “Vertical and horizontal reciprocity in a theory of taxpayer compliance”, in J. Alm, J. Martinez-Vazquez and B. Targlter (2010, eds.): *Developing Alternative Frameworks for Explaining Tax Compliance*. Routledge, Ch. 4.
- ALM, J.; J. MARTINEZ-VAZQUEZ AND B. TARGLTER (2010, eds.): *Developing Alternative Frameworks for Explaining Tax Compliance*. Routledge.
- SMITH, A. (1767): *The Theory of Moral Sentiments*. London: A. Millar, 3<sup>rd</sup> ed.
- STAEHR, K. (2010): “The global financial crisis and public finances in the new EU countries in Central and Eastern Europe: Developments and challenges”. *Public Finance and Management*, Vol. 10, No. 4, pp. 671–712.
- TAFENAU, E.; H. HERWARTZ AND F. SCHNEIDER (2010): “Regional estimates of the shadow economy in Europe”. *International Economic Journal*, Vol. 24, No. 4, pp. 629–636.
- TORGLER, B. AND F. SCHNEIDER (2005): “Attitudes towards paying taxes in Austria: an empirical analysis”. *Empirica*, Vol. 32, No. 2, pp. 231–250.
- TORGLER, B.; AND F. SCHNEIDER (2006): “What shapes attitudes toward paying taxes? Evidence from multicultural European countries”. IZA Discussion Paper, No. 2117, <http://ftp.iza.org/dp2117.pdf>.
- TORGLER, B. (2003): “Tax morale in transition countries”. *Post-Communist Economies*, Vol. 15, No. 3, pp. 357–381.
- TORGLER, B. (2012): “Tax morale, Eastern Europe and European enlargement“. *Communist and Post-Communist Studies*, Vol. 45, No. 1-2, pp. 11–25.
- USLANER, E.M. (2010): “Tax evasion, corruption, and the social contract in transition”, Ch. 10 in J. Alm, J. Martinez-Vazquez and B. Torgler (eds.): *Developing Alternative Frameworks for Explaining Tax Compliance*. Routledge, pp. 206–225.
- VIHANTO, M. (2003): “Tax evasion in a transition from socialism to capitalism: the psychology of the social contract”. *Journal of Socio-Economics*, Vol. 32, No. 2, pp. 111–125.

- WEBLEY, P.; H. ROBBEN, H. ELFFERS AND D. HESSING (1991): *Tax Evasion: An Experimental Approach*. Cambridge University Press.
- WILLIAMS, C. (2008): “Envelope wages in Central and Eastern Europe and the EU”. *Post-Communist Economies*, Vol. 20, No. 3, pp. 363–376.
- WILLIAMS, C. (2009): “The prevalence of envelope wages in the Baltic Sea region”. *Baltic Journal of Management*, Vol. 4, No. 3, pp. 288–300.
- WORLD BANK (2012): “Worldwide Governance Indicators”, <http://info.worldbank.org/governance/wgi/index.asp>.
- WORLD VALUES SURVEY (1999): <http://www.worldvaluessurvey.org/> (Online Data Analysis → 1999-2004 → Estonia [1999], Latvia [1999], Lithuania [1999] → 7. Religion and morale → Justification of social behaviours → Cheating on taxes (F116)).
- YITZHAKI, S. (1974): “A note on income tax evasion: a theoretical analysis”. *Journal of Public Economics*, Vol. 3, No. 2, pp. 201–202.



## Appendix A

Table A.1: Descriptive statistics of the key indicators of the econometric analysis

	Estonia		Lithuania		Latvia	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
<i>Share of profits, employment and wages evaded, in %</i>						
Unreported profits	19.6	19.9	20.2	17.2	25.8	21.0
Unreported employment	15.9	18.4	14.0	15.0	17.4	19.5
Unreported wages	24.2	21.0	21.8	17.8	30.5	22.1
<i>Reciprocity towards government: Perception of government performance</i>						
Satisfaction with State Revenue Service <sup>a</sup>	3.69	0.82	3.33	0.94	2.81	1.17
Satisfaction with government tax policy <sup>a</sup>	3.35	1.01	2.34	1.06	2.02	0.83
Satisfaction with business legislation <sup>a</sup>	3.43	0.88	2.56	1.02	2.70	0.80
Satisfaction with government support for entrepreneurs <sup>a</sup>	2.99	1.03	2.03	1.07	2.15	1.09
Entrepreneurs in my country believe their tax money is spent appropriately <sup>b</sup>	2.848	1.263	1.767	1.102	1.538	0.820
Tax evasion is a response to a lack of government support <sup>b</sup>	2.810	1.340	3.408	1.339	3.689	1.274
<i>Social norms: Tolerance of tax avoidance and bribery</i>						
Tax avoidance is tolerated behaviour <sup>a</sup>	2.55	1.15	3.39	1.27	2.21	1.21
Bribing is tolerated behaviour <sup>a</sup>	2.16	1.15	3.75	1.28	1.74	1.00
<i>Rational choice: Rational reasons for tax evasion</i>						
Taxes are evaded more in difficult times <sup>b</sup>	3.024	1.393	2.968	1.263	3.341	1.335
Evading taxes is the only way to survive <sup>b</sup>	2.651	1.422	2.976	1.386	3.475	1.350
Firms always evade taxes to reduce costs, regardless of firm performance <sup>b</sup>	2.448	1.207	2.762	1.165	2.557	1.150
Firms always evade taxes to reduce costs, regardless of government performance <sup>b</sup>	2.565	1.211	2.562	1.153	2.416	1.124

Notes: S.D. indicates the standard deviation. Means and standard deviations are calculated using sample weights.

<sup>a</sup> Questions are assessed on a scale from 1 = “very unsatisfied” to 5 = “very satisfied”.

<sup>b</sup> Questions are assessed on a scale from 1 = “completely disagree” to 5 = “completely agree”.

## Appendix B

Table B.1: Spearman rank correlations between the set of explanatory variables and unreported economic activities

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Satisfaction with State Revenue Service	1.000											
(2) Satisfaction with government tax policy	0.390	1.000										
(3) Satisfaction with business legislation	0.324	0.571	1.000									
(4) Satisfaction with government support to entrepreneurs	0.329	0.607	0.505	1.000								
(5) Entrepreneurs in my country believe their tax money is spent appropriately	0.247	0.453	0.367	0.358	1.000							
(6) Tax evasion is a response to a lack of government support	-0.215	-0.394	-0.289	-0.298	-0.356	1.000						
(7) Tax avoidance is tolerated behaviour	-0.081	-0.082	-0.174	-0.193	-0.085	0.084	1.000					
(8) Bribery is tolerated behaviour	-0.099	-0.045	-0.162	-0.169	-0.068	0.045	0.574	1.000				
(9) Taxes are evaded more in difficult times	-0.067	-0.208	-0.118	-0.151	-0.114	0.199	0.033	-0.072	1.000			
(10) Evading taxes is the only way to survive	-0.180	-0.295	-0.190	-0.233	-0.203	0.284	0.035	-0.090	0.503	1.000		
(11) Firms always evade taxes to reduce costs, regardless of firm performance	-0.090	-0.070	-0.057	-0.083	-0.089	0.128	0.124	0.092	0.159	0.214	1.000	
(12) Firms always evade taxes to reduce costs, regardless of government performance	-0.043	0.011	-0.008	-0.061	0.008	0.067	0.127	0.057	0.202	0.236	0.644	1.000

Notes: Sample weights are not applied.

## Appendix C

Table C.1: Factor loadings of explanatory variables for first principal component

<b>Variable</b>	<b>Loadings</b>
Satisfaction with State Revenue Service	0.337
Satisfaction with government tax policy	0.494
Satisfaction with business legislation	0.442
Satisfaction with government support to entrepreneurs	0.448
Entrepreneurs in my country believe their tax money is spent appropriately	0.380
Tax evasion is a response to a lack of government support	-0.319

*Notes: Sample weights are not applied.*

Table C.2: Factor loadings of explanatory variables for first principal component

<b>Variable</b>	<b>Loadings</b>
Taxes are evaded more in difficult times	0.467
Evading taxes is the only way to survive	0.494
Firms always evade taxes to reduce costs, regardless of firm performance	0.516
Firms always evade taxes to reduce costs, regardless of government performance	0.521

*Notes: Sample weights are not applied.*

Table C.3: Factor loadings of explanatory variables for first principal component

<b>Variable</b>	<b>Loadings</b>
Tax avoidance is tolerated behaviour	0.707
Bribery is tolerated behaviour	0.707

*Notes: Sample weights are not applied.*

## Appendix D

Table D.1: Perceived share of undeclared activity and firm characteristics

	Profits	Employees	Salaries
<i>Country (Reference group : Latvia)</i>			
Estonia	-12.169*** (1.806)	-2.487 (1.586)	-9.401*** (1.879)
Lithuania	-7.514*** (1.578)	-3.506*** (1.354)	-12.148*** (1.618)
<i>Sector (Reference group : manufacturing)</i>			
Wholesale	-1.221 (2.145)	-3.613* (1.944)	4.347* (2.327)
Retail	-0.473 (2.360)	-4.395** (2.009)	0.964 (2.314)
Services	1.028 (1.948)	-2.750 (1.753)	0.419 (1.997)
Construction	1.910 (2.592)	1.441 (2.262)	3.609 (2.592)
Other	-3.974* (2.378)	-3.347 (2.473)	-1.391 (3.016)
<i>Firm size (Reference group : number of employees &gt; 100)</i>			
1–5 employees	-0.163 (2.613)	3.209 (2.330)	-0.171 (2.621)
6–9 employees	-1.071 (2.637)	3.481 (2.375)	1.122 (2.800)
10–19 employees	-3.579 (2.567)	0.317 (2.189)	-2.738 (2.688)
20–49 employees	-5.874** (2.500)	-0.711 (2.083)	-3.924 (2.547)
50–99 employees	-3.309 (3.068)	-2.537 (2.423)	-3.401 (3.114)
<i>Manager's level of education (Reference group: less than secondary)</i>			
Secondary	0.967 (2.901)	0.293 (2.418)	0.353 (2.950)
BA / engineering degree	-0.917 (2.125)	-0.346 (2.025)	0.245 (2.201)
Masters / doctoral degree	-2.311 (2.407)	-1.167 (2.284)	1.379 (2.589)
Manager's experience	-0.246** (0.096)	-0.209** (0.084)	-0.213** (0.096)
Log(firm average wage)	-0.426 (1.158)	0.060 (0.660)	-0.547 (1.099)
Log(firm age)	-0.043 (1.472)	-1.343 (1.394)	-2.035 (1.349)
$R^2$	0.081	0.048	0.089
No. of obs.	967	965	968

Notes: See the notes for Table 2 for the description of regressions.

Table D.2: Perceived share of undeclared activity and firm characteristics interacted with country dummies

	Profits	Employees	Salaries
<i>Country (Reference group : Latvia)</i>			
Estonia	-19.850*** (6.309)	-7.355 (5.133)	-15.473*** (5.725)
Lithuania	-10.247** (4.947)	-4.575 (4.446)	-14.672*** (4.372)
<i>Sector (Reference group : manufacturing)</i>			
Wholesale	3.695 (3.842)	-2.162 (3.642)	10.910** (4.255)
Retail	3.052 (3.737)	-2.655 (3.745)	5.215 (3.561)
Services	5.681* (3.337)	-1.329 (3.118)	4.872 (3.150)
Construction	8.517 (5.656)	4.147 (5.262)	5.216 (4.957)
Other	-7.127* (4.048)	-9.533*** (3.311)	-3.721 (5.023)
<i>Firm size (Reference group : number of employees &gt; 100)</i>			
1–5 employees	-6.231 (4.095)	2.001 (3.822)	-4.359 (4.009)
6–9 employees	-4.603 (4.302)	0.433 (3.689)	-3.813 (4.421)
10–19 employees	-9.504** (4.272)	-2.052 (3.857)	-9.256** (4.259)
20–49 employees	-14.420*** (4.080)	-3.626 (3.573)	-10.287** (4.132)
50–99 employees	-5.831 (4.924)	-3.335 (4.225)	-8.988* (5.059)
<i>Manager's level of education (Reference group: less than secondary)</i>			
Secondary	1.938 (2.931)	1.146 (2.440)	0.830 (2.976)
BA / engineering degree	-0.536 (2.157)	0.040 (2.051)	0.624 (2.209)
Masters / doctoral degree	-1.806 (2.463)	-0.881 (2.288)	1.730 (2.607)
Manager's experience	-0.244** (0.097)	-0.221*** (0.085)	-0.196** (0.097)
Log(firm average wage)	-0.275 (1.185)	0.244 (0.678)	-0.467 (1.142)
Log(firm age)	-0.345 (1.508)	-1.570 (1.438)	-2.394* (1.376)
<i>Interacted dummies</i>			
Estonia × wholesale	-4.948 (5.832)	-2.849 (5.666)	-8.946 (6.769)
Estonia × retail	-0.106 (6.369)	-1.560 (6.203)	-5.366 (7.557)

Estonia × services	-7.792 (4.832)	-3.054 (4.618)	-8.561 (5.439)
Estonia × construction	-10.109 (7.050)	-5.028 (6.530)	-5.028 (6.858)
Estonia × other	3.397 (5.921)	8.967 (5.619)	0.240 (7.530)
Estonia × 1–5 employees	14.231** (6.116)	5.987 (4.907)	12.142** (5.506)
Estonia × 6–9 employees	12.183* (6.713)	10.590* (5.563)	14.161** (6.517)
Estonia × 10–19 employees	10.859 (6.631)	3.109 (5.124)	9.717 (6.527)
Estonia × 20–49 employees	19.475** (7.812)	11.686** (5.601)	15.111** (7.090)
Estonia × 50–99 employees	1.433 (7.320)	1.083 (5.699)	11.475 (10.289)
Lithuania × wholesale	-10.607** (4.913)	-1.896 (4.334)	-11.874** (5.019)
Lithuania × retail	-9.571* (5.329)	-4.324 (4.383)	-8.598* (4.727)
Lithuania × services	-6.900 (4.869)	-1.638 (4.295)	-6.215 (4.489)
Lithuania × construction	-7.672 (6.936)	-2.182 (6.263)	0.442 (7.242)
Lithuania × other	1.973 (5.529)	6.078 (5.643)	5.860 (6.993)
Lithuania × 1–5 employees	9.664* (5.781)	-1.106 (4.985)	3.789 (5.408)
Lithuania × 6–9 employees	3.121 (5.615)	1.143 (5.037)	5.048 (5.879)
Lithuania × 10–19 employees	12.375** (5.581)	6.236 (4.761)	13.761*** (5.233)
Lithuania × 20–49 employees	14.595*** (5.237)	3.029 (4.524)	10.475** (5.125)
Lithuania × 50–99 employees	8.183 (6.722)	3.263 (5.354)	10.621 (6.661)
$R^2$	0.106	0.065	0.109
No. of obs.	967	965	968

Notes: See the notes for Table 2 for the description of regressions.

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