
Business Tax Evasion in Transition Economies: A Cross-Country Panel Investigation

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Abstract

This paper uses the Business Environment and Enterprise Performance Survey data for the years 1999, 2002 and 2005 to investigate business tax evasion in 24 transition economies. We use both conventional fixed effects estimation and the recently developed Fixed Effect Vector Decomposition approach. The most robust finding in our study is the importance of institutional factors. In particular, higher levels of corruption related to tax administration and slower transition reforms substantially reduce the amount of taxes paid by businesses in transition economies. In addition, we find a positive relationship between evasion and tax rate; and identify minor effects of the macroeconomic environment. We also find that social norms play a significant role in tax evasion. These findings inform policy recommendations intended to reduce either the possibility and/or the inclination to evade.

JEL Classification: H25, H26, H32, P20

Keywords: Tax Evasion; Tax Compliance; Transition Economies; Corruption; Institutions; Tax Rate.

1. Introduction

With taxes comes evasion (Cowell, 1990). Tax evasion imposes economic costs: it slows down economic growth by weakening the government's ability to provide adequate public goods (Johnson et al., 2000); it diverts resources to unproductive activities such as establishing financial subsidiaries to cover-up evasion (Slemrod, 2007); it provides an incentive for firms to remain small and invisible to facilitate evasion, thereby missing opportunities from the formal economy (Nur-tegin, 2008); and it generates inequity between the evaders and the honest taxpayers by shifting the burden to the latter group, thereby creating an incentive for further evasion (Feinstein, 1991).

Tax evasion is one of the major problems facing developing (Fuest and Riedel, 2009) and transition economies (Pirttila, 1999). The literature on the factors shaping tax evasion is fairly well developed (reviews include: Jackson and Milliron, 1986; Cowell, 1990; Andreoni, et al., 1998; Franzoni, 2008; Torgler 2011). However, most of it relates to individuals.

The lack of research on tax evasion by businesses is unfortunate, especially given the fact that in most countries the bulk of taxes is paid by firms and firms account for the bulk of tax evasion too (McCaffery and Slemrod, 2004; Crocker and Slemrod, 2005; Chang and Lai, 2004, Nur-tegin, 2008). Moreover, as suggested by Andreoni et al (1998) there is a huge gap and thus a permanent need for international and cross country research on tax evasion; while the work in the context of transition countries is still less

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developed. This paper aims to reduce this gap by introducing some empirical findings for businesses, cross-country and transition features of tax evasion.

The starting assumption in our work is similar to the assumption made generally in the current literature on the tax behaviour of businesses, which is that the behaviour of businesses is similar to the behaviour of individuals, and that – as a corollary – the determinants of business tax evasion may be similar, at least qualitatively, to the determinants of tax evasion by individuals or households.⁴ As Slemrod (2007, p.36) points out, the literature on business tax evasion “*adapts the theory of tax evasion, which for the most part concerns individual decision makers, to the tax compliance decisions made by businesses*”.

So far, cross-country investigations on tax evasion are rare. Through this paper we want to build upon pioneering work of cross-country investigation in Riah-Belkaiou (2004) and Richardson (2006) who have analysed individual tax evasion in respectively 30 and 45 countries. Riah-Belkaiou (2004) examines the international differences in tax evasion and relates these differences to selected determinants of tax morale. His findings show that tax evasion is lowest in countries characterized by high economic freedom, a developed equity market, effective competition laws and a low serious crime rate.

Richardson (2006) on the other hand advances cross-country investigation of individual tax evasion using a larger sample and finds that non-economic determinants have the strongest impact on tax evasion in comparison with economic determinants; most notably, the complexity of the tax system, education, income source, fairness and tax morale are highly correlated with tax compliant behaviour. We extend their (cross-country) approach by focusing on business instead of individual tax evasion and by focusing only on transition countries.⁵

Firm level analysis using BEEPS data have been also conducted previously by Nur-tegin (2008) Joulfaian (2009) and Abdixhiku et al. (2016). In addition to Riah-Belkaiou (2004) and Richardson (2006), we build upon the work of Nur-tegin, (2008), Joulfaian (2009) and Alon and Hageman (2012) by first, introducing new – and, so far, unobserved – determinants to the tax compliance model given the aggregation of micro data from various non-BEEPS sources; and second, by increasing the time period of dataset to three years (as compared to one in the past studies).

In a very recent publication, Alm, Martinez-Vazquez and McClellan (2016) also investigate the relationship between corruption and tax evasion – i.e. on ‘how the potential for bribery of tax officials affects a firm’s tax evasion decision’. They develop a new theoretical model of firms reporting when bribery is an option. Our cross-country

⁴ However, we must note that, there is a growing literature that highlights mostly theoretically that firm tax evasion may differ in various aspects from income tax evasion in its determinates and consequences (e.g. Chen and Chu, 2005; Crocker and Slemrod 2005; Goerke and Runkel 2006; Seidel and Thum 2016; Marjit et. al. 2017; Goerke 2017). Furthermore, there exists a substantial mostly empirical literature on profit shifting (Dischinger and Riedel, 2011; Dharmapala and Riedel, 2013).

⁵ Williams and Martinez (2007) conduct an exploratory analysis of individual tax morale and cross-country variations in the European Union. We note that studies on individual tax morale – in addition to individual tax evasion - have been extensive (see Torgler 2011 for a review). Business tax morale, on the other hand, has been neglected by researchers given the lack of data availability for most of the countries (Torgler, 2007). Though understanding the determinants of intrinsic motivation of individuals to comply – i.e. tax morale – has been always important in understanding a part of tax evasion behaviour, this paper focuses on a broader picture, that is, on determinants of business tax evasion in a cross-country context.

panel investigation, instead, uses the traditional model – and focuses on a wider range of determinants of tax evasion that go beyond the causal relationship between tax evasion and corruption related to tax administration. In our work, we focus on macroeconomic factors (GDP per capita, unemployment, inflation, non-performing loans); institutions (corruption and institutional development); and socio-cultural differences (social norms and education). Furthermore, when treating corruption in tax administration as a control variable for tax evasion,⁶ we come to similar results as in Alm, Martinez-Vazquez & McClellan (2016)- that the likelihood of the decision to evade increases in countries where there is corruption in tax administration and that the possibility of bribing the tax administration officials affects business decision to evade.

Specifically, this paper contributes to the literature by using the data for the years 1999, 2002 and 2005 to investigate business tax evasion in 24 transition economies. In our study, we incorporate institutional and macroeconomic indicators alongside tax rate and cultural influences on business evasion in transition economies.

To analyse the data from 24 transition economies for the years 1999, 2002 and 2005, we employ a conventional fixed effects approach as well as a recent innovation in fixed effect panel analysis, known as fixed effect vector decomposition (FEVD), which hitherto has not been used in this context. The main benefit of this approach is that it enables us to model the effect of time-invariant (or, at least, “slow moving”) variables, most notably proxies for institutional development. These determinants were not captured by previous studies (Riahl-Belkaiou, 2004; Richardson, 2006; Nur-tegin, 2008; Joulfaian, 2009; and Alon and Hageman, 2012)

The paper is organized as follows. In Section 2 we provide a brief overview of existing cross-country investigations. In Section 3 we describe the data used in our study and we review the major determinants of tax evasion. In Section 4 we outline the general form of the regression model. In Section 5 we focus on our approach to estimation and highlight the importance of diagnostic testing. Sections 6 and 7 report and discuss the empirical findings. The final section concludes.

2. Theory and determinants of tax evasion

Over four decades of research on tax evasion have given rise to an enormous amount of work (for reviews see Jackson and Milliron, 1986; Cowell, 1990; Andreoni, et.al, 1998; and Franzoni 2008 and Torgler 2011). The vast majority of this work, however, has neglected three important factors. The first factor relates to the importance of cross-country investigations. In one of the most insightful reviews of tax evasion, Andreoni et al. (1998, p.855), while concluding and providing directions for future research, argue that “...a broadening of the empirical database will improve the power of statistical tests of theoretical models, and spur comparative analysis across countries”. The second factor relates to the lack of studies on business tax evasion. As Torgler (2011) argues, “...business tax evasion in general, has received very little attention. Work in this area is therefore highly relevant (p.6)”. Last, the context of transition economies in tax evasion studies has received limited attention (Pirttila, 1999).

In this paper we attempt to fill these gaps by introducing all three components: business tax evasion; cross-country comparison; and the transition context. In order to do so, we start by assuming that the behaviour of businesses is similar to the behaviour

⁶ We thank an anonymous referee for suggesting to control for corruption related to tax administration and to distinguish it from general corruption

of individuals, and that the determinants of business tax evasion may be similar, at least qualitatively, to the determinants of tax evasion by individuals or households. The decision on evasion, or compliance, is made by individual managers or entrepreneurs who, in essence, act as individuals (Arias, 2005). As Slemrod (2007, p.36) points out, the literature on business tax evasion "adapts the theory of tax evasion, which for the most part concerns individual decision makers, to the tax compliance decisions made by businesses". This is particularly true of small and medium sized enterprises (SMEs) where the decision making entrepreneur makes compliance decisions both as an individual and as a manager.

Ever since Allingham and Sandmo's conventional model was introduced in 1972, theoretical and empirical literature on tax evasion has flourished. Advances incorporating interactions between institutions and taxpayers, cultural and behavioural differences as well as individual socio-demographic characteristics have also been made. These and conventional determinants of tax evasion, namely the tax rate, fine rate and audit rate, have contributed profoundly to modelling compliance decisions.

In the traditional model the level of income tax evasion is negatively related to the level of punishment⁷ imposed by law and the probability of audit by tax examiners.⁸ When analysing the impact of tax rates on evasion, the model predicts an ambiguous effect with the occurrence of both an income effect (as tax rates rise, people become poorer and, in the presence of decreasing absolute risk aversion, they evade less) and a substitution effect (rising taxes means that the return from evasion is higher, thus the taxpayer prefers the risky choice to the safer one). However, Yitzhaki (1974) argued that the ambiguity was a result of an unrealistic assumption of the model that the penalty is imposed on the amount of income not reported; if instead it is imposed on the evaded tax the substitution effect disappears and thus a tax rise will reduce evasion. Most of the models on business tax evasion have conducted comparative static analysis similar to that of the traditional model; namely, the firm evades less with higher probability of detection and larger fines, while the impact of tax rates is ambiguous (see Marelli, 1984; Marelli and Martina, 1988; Virmani, 1989; Sandmo, 2004; Crocker and Slemrod, 2005).

Consistent with the theory, the empirical evidence on the impact of tax rates is quite controversial. Clotfelter (1983) was the first author to make use of the US Tax Compliance Measurement Programme (TCMP) data to investigate evasion. His empirical analysis found positive and significant effects of the marginal tax rate on evasion. Similar results were reported by Pommerehne and Weck (1996) for Switzerland, Carroll (1998) for the US, Gorodnichenko et al. (2009) for Russia, Chiarini et al. (2008) for Italy, Sillamaa and Veall (2000) for Canada, and Fisman et al. (2004) for China. Similarly, Friedland et al. (1978), Collins and Plumlee (1991), and Alm et al. (1992) used laboratory experiments to show that participants' compliance decreased whenever the tax rate increased. Perhaps the biggest challenge to Clotfelter's findings

⁷ For the positive relationship between fine rate and tax compliance see Friedland et al.(1978), Grasmick and Scott (1982), Witte and Woodbury (1985), Becker et al. (1987) and Beck et al. (1991), Alm et al. (1992), Alm et al (1995), Hasseldine et al. (2007), Park and Hyun (2003). For negative relationship see Schwartz and Orleans (1967), Strumpel (1969) and Fjeldstad and Semboja (2001). For no effect see Baldry (1987), Webley et al. (1991), Pommerehne and Weck (1996), and Ali et al. (2001).

⁸ For the positive relationship between audit rates and compliance see Witte and Woodbury (1985), Crane and Nourzad (1986), Dubin et al. (1987) and Pommerehne and Weck-Hannemann (1996), Spicer and Hero (1985), Chang et al. (1987), Beck et al. (1991), Alm et al. (1995), Trivedi et al. (2004) and Feld et al. (2007), Kleven et al. (2010) and Slemrod et al. (2001).

comes from Feinstein (1991) as, employing the same data source (TCMP) and using a pooled model for the years 1982 and 1985, he found that the marginal tax rate has a negative relation with evasion. A negative relationship is also reported by Alm et al. (1995) for Spain, Kamdar (1997) for USA, and Alm et.al (1990) for Jamaica. To make the review on the impact of tax rates even more ambiguous, the works of Baldry (1987), Porcano (1988) and Joulfaian and Rider (1996) found that tax rates had no effect at all on evasion.

The conventional model consisting of tax rate, audit and fine rate has often been criticized for its simplicity. Andreoni et al. (1998, p.850) argue in favour of incorporating morals and social dynamics:

...it has been suggested that factors such as a moral obligation to be truthful, or the social consequences of being a known cheater, may add further enforcement incentives that are not accounted for in our models .

Further they elaborate three main groups of factors that are important when treating tax evasion models. The first group involves moral rules and sentiments that directly guide and impact the decision to comply or not. The field of individual tax morale has attracted attention from researchers quite recently (for an extensive review see Torgler, 2007), while the perspective of business tax morale is still unexplored. The second group relates to how the fairness of the tax system and its enforcement affects individuals' willingness to comply. Jackson and Milliron (1986, p.137) argued that tax fairness consists of at least two different dimensions: "*One dimension appears to involve the equity of the trade - the benefits received for the tax dollars given...*"; "*...the other dimension appears to involve the equity of the taxpayers' burden in reference to that of other individuals*". Last, the third group includes taxpayers' evaluations of the government according to the prevailing standards of performance, corruption and transparency. Hanousek and Palda (2004) looked at tax evasion as a form of legitimate protest by citizens against the government. Tirole (1996) explains that when taxpayers see their government as corrupted and unfair, evasion is seen as a "vote of dissent" from government. Accordingly, a strong positive relationship between corruption and tax evasion is reported by Tirole (1996), Anderson (2006) Picur and Riahi-Blekaoui (2005), Pashev (2005), Fjelsdad (2004), Nurtegin (2008) and Joulfaian (2009).

Socio-cultural determinants appear also as a powerful factor in influencing evasive behaviour (Nerre, 2001). According to Chau and Leung (2009), different social norms and ethical values create different incentives for tax evasion. Cultural attributes in tax evasion are also highlighted by Cummings et al. (2005) and Chan et al. (2000) where peer influence is seen as part of the cultural characteristics of specific groups of individuals or nations. Chau and Leung (2009) and Grasmick and Scott (1982) indicate that respondents with peers involved in unlawful activities are more likely to be non-compliant.

Amongst many factors, the tax evasion literature relates taxpayers' ability to comprehend and comply with tax laws to education. Two opposing effects are observed. On the one hand, fiscal knowledge may positively influence the practice of evasion, as more educated people involved in businesses may tend to better understand the opportunities for evading tax obligations. On the other hand, more educated people understand the importance of taxes better, which increases their level of voluntary compliance. The level of education is particularly important at the firm level. As Vogel

(1974) indicated, less educated taxpayers need more assistance, which in turn increases costs of compliance and thus evasive behaviour. In the empirical literature, a negative relationship between education and tax evasion is found by Dubin and Wilde (1988), Eriksen and Fallan (1996), Chan et al. (2000), Houston and Tran (2001) and Richardson (2006); while a positive relationship was reported by Witte and Woodbury (1985), Beron et al. (1992) and Scholz and Pinney (1993).⁹

In addition to the conventional moral, socio-cultural and demographic determinants, cross-country and within country time-series estimations, for both individual and business tax evasion, have also included economic determinants.¹⁰ Per capita income, unemployment, inflation and other performance indicators are common in such studies. Chelliah (1971) argues that higher per capita income reflects a higher level of development which, in turn, means not only a greater willingness to pay taxes but also a greater capacity to collect taxes. Other studies suggested that those taxpayers who have better living standards tend to create stronger bonds with compliant attitudes towards social systems (Tanzi, 1980 and Ghura, 1998). Frey and Weck-Hanneman (1984), moreover, argue that in countries with low per capita income people tend to hold more than just one job, yet tax reporting is more likely to be related only to the first job. Sookram and Watson (2005) using data from Trinidad and Tobago for the period 1960-2000 found that the per capita income had a negative relationship with tax evasion in the short run. However, in the long run this variable was not statistically significant and even had a positive relationship with tax evasion.

It is widely believed that an increase in unemployment is usually associated with reduced income that, consequently, increases levels of tax evasion. Furthermore, an increase in cash payments caused by an increase in unemployment (as individuals may switch to the “hidden” economy) may give rise to problems related to tax collection. Boame (2009), using Canadian aggregate macroeconomic time-series data from 1987 to 2003, found that an increase in the unemployment rate has a positive and statistically significant effect on tax evasion.

Views of the impact of inflation on tax evasion are summarised in two opposing groups. Fishburn (1981), amongst many, argues that inflation has a positive relationship with tax evasion as the decision to evade can be affected by the attempt of taxpayers to restore their purchasing power. Tanzi (1980) on the other hand argues that taxpayers delay tax payments to future high inflation periods, creating an overall negative relationship between inflation and tax evasion.

Following the above discussion, we estimate a model that combines the traditional determinants with institutional, behavioural and economic determinants. The following section provides a detailed description of the variables.

⁹ Gender studies show that female taxpayers are more compliant than men (for survey studies see, e.g., Vogel, 1974; Mason and Calvin, 1978; Minor, 1978; Aitken and Bonneville, 1980; Tittle, 1980; and Torgler and Schneider, 2006; for experiments, Spicer and Becker, 1980; Spicer and Hero, 1985; and Baldry, 1987).

¹⁰ Firm level studies covered also firm characteristic determinants, such as size, legal status, ownership, sector, performance and region amongst others.

3. Research Design

3.1. Data

In this model, the dependent variable, *Tax Evasion*, is the most difficult to quantify. Furthermore, as evasion is not directly observable, the information on which the measure of tax evasion is based is difficult to obtain, particularly for transition economies and especially when dealing with businesses. In order to assess the level of tax evasion, we use the Business Environment and Enterprise Performance Survey (BEEPS) database, produced jointly by the European Bank for Reconstruction and Development (EBRD) and the World Bank, which provides firm-level data on a broad range of variables related to the business environment and performance of firms.¹¹ The question of interest for the present study is as follows:

Q.48a (1999), Q.58 (2002) and Q.43a (2005) - What percentage of the sales of a typical firm in your area of activity would you estimate is reported to the tax authorities, bearing in mind difficulties with complying with taxes and other regulations?

Although the main question does not directly measure the level of compliance by the respondent, it is designed to act as a reasonable substitute by taking into account the respondents' obvious reluctance to reveal their own compliance. Such indirect measures of compliance (and other unlawful activities) are common in survey research.¹² We transform the question from a measure of compliance into a measure of evasion by subtracting the percentage of sales reported for tax purposes from 100.¹³

Table 1 displays the tax evasion levels for 24 transition countries for all available years; these data define the extent of our panel dataset.¹⁴ To our knowledge, this is the largest sample of transition countries so far used to assess the determinants of business tax evasion.

¹¹ The first round of the BEEPS, in 1999, surveyed 4,100 enterprises from 25 transition countries and Turkey. The sample size increased to 6,667 firms from 27 transition countries including Turkey but excluding Turkmenistan in the second round of the survey in 2002. The 2005 round covered around 9,500 firms in 28 transition countries, including Turkey and Turkmenistan. We did not include the latest round of BEEPS data (2008/09) as the main question on the level of tax evasion was dropped from the questionnaire in this survey.

¹² For more on how to conduct evasion questionnaires see Breman (1980), Hanousek and Palda (2004) and Gerxhani (2006).

¹³ For 1999, the respondents were asked to provide answers in eight categories between 0-100%. For each response we have taken the mid-point of the range; then we derived a country level of tax evasion by averaging mid-points. In the 2002 and 2005 surveys respondents were asked to provide a figure (in percentages) for the proportion of sales reported to the authorities. We then averaged these responses by country and thus obtained a country level of business tax compliance. After averaging we subtracted each result from 100% in order to get the measure of tax evasion for each country.

¹⁴ We had to exclude Serbia, Kosovo, Tajikistan and Montenegro because of the unavailability of data for these three countries over the three survey periods. For 1999 we averaged the responses of Bosnia and Republica Srpska to obtain the level of business tax compliance for Bosnia and Herzegovina as a whole. Last, as suggested by BEEPS (1999), we dropped country-level estimates for Lithuania and Slovakia for the year 1999, due to methodological mistakes committed by the survey team; instead we had to extrapolate data from the previous two years in order to get estimates for these two countries in the year 1999.

Table 1 Levels of business tax evasion in transition economies

		1999	2002	2005
1	ALBANIA	69.56	22.53	22.96
2	ARMENIA	19.22	9.19	4.51
3	AZERBAIJAN	32.07	13.09	13.94
4	BELARUS	5.75	8.12	7.17
5	BOSNIA	53.54	32.46	11.79
6	BULGARIA	27.65	17.19	13.54
7	CROATIA	23.77	12.69	7.58
8	CZECH REPUBLIC	22.64	9.84	13.09
9	ESTONIA	15.95	7.32	3.07
10	GEORGIA	33.16	35.66	10.85
11	HUNGARY	15.06	11.55	11.28
12	KAZAKHSTAN	15.16	17.28	6.61
13	KYRGYZISTAN	16.98	26.15	14.65
14	LATVIA	24.14	12.57	7.10
15	LITHUANIA	19.04	14.66	10.28
16	MACEDONIA FYR	24.02	36.23	23.48
17	MOLDOVA	18.97	20.47	10.54
18	POLAND	14.59	9.78	10.00
19	ROMANIA	12.04	13.36	6.55
20	RUSSIA	23.02	18.04	15.55
21	SLOVAK REPUBLIC	21.77	13.11	4.45
22	SLOVENIA	3.47	17.96	7.23
23	UKRAINE	25.43	14.56	10.68
24	UZBEKISTAN	20.26	10.54	2.97

*Source: Author's aggregated data from BEEPS 99,02,05

The independent variables are grouped in the following categories: *tax rate*, *economic performance*, *institutional* and *cultural factors*.

Tax rate is the only traditional determinant of tax evasion considered in this paper. Given the data constrains, we are unable to identify suitable proxies for the two remaining traditional variables: the probability of audit; and the fine rate. We use the Fiscal Freedom Index to account for the tax burden across countries. The *Economic performance* group includes the level and trends of economic development throughout transition economies. It encompasses all those economic factors that affect a firm's operations but that are outside the firm's ability to control and influence. We use four proxies to capture the national economic environment: *real per capita GDP*; *unemployment*; *inflation*; and *non-performing loans*. *Institutions* reflect the institutional development of a country. The institutional framework may be defined in a number of ways. In this paper, we explore the impact of corruption. We differentiate between corruption related to tax administration and corruption as a perception. For the former we generate data from the BEEPS dataset; for the latter we use *Freedom from Corruption* from the Heritage Foundation. For the institutional reforms in transition economies we use *Transition Index* published by the European Bank for Reconstruction and Development (EBRD). Last, *culture* proxies socio-cultural differences

between countries and captures social norms and educational levels within each country.¹⁵

Table 2 presents the list of variables together with their description, expected effects with respect to tax *evasion* (derived from the literature review above, which refers to the inverse of tax evasion, i.e. tax *compliance*) and the data source.

We acknowledge two main issues of endogeneity when using some of the proxies of corruption and tax evasion. One concern relates to potential sources of endogeneity: omitted variables; and simultaneity. On the first potential source, perceptions of levels of corruption and levels of tax evasion as well as measures of social norms may all be output variables with shared underlying determinants, some of which are necessarily omitted from the model (either because theoretical support and/or empirical evidence is lacking or because there are no suitable measures). Nonetheless, fixed effects estimation minimizes this type of potential endogeneity by controlling for all “time invariant” and/or “slowly moving” unobserved determinants of tax evasion, corruption and social norms. Country-level fixed effects imply that such determinants are moved from the error term into the estimated part of the model, thereby removing this source of potential endogeneity that otherwise might arise from omitted variables.

The second potential source of endogeneity is that corruption may be induced by tax evasion opportunities.¹⁶ However, induced effects work sequentially not simultaneously; for example, it takes time for corrupt officials to recognise greater levels of tax evasion and then to try to extract more rent by colluding with tax evaders. Accordingly, we assume that current levels of corruption condition current levels of tax evasion but that current levels of tax evasion contribute – as one influence among many – to future levels of corruption only. Hence, in our model, the feedback from tax evasion into perceptions of the level of corruption is not a source of simultaneity bias.

¹⁵ Other social factors such as age or region could not be included in this research given the lack of relevant data at firm level. Aggregation of other individual data for business research requires strong assumptions. Amongst others, the ratio between male and female population, or in the labour force, does not necessarily represent the gender structure of businesses in transition economies given disproportions in ownership by gender.

¹⁶ We thank an anonymous referee for bringing this point to our attention.

Table 2 Summary of independent variables

Variable	Description	Expected Sign	Source
TaxRate	The level of tax rates across countries, proxied by the Fiscal Freedom Index, an element of the Index of Economic Freedom for the years 1999, 2002 and 2005. The Index combines the top tax rates on individual and corporate incomes and the overall amount of tax revenue as a percentage of GDP. The index is presented in percentages.	Ambiguous	The Heritage Foundation 1999, 2002, 2005
Real GDP per capita	GDP per capita expressed in constant US dollars (\$).	Negative	World Bank 1999, 2002, 2005
Unemployment	Unemployment rate expressed in percentages	Positive	International Monetary Fund 1999, 2002, 2005
Inflation	Average annual percentage change in the Consumer Price Index	Ambiguous	Transition Report 1999, 2002, 2005
Business Environment	Business environment across countries proxied by the ratio of non-performing loans to total loans of commercial banks. Non-performing loans include categories of loans classified as sub-standard, doubtful and loss making, but exclude loans transferred to a state rehabilitation agency or consolidation bank, end-of-year.	Positive	Transition Report 1999, 2002, 2006
TranIndex	Intensity of reforms, proxied by the Transition Index; an average of six standard EBRD transition indicators measuring progress in transition. Progress is measured against the standards of industrialised market economies, while recognising that there is neither a "pure" market economy nor a unique end-point for transition. The Index ranges from 1 to 4+, where 1 represents little or no change from a rigid centrally planned economy and 4+ represents the standards of an industrialised market economy.	Negative	World Governance Indicators 1999, 2002, 2005

Variable	Description	Expected Sign	Source
Freedom from Corruption	The score for this component is derived primarily from Transparency International's Corruption Perceptions Index (CPI). The CPI is based on a 10-point scale in which a score of 10 indicates very little corruption and a score of 0 indicates a very corrupt government. In scoring freedom from corruption, the Index converts the raw CPI data to a scale of 0 to 100 by multiplying the CPI score by 10.	Negative	The Heritage Foundation 1999, 2002, 2005
Corruption related to Tax Administration	Q.25, Q.54 and Q39 – "Thinking about officials, would you say the following statements are always, usually, frequently, sometimes, seldom or never true? – It is common for firms in my line of business to have to pay some irregular "additional payments/gifts" to get things done with regards to customs, taxes, licences, regulations, services, etc."	Positive	BEEPS 1999,2002,2005
Social Norms	Social norms, or general attitude of society towards systems; proxied by electric power transmission and distribution losses. These include losses in transmission between sources of supply and points of distribution and losses in the distribution to consumers, including pilferage. Persistent refusal in a specific system over a certain period becomes a common social habit for other systems as well.	Positive	World Development Indicators 1999, 2002, 2005
Education	The level of education within a country, proxied by the number of new entrants to the first grade of secondary education (general programs only) in a given year, expressed as a percentage of the number of pupils enrolled in the final grade of primary education in the previous year.	Negative	World Bank 1999, 2002, 2005
Year 2002	Dummy Variable for data from 2002 (1999 is the omitted category)	Negative	BEEPS 2002
Year 2005	Dummy Variable for data from 2005 (1999 is the omitted category)	Negative	BEEPS 2005

3.2. Regression Model

To investigate the determinants of tax evasion in transition economies, we estimate the following model:

$$\begin{aligned} \text{TaxEvasion}_{it} = & \hat{\theta}_1 + \hat{\theta}_1 \text{TaxRate}_{it} + \hat{\theta}_2 \text{GDPpercapita}_{it} + \hat{\theta}_3 \text{Unemployment}_{it} + \hat{\theta}_4 \text{Inflation}_{it} + \\ & + \hat{\theta}_5 \text{BusinessEnv}_{it} + \hat{\theta}_6 \text{TranIndex}_{it} + \hat{\theta}_7 \text{CorruptionGen}_{it} + \hat{\theta}_8 \text{CorruptionAdmin}_{it} + \\ & + \hat{\theta}_9 \text{SocialNorms}_{it} + \hat{\theta}_{10} \text{Education}_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

The subscript i refers to countries (1,..., 24) and t to years 1999, 2002 and 2005. TaxEvasion_{it} stands for the level of evasion; TaxRate_{it} is the tax rate levied on businesses; GDPpercapita_{it} is the level of real per capita income; Unemployment_{it} is the unemployment rate; Inflation_{it} is the inflation rate; BusinessEnv_{it} is the state of the business environment proxied by the share of non-performing loans as a percentage of total loans; TranIndex_{it} is the EBRD's transition index showing the progress of transition; $\text{CorruptionGen}_{it}$ is the Freedom from Corruption score; $\text{CorruptionAdmin}_{it}$ is corruption related to tax administration, SocialNorms_{it} is the society's attitude towards systems and compliance requirements (or social norms) proxied by the level of electricity losses and theft as a percentage of total output; while Education_{it} is the progression rate of students to secondary school as a percentage of total graduates from primary schools. $\hat{\theta}_i$ are country fixed effects that control for all time invariant – or, at least, slowly moving – national geographic, historical/cultural, institutional, social and economic influences not otherwise explicitly specified in the model. $\hat{\theta}_{1-10}$ are estimated coefficients that measure the effects of each dependent variable on tax evasion. Finally, ε_{it} is the usual white noise error term.

Table 3 reports descriptive statistics for the variables used in the model for our panel of 24 transition economies. The next section elaborates on various econometric issues related to the estimation of the model.

Table 3 Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
TaxEvasion	72	16.68	11.09	2.97	69.56
TaxRate	72	72.08	11.77	44.9	91.5
GDPpercapita	72	3676	3594	259.8	17908
Unemployment	72	12.77	8.32	0.3	37.25
Inflation	72	13.01	36.2	-8.5	293.7
BusinessEnv	72	12.66	13.29	0.1	62.6
TranIndex	72	3.22	0.59	1.55	3.99
CorruptionGen	72	32.2	13.88	10	70
CorruptionAdmin	72	2.42	0.61	1.17	3.95
SocialNorms	72	16.12	9.23	3.43	48.8
Education	72	98.13	1.59	92.2	99.93
Year 2002	72	0.33	0.47	0	1
Year 2005	72	0.33	0.47	0	1

There are no missing observations; hence, econometric estimation proceeds using a fully balanced panel. The next section elaborates various econometric issues with corresponding implications for the specification and estimation of the model.

3.3. Econometric Issues

Post estimation, we subjected our conventional fixed effects model to a series of diagnostic tests. The Pesaran (2004) test for cross sectional dependence fails to indicate the presence of cross-section dependence at the 10% level; however, we include two period dummy variables for the years 2002 and 2005 to account for the potential effects of common shocks. The modified Wald Test for groupwise heteroskedasticity indicated substantial heteroskedasticity, which is common in panel datasets. Accordingly, we report robust standard errors, which are also robust to clustering effects in the data. For small datasets, cluster robust standard errors can be smaller than the default standard errors; therefore, we report both.

Although we have too few observations in the time-series dimension to test for serial correlation in the residuals, these standard errors are robust to arbitrary departures from independence within each cluster (country). Finally, we investigated the distribution of the errors. Normality is not required in order to obtain unbiased estimates of the regression coefficients. However, it is required for valid hypothesis testing in small samples. Our test results revealed non-normality. Thus prompted to investigate, we found two outliers: Albania for the year 1999 (*AL99*); and Macedonia for the year 1999 (*MC99*). The inclusion of two corresponding dummy variables improves significantly the distribution of the residuals (the null hypothesis of no skewness, no excess kurtosis and, jointly, of normality cannot be rejected at conventional levels of significance). Full details of these diagnostic tests, together with the Stata user-written programmes used to implement them, are available on request.

Before we interpret our final results, we introduce a recently developed alternative to conventional fixed effects (FE) estimation. Because it is new to the tax evasion literature, we present the key concepts of the Fixed Effects Vector Decomposition (FEVD) approach (Plümer and Troeger, 2004) and explain its application to our case.

3.3.1. Fixed Effect Vector Decomposition

In fixed effects estimation, the group-specific fixed effects (i.e., dummy variables) fully account for all between-group variation. From this characteristic arise both the main advantage and the main disadvantages of FE estimation.

The great advantage is that the group-specific fixed effects control for all *unobserved* sources of time-invariant heterogeneity between groups. The corresponding disadvantages are two-fold: first, the group-specific fixed effects fully account also for all *observed* sources of time invariant heterogeneity between groups so that time-invariant variables cannot be separately estimated (they are perfectly collinear with the fixed effects); a second but less well known corollary of the full absorption of between-group variation by the group-specific fixed effects, and the corresponding loss of information, is that *observed* variables with relatively little within-group variation cannot be estimated efficiently (Plümer and Troeger, 2007).

Plümer and Troeger (2007, p.127) elaborate on the implications of this second disadvantage:

... inefficiency does not just imply low levels of significance; point estimates are also unreliable since the influence of the error on the estimated coefficients becomes larger as the inefficiency of the estimator increases.

To address both of these disadvantages, Plümper and Troeger (2007) propose their Fixed Effects Vector Decomposition (FEDV) estimator. This is a three-stage approach that combines fixed effects estimation to analyse the effect of variables with relatively high within-group variation and pooled ordinary least squares (OLS) estimation of both time-invariant and “rarely changing” (or slowly moving) variables with relatively low within-group variation (Plümper and Troeger, 2011). With reference to our model, FEDV proceeds as follows.

Stage One is fixed effects estimation of our preferred model specified in Equation 1 with two additional country dummies (for Albania 1999 and Macedonia 1999) introduced given the empirical considerations. This model includes several variables that are rarely changing but none that are completely time invariant (see Table 4 below).

Stage Two is a cross-section regression of the vector of the estimated group fixed effects ($\hat{\theta}_i$) from Equation 1 on the time invariant variables and/or rarely changing explanatory variables from Equation 1 (our fully-specified model includes only the latter). The Stage 2 treatment of slowly moving variables in FEVD estimation is necessary to address the problem that conventional fixed effects estimates of the effects of slowly moving variables can be imprecise, as noted above.

A second reason arises in cases where researchers are concerned by unobserved correlations between the estimated group fixed effects ($\hat{\theta}_i$) and time varying but slowly moving variables, Plümper and Troeger (2007, p.136) find that “*we can reduce the potential for bias of the estimation by including additional time-invariant or rarely changing variables into stage 2*”, while warning that “*this may reduce bias but is likely to also reduce efficiency*”. In country-level panels covering only a short time span such correlations and corresponding estimation biases can be presumed to be prevalent. In such cases, fixed effects capture unobserved time invariant country influences, which – given the short sample period - includes broad influences associated with history, culture and institutions that are most likely to be correlated with one or more of the slowly moving variables.

Accordingly, to address these potential problems in estimating our model, we follow the rule of thumb recommended by Plümper and Troeger (2007) for the inclusion of variables in the Stage 2 regression. This guideline was subsequently endorsed by Greene (2011, p.9):

Strictly time invariant characteristics will obviously be included and variables with sufficiently low within-variance should also be included ... a between-to-within ratio of 2.8 is sufficient to justify the inclusion of the variable in the second stage.

Table 4 below compares the between- and within-group variation (measured by standard deviations) for each variable in our model and indicates those that, according to this guideline, are slowly moving and thus included in our Stage 2 regression.

Table 4 Identifying Slowly Changing Variables

Variable	Between Group Variations	Within Group Variations	Between/Within Ratio	Slowly Changing*
TaxEvasion	7.86	7.93	0.99	
GDPpercapita	3266	1599	2.04	
Unemployment	7.94	2.81	2.82	*
Inflation	23.73	27.7	0.85	
BusinessEnv	9.20	9.72	0.94	
TaxRate	9.58	7.03	1.36	
TranIndex	0.59	0.12	4.91	*
CorruptionGen	12.44	6.51	1.91	
CorruptionAdmin	0.43	0.44	0.97	
SocialNorm	8.98	2.60	3.45	*
Education	1.29	0.95	1.35	
Year 2002	5.67E-17	0.47	0	
Year 2005	5.67E-17	0.47	0	
AL99	5.67E-17	0.47	0	
MC99	5.67E-17	0.47	0	

* If value > Rule of Thumb 2.8; Source: Authors, using STATA 11

Accordingly, our Stage 2 FEVD regression is specified as follows:

$$\hat{\theta}_i = \hat{\beta}_0 + \hat{\beta}_1 \text{Unemployment}_{it} + \hat{\beta}_2 \text{TranIndex}_{it} + \hat{\beta}_3 \text{SocialNorms}_{it} + \omega_i \quad (2)$$

where $\hat{\beta}_0$ is the intercept; and ω_i is the unobservable part of the fixed effects (i.e. “the second stage residual”). This Stage 2 regression decomposes the vector of estimated group fixed effects from Equation 1 ($\hat{\theta}_i$) into two parts: the effects of the intercept β_0 and the observed slowly moving variables (*Unemployment*, *TranIndex* and *SocialNorms*); and the unobserved group effects (the Stage 2 residual, ω_i). It is this decomposition that characterises the FEVD estimator and that integrates its FE and pooled-OLS components.

Stage Three: Finally, the *unobservable* part (ω_i) of the estimated vector of fixed effects ($\hat{\theta}_i$) obtained in Stage 2 is substituted for the vector of unit fixed effects ($\hat{\theta}_i$) in Equation 1.¹⁷ Since the estimated unobservable effects $\hat{\omega}_i$ control for potential sources of omitted variable bias, and are - by design - not correlated with the time invariant variables (Plümper and Troeger, 2007), we estimate the resulting Equation 3 by pooled OLS. In this case, the final model yields unbiased estimates, although the standard errors must be adjusted to account for $\hat{\omega}_i$ being estimated in Stage 2, hence subject to error, as well as for unrepresented degrees of freedom (Plümper and Troger, 2007) (in a small sample, not making this adjustment will severely underestimate the standard

¹⁷ If observable time invariant variables are part of the fully-specified model then these also appear in the Stage 2 regression and are then substituted, along with the unobservable part (ω_i) of the estimated vector of fixed effects ($\hat{\theta}_i$), for the vector of unit fixed effects ($\hat{\theta}_i$) in Equation 1.

errors).^{18,19} The estimated coefficient on $\widehat{\omega}_i$ should be either equal to - or at least close to - 1.0 (Greene, 2010 and 2011), which may be regarded as a specification check on FEVD estimation.

$$\begin{aligned} \text{TaxEvasion}_{it} = & \widehat{\theta}_0 + \widehat{\theta}_1 \text{TaxRate}_{it} + \widehat{\theta}_2 \text{GDPcapita}_{it} + \widehat{\theta}_3 \text{Unemployment}_{it} + \widehat{\theta}_4 \text{Inflation}_{it} + \\ & + \widehat{\theta}_5 \text{BusinessEnv}_{it} + \widehat{\theta}_6 \text{TranIndex}_{it} + \widehat{\theta}_7 \text{CorruptionGen}_{it} + \widehat{\theta}_8 \text{CorruptionAdmin}_{it} + \\ & + \widehat{\theta}_9 \text{SocialNorms}_{it} + \widehat{\theta}_{10} \text{Education}_{it} + \widehat{\theta}_{11} \text{Year2002}_{it} + \widehat{\theta}_{12} \text{Year2005}_{it} + \\ & + \widehat{\theta}_{13} \text{AL99}_{it} + \widehat{\theta}_{14} \text{MC99}_{it} + \widehat{\omega}_i + \varepsilon_{it} \end{aligned} \quad (3)$$

Compared to conventional fixed effects estimation, the FEVD approach has an advantage with respect to the estimation of slowly moving variables: because the Stage 3 regression is estimated by OLS, both between-group and within-group variation is taken into account, which gives superior efficiency (i.e., more precise estimates). OLS estimation also has the advantage of a widely understood range of diagnostic tests and checks on the statistical integrity of the model. In the case of the model specified in Equation 3, standard diagnostic tests suggest that this Stage 3 FEVD regression is statistically well specified with respect to homoskedasticity, normal distribution of the model errors and as a linear model. In addition, diagnostic checks suggest no undue influence from (multi) collinearity or high-leverage observations. A final advantage of FEVD, shared with conventional fixed effects estimation, is that it is well suited for the estimation of small samples, particularly because OLS has known small sample properties. In comparison with estimators whose properties are known only asymptotically, FEVD may be particularly appropriate for analysing transition and institutional processes where panel datasets are often small (Plümper and Troger, 2007; Beck, 2011). For example, the cross-section dimension of the dataset in the present study is limited to the number of transition economies. FEVD estimation may have one disadvantage in short panels (for example, the three-periods available to the present study). Monte Carlo simulations establish that the accuracy of the standard errors on the time invariant variables depends on the number of the time series observations (T) in the panel (Plümper and Troger, 2011). Although the simulation evidence suggests that the FEVD standard errors on the time invariant variables are most accurate when the number of both cross-section and time series observations (N and T) both exceed 20, no evidence is reported on the extent of deterioration for T<10. For this reason, we do not report only FEVD estimates but also those from conventional fixed effects estimation.

As argued, the greatest advantage of Fixed Effect Vector Decomposition (FEVD) approach lies in its ability to account for slowly moving variables. In our model, “unemployment”, “transition index” and “social norms” are all slowly moving variables.

¹⁸ Since we include only one variable (the error term of the second stage) to account for all remaining unobservable country effects in the third stage regression, we adjust the degrees of freedom by $(\widehat{\theta}_i - 1)$, which in our case is 23.

¹⁹ An important practical consequence for researchers is that the appropriate Stata ado-file to implement FEVD is version `xtfevd4.0beta.ado` (the latest at the time of writing), which computes standard errors based on an appropriately revised variance equation. This file, which is available from Plümper and Troger’s website, executes all three steps of FEVD and adjusts the variance-covariance matrix for the degrees of freedom.

Employing standard Fixed Effect approach in this case would not provide accurate estimations. Because of FEVD we have been able to understand the impact of – especially – the “transition index” and “social norms” in tax evasion; as these two variables appear to be statistically significant and with signs in line with theoretical expectations.

4. Empirical Results and Analysis

The results are presented in three columns in Table 5. Column 1 presents fixed effects estimates of the basic model (Equation 1); Column 2 presents fixed effects results using cluster-robust standard errors (to address various sources of departure from the assumption of white noise error terms). Finally, the third column presents the FEVD estimates. The interpretation of results is based on this column.

Most of the estimated effects are in accordance with the theory and the previous empirical literature. The estimates consistently suggest that *TaxRate*, *BusinessEmv*, *SocialNorms* and institutions (proxied by *TranIndex* and *CorruptionAdmin*) are the most economically influential and consistently statistically significant variables. The association between *TaxRate* and *TaxEvasion* is positive and significant at the 1% level. An one percentage change in the level of the Fiscal Freedom Index, that is an increase in tax burden, leads to a rise of the tax evasion level by more than one third of a percentage point.

The relationship between *TranIndex* and *TaxEvasion* is negative and significant at the 10% level. An increase of the Transition Index by one point, that is improvement in reforms, lessens the level of tax evasion by 8.36%. On corruption, we find that there is distinction between general perception on corruption and corruption related to tax administration. While we fail to establish any statistical significance on *CorruptionGen*, we find that *CorruptionAdmin* is positively related to tax evasion at the five percent level of significance.

The relationship between real *GDPpercapita* and *TaxEvasion* is positive across all estimations but the coefficient is very small: a huge amount of extra income per capita is required to make any substantial difference in the level of tax evasion: around \$1,000 of additional per capita income are needed to increase tax evasion by a single percentage point (this is purely indicative as, strictly speaking, this is outside the range of a merely marginal change). The other economic performance variable, *BusinessEmv*, appears to be statistically significant at one percent level. There is a positive relationship between firm non-performance and tax evasion; an increase of non-performing loans by one point tends to increase tax evasion by one fifth of the point. The other two remaining economic variables *Unemployment* and *Inflation* do not appear as statistically significant.

The next sub-group of highly significant regressors are the dummy variables. The period dummies suggest that, at the 1% level of significance, compared to the base year, tax evasion falls in 2002 and 2005 by respectively 5 and 13 percent. These numbers are consistent with the unconditional statistics on business tax evasion presented in Table 1 (in which 13 of the 24 countries display continuous improvement) and suggest an increase in compliance over time that is consistent with more or less general progress in institutional reform. In addition, the dummies for Albania for the year 1999 and Macedonia for the year 1999 both suggest strongly positive but temporary effects on tax evasion.

Results for cultural differences and characteristics appear to be in line with theoretical expectations. The percentage of electricity losses or theft used as a proxy for

Social Norms is positively related to tax evasion, and statistically significant in FEVD estimation. Indeed, it is because of FEVD technique that accounts for slowly moving variables, that this particular variable was captured to be significant. *Education* is estimated with a negative sign but is also statistically insignificant across all estimations. Finally, as suggested by Plümper and Troeger (2004), our coefficient on ω_i is 1.0 in FEVD, which confirms that our FEVD model is properly estimated.

Table 5. Regression Results

	FIXED EFFECTS			FIXED EFFECTS			FEVD		
	1			2			3		
Dependent: Tax Evasion	Coeff		S.E	Coeff	robust S.E		Coeff	fevd S.E	
Tax Rate	0.39	***	0.11	0.39	**	0.14	0.39	***	0.11
Economic Performance									
GDP per capita	1.9E-3	***	5.8E-4	1.9E-3	***	5.3E-4	1.9E-3	***	5.8E-4
Unemployment	0.06		0.21	0.06		0.16	0.22		0.16
Inflation	-0.01		0.02	-0.01		0.02	-0.16		0.02
Business Environment	0.24	***	0.08	0.24	**	0.10	0.24	***	0.08
Institutions									
Transition Index	-9.49		11.07	-9.49		9.58	-8.36	***	3.03
Corruption General	0.03		0.10	0.03		0.09	0.03		0.10
Corruption Tax Admin	4.72	**	2.08	4.72	**	1.82	4.72	**	2.03
Culture									
Social Norms	0.35		0.26	0.35		0.26	0.29	*	0.17
Education	0.24		0.67	0.24		0.53	-0.24		0.60
Year Dummies									
2002	-4.92	**	2.18	-4.92	***	1.71	-4.92	***	1.64
2005	-12.89	***	3.79	-12.89	***	3.72	-12.8	***	2.73
Constant	-21.2		87.2	-21.2		72.7	-33.0		61.4
Eta							1.00		.
R-squared	0.57			0.58			0.93		
Number of observations	72			72			72		

Note: *** at 1% level of significance; ** at 5% level of significance; * at 10% level of significance

4.1. Discussion

One of the most important findings in this study relates to the effect of the tax rate on tax evasion, particularly given the theoretical and empirical ambiguity associated

with this relationship. A robust positive relationship in our estimated models suggests that higher tax rates increase the benefits of evasion as described in the Allingham and Sandmo (1972) model. For transition economies, it seems that the substitution effect prevails over the income effect.

We advance evidence that the macroeconomic environment has significant but minor effects on business tax evasion. The literature argues that per capita GDP acts as a proxy for the general level of development within a country. If so, then in transition economies levels of business tax evasion may rise a little as overall prosperity increases. However, this effect is very small. A much considerable effect is foreseen within business environment. Increased non-performing loans, used as a proxy for difficult business environment, show that in times of difficult business environment, businesses are more inclined to evade and thus recuperate the lost gain. In other words, the risky option of evasion yields higher profits.

The most important finding of our study is the impact of institutional factors on tax evasion. Even if a country is performing well in general economic terms, the presence of negative institutional phenomena (most notably corruption and lack of reforms) exerts a dominant and immediate influence on the relationship between businesses and government. We used the measure of transition reforms and corruption to proxy the relationship between businesses and formal institutions. Reforms depend on the quality of state bodies which, in turn, affects citizens' trust in these same bodies, while corruption gives rise to both dissatisfaction and opportunities. There is, however, a significant distinction between corruption related to tax administration and general perception of corruption; with the former causing opportunities for tax evasion. The negative effect of both the transition index and the corruption index (government effectiveness) on tax evasion is as expected; moreover, the size of these institutional effects is economically substantial. The size of the coefficients enforces the general claim in the literature that institutional factors do matter in accounting for tax evasion and suggests that their inclusion in models of tax evasion for transition economies is imperative. Our findings are consistent with several complementary explanations: first, if businesses feel betrayed by their government they may respond by non-payment of taxes as a form of revolt; secondly, corruption undermines the government-business relationship more broadly, thereby loosening feelings of social obligation; thirdly, corruption related to tax administration changes the risk of penalties, which suggests that businesses from transition economies see corruption also as an opportunity to lessen their tax obligations.

The positive relationship between social norms and tax evasion shows that evasive behaviour is not just a response of non-confidence towards the government, but it can be also part of a culture; of how people behave towards systems. If noncompliance with bills, obligations and other citizenship duties is part of certain culture within a country, i.e. is a social norm, then tax evasion is considered morally right and totally acceptable.

Finally, positive, large and highly significant period effects for the Year 2002 and the Year 2005 relative to 1999 suggests that tax evasion is falling over time. This again is consistent with the importance of transitional reforms, in particular improvements in law enforcement and other institutions in these countries.

The main concern in our work relates to the potential sources of endogeneity; i.e. corruption may be induced by tax evasion opportunities. Though we argue in our paper that the fixed effects estimation minimizes this type of potential endogeneity by

controlling for all “time invariant” and/or “slowly moving” unobserved determinants of tax evasion – we acknowledge also that this is a very strong assumption that all essential omitted variables are not necessarily “time invariant” and/or “slowly moving”. A good example is the substantial anti-corruption reforms in Georgia over our sample period (for details see World Bank, 2012).²⁰ Having said that, we acknowledge that the work may not have a strong identification strategy that relies on truly exogenous variation in our explanatory variables. Hence our results might reflect correlations which do not necessarily imply causation. Still, our work serves as a guidance for future research; and we encourage future research to find ways to properly identify it.

5. Conclusions

In spite of the extensive literature on tax evasion, business tax evasion in TEs has been largely neglected. Yet many of these economies suffer greatly from tax evasion. This study contributes to knowledge in this area by providing evidence from a cross-country investigation of business tax evasion in 24 transition economies. This is particularly important as most tax evasion is accounted for by the business sector. As well as conventional fixed effects estimation, we employ a recently developed approach known as fixed effect vector decomposition (FEVD), which is particularly suited to small samples. At each stage particular attention has been paid to model diagnostics to ensure the statistical integrity of the models and, hence, the validity of our estimates.

The major findings of this study are the importance of institutional factors and of the tax rate: higher corruption, slower reforms and higher tax rates all reduce substantially the amount of taxes paid by businesses in TEs. In addition, we identify minor effects from the macroeconomic environment on business tax evasion: a significant effect of the business environment; as well a significant effect of social norms on noncompliance.

This study contributes to the empirical literature on tax evasion by investigating the determinants of business tax evasion in transition countries and by its suggestions on model specification and estimation. However, this study is subject to two main limitations. The first is the lack of data on and consequent non-inclusion in the model both of the penalty element and of the probability of audit. Of course, the inability of transition countries to keep and publish data on these two factors limits any study. However, to the extent that that these variables are time invariant or “slowly changing” their influence is controlled for by the country fixed effects and thus is not a source of omitted variables bias. The second limitation is that the proxy for tax evasion is derived from a survey. Surveys of tax evasion are complicated, because evasion is a criminal activity and individuals are reluctant to admit such behaviour. Because of this, the data provided in surveys related to tax evasion are based on perceptions about the behaviour of others; therefore the outcomes are subjective and subject to measurement errors.

Our findings suggest that in transitional economies institutional reform is the key to improving tax evasion. Additional institutional improvements could usefully include enhanced data collection. In particular, reporting data on penalties for evasion and audit practices would address one of the limitations of this study (and similar studies) noted above, and so better inform research and policy design.

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References

- Abdixhiku L., Krasniqi, B., Pugh, G., Hashi, I. (2017), 'Firm-level determinants of tax evasion in transition economies', *Economic Systems*, 41(1), 354-366.
- Aitken S., Bonneville L. (1980), 'A General Taxpayer Opinion Survey'. Prepared for Office of Planning and Research IRS. Washington: CSR, Inc.
- Ali M., Cecil W., Knoblett A. (2001), 'The Effects of Tax Rates and Enforcement Policies on Taxpayer Compliance: A Study of Self-Employed Taxpayers', *Atlantic Economic Journal*, 29, 186-202.
- Allingham M., Sandmo A. (1972), 'Income tax evasion: A theoretical analysis', *Journal of Public Economics*, 1, 323-338.
- Alm J., Bahl R., Murray M. (1990). 'Tax Structure and Tax Compliance', *The Review of Economics and Statistics*, 72, 603-613.
- Alm J., McCallin N. (1990), 'Tax Avoidance and Tax Evasion as a Joint Portfolio Choice', *Public Finance*, 45(2), 193-200 .
- Alm J., McClelland G., Schulze W. (1992), 'Why do people pay taxes?', *Journal of Public Economics*, 48, 21-48.
- Alm J., Sanchez I., de Juan A. (1995), 'Economic and Noneconomic Factors in Tax Compliance', *Kyklos*, 48, 3-18.
- Alm J., Martinez-Vazquez J., McClellan C. (2016), 'Corruption and firm tax evasion', *Journal of Economic Behavior and Organization*, 124, 146-163.
- Alon A., Hageman A. (2012), 'The impact of corruption on firm tax compliance in transition economies: Whom do you trust?', *Journal of Business Ethics*, 116 (3), 479-524.
- Anderson J. (2006), 'Tax Bribes in Transition Countries', Presented in a session Tax Culture and Tax Morale at the 99th Annual Conference on Taxation of the National Tax Association, Boston, MA, November 16-18, 2006.
- Andreoni J., Erard B., Feinstein J. (1998) 'Tax compliance', *Journal of Economic Literature*, 36, 818-860.
- Arias R. (2005), 'A note on indirect tax evasion'. *Asociacion Argentina de Economia Politica*, 2005.
- Baldry J. (1987) 'Income tax evasion and the tax schedule: Some experimental results', *Public Finance*, 42, 357-383.
- Beck P., Davis S. Jon W. (1991), 'Experimental evidence on taxpayer reporting under uncertainty', *The Accounting Review*, 66, 535-58.
- Beck N. (2011), 'Of Fixed-Effects and Time-Invariant Variables', *Political Analysis*, 19, 119-122.
- Becker W., Buchner H., Slesking S. (1987), 'The impact of public transfer expenditures on tax evasion: An experimental approach', *Journal of Public Economics*, 34, 243-252.
- BEEPS (1999), 'Key findings from the business environment survey of private sector firms in the CEE and CIS', *European Bank for Reconstruction and Development*, 1999.
- Beron K., Tauchen H., Witte D. (1992), 'The Effect of Audits and Socioeconomic Variables on Compliance'. in Slemrod, J. (Ed.), 'Why People Pay Taxes. Tax Compliance and Enforcement', *The University of Michigan Press*, Ann Arbor, 67-89.

- Boame A. (2008), 'Individual Tax Compliance: A Time-Series Regression Using Canadian Data, 1987-2003', *Compliance Research and Measurement Section*, Baseline Research Paper.
- Brenan J. (1980), 'The informal sector in research: Theory and Practice', *Rotterdam Erasmus University*, Comperative Asian Studies Program 3.
- Chang J., Lai C. (2004), 'Collaborative tax evasion and social norms: why deterrence does not work', *Oxford Economic Papers*, 56(2), 344-368.
- Chen K., Chu C. (2005). 'Internal control versus external manipulation: a model of corporate income tax evasion', *RAND Journal of Economics*, 36(1), 151-164.
- Carroll R. (1998), 'Tax Rates, Taxpayer Behavior, and the 1993 Tax Act. U.S. Department of the Treasury', *Office of Tax Analysis*. Working Paper 79.
- Chan C., Troutman C., O'Bryan D. (2000), 'An Expanded Model of Taxpayer Compliance: Empirical Evidence from the United States and Hong Kong', *Journal of International Accounting Auditing and Taxation*, 9, 83-103.
- Chang O., Nichols N., Schultz J. (1987), 'Taxpayer attitudes toward tax-audit risk', *Journal of Economic Psychology*, 8, 299-309.
- Chau G., Leung P., (2009), 'A critical review of Fischer tax compliance model: A research synthesis', *Journal of Accounting and Taxation*, 1 (2), 034-040.
- Chelliah R. (1971), 'Trends in Taxation in Developing Countries', *International Monetary Fund*, Staff Papers, 18, 254-331.
- Chiarini B., Marzano E., Schneider F. (2008), 'Tax Rates and Tax Evasion: An Empirical Analysis of the Structural Aspects and Long-Run Characteristics in Italy', *IZA Discussion Paper*, No. 3447.
- Clotfelter C. (1983), 'Tax Evasion and Tax Rates: An Analysis of Individual Returns', *Review of Economics and Statistics*. 65(3), 363-73.
- Colin W., Álvaro M. (2007), 'Explaining cross-national variations in tax morality in the European Union: an exploratory analysis', *Studies of Transition States and Societies*, 2007. Vol 6.
- Collins J., Plumlee P. (1991), 'The Taxpayer's Labor and Reporting Decision: The Effect of Audit Schemes', *Accounting Review*, 66, 559-576.
- Cowell F. (1990), 'Cheating the government: The economics of evasion', *Cambridge, Mass. and London: MIT Press*.
- Crocker K., Slemrod J. (2005), 'Corporate Tax Evasion with Agency Costs', *Journal of Public Economics*, 89(9-10), 1593-1610.
- Crane S., Nourzad F. (1986), 'Inflation and Tax Evasion: an Empirical Analysis', *Review of Economics and Statistics*, 68, 217-223.
- Cummings R. *et al.* (2005), 'Effects of Tax Morale on Tax Compliance: Experimental and Survey Evidence', *Crema Working Paper Series*, 2005-29.
- Das-Gupta A., Lahiri R., Mookherjee D. (1995). 'Income Tax Compliance in India: An Empirical Analysis', *World Development*, 23(12), 2051-2064.
- Dharmapala Dh., Riedel N. (2013), 'Earnings shocks and tax-motivated income-shifting: Evidence from European multinationals' *Journal of Public Economics*, 97(1), 95-107.
- Dischinger M, Riedel N. (2011), 'Corporate taxes and the location of intangible assets within multinational firms' *Journal of Public Economics*, 95(7), 691-707.
- Dubin J., Michael G., Louis W. (1987), 'Are We a Nation of Tax Cheaters? New Econometric Evidence on Tax Compliance', *American Economic Review*, 77(2).
- Dubin J., Louis W. (1988), 'An empirical analysis of federal income tax auditing and compliance', *National Tax Journal*, 41, 61-74.

- Eriksen K., Fallan L. (1996), 'Tax knowledge and attitudes towards taxation: A report on a quasi-experiment', *Journal of Economic Psychology*, 17, 387 – 402.
- Feinstein J. (1991), 'An Econometric Analysis of Income Tax Evasion and its Detection', *RAND Journal of Economics*, 22(1), 14-35.
- Feld L., Schmidt A., Schneider F. (2007), 'Tax Evasion, Black Activities, and Deterrence in Germany: An Institutional and Empirical Perspective', *Mimeo*, University of Heidelberg.
- Fishburn G., (1981), 'Tax Evasion and Inflation', *Australian Economic Papers*, 20, 325-332.
- Fisman R., Wei S. (2004), 'Tax Rates and Tax Evasion: Evidence from 'Missing Imports' in China', *Journal of Political Economy*, 112(2), 471-496.
- Fjeldstad O., Semboja J., (2001), 'Why People Pay Taxes: The Case of the Development Levy in Tanzania', *World Development*, 29, 2059-2074.
- Fjeldstad O. (2004), 'What's trust got to do with it? Non-payment of service charges in local authorities in South Africa', *Journal of Modern African Studies*, 42(4), 539-562.
- Franzoni L. (2008), 'Tax Compliance. Encyclopaedia of Law and Economic', *Boudewijn Bouckaert and Gerrit De Geest*, eds., Edward Elgar.
- Friedland N., Shlomo M., Aryeh R. (1978), 'A Simulation Study of Income Tax Evasion', *Journal of Public Economics*, 10(1), 107-116.
- Frey B., Weck-Hanneman H. (1994), 'The Hidden economy as an 'unobservable variable'', *European Economic Review*, 26, 33-35.
- Fuest C., Riedel N. (2009), 'Tax Evasion, Tax Avoidance and Expenditures in Developing Countries: A review of the literature', *Oxford University Centre for Business Taxation*.
- Goerke L. (2017), 'Tax evasion in a Cournot oligopoly with endogenous entry', *International Tax and Public Finance*, 24(5), 754–779.
- Goerke L., Runkel M. (2006), 'Profit tax evasion under oligopoly with endogenous market structure', *National Tax Journal*, 59(4), 851-57.
- Goerke L., Runkel M. (2011), 'Tax evasion and competition' *Scottish Journal of Political Economy*, 58(5), 711-736.
- Gërkhani K. (2006), 'Did you pay your taxes?' How (not) to conduct tax evasion surveys in transition economies', *Social Indicators Research*, (2007) 80; 551-581.
- Ghura D. (1998), 'Tax Revenue in sub-Sahara Africa: Effects of economic policies and corruption', *International Monetary Fund*, Working Paper, 1998/135. Washington D.C
- Gorodnichenkoa Y., Martinez-Vazquez J., Sabirianova K. P., (2009), 'Myth and Reality of flat tax reform: micro estimates of tax evasion response and welfare effects in Russia', *Journal of Political Economy*, 117(3), 504-554.
- Grasmick H., Scott W. (1982), 'Tax Evasion and Mechanisms of Social Control: A Comparison with Grand and Petty Theft', *Journal of Economic Psychology*, 2, 213-230.
- Greene W. (2010), 'Fixed Effects Vector Decomposition: A Magical Solution to the Problem of Time Invariant Variables in Fixed Effects Models?', Working Paper version of: Greene, W. (2010), Fixed Effects Vector Decomposition: A Magical Solution to the Problem of Time Invariant Variables in Fixed Effects Models?. *Political Analysis*, 19(2) (Spring).
- Greene W. (2011), 'Reply to Rejoinder by Plumper and Troeger', *Political Analysis*, 19(2) (Spring), 170-72.
- Hanousek J., Palda F. (2004), 'Quality of Government Services and the Civic Duty to Pay Taxes in the Czech and Slovak Republics, and other Transition Countries', *Kyklos*, 57(2), 237-252.
- Hasseldine J. et al. (2007), 'Persuasive communications: Tax compliance enforcement strategies for sole proprietors', *Contemporary Accounting Research*, 24, 171-194.

- Houston J., Tran A. (2001), 'A Survey of Tax Evasion Using the Randomized Response Technique', *Advanced Taxation*, 13, 69-94.
- Jackson B., Milliron V. (1986), 'Tax compliance research: Findings, problems and prospects', *Journal of Accounting Literature*, 5, 125-165.
- Johnson S. *et al.* (2000), 'Why Do Firms Hide? Bribes and Unofficial Activity after Communism', *Journal of Public Economics*, 76(3), 495-520.
- Joulfaian D., Rider M. (1996), 'Differential Taxation and Tax Evasion by Small Business', *National Tax Journal*, 51(4), 676-87.
- Joulfaian D. (2009), 'Bribes and Business Tax Evasion' *The European Journal of Comparative Economics*, 6(2), 227-244.
- Kamdar N. (1997), 'Corporate Income Tax Compliance: A Time Series Analysis', *Atlantic Economic Journal*, 25(1), 37-49.
- Kaufman D., Kraay A., Mastruzzi M. (2009), 'Governance Matters VIII: Aggregate and Individual Governance Indicators for 1996-2008', *World Bank Policy Research*, Working Paper No. 4978, Washington, D.C.
- Kleven H. *et al.* (2010), 'Unwilling or Unable to Cheat? Evidence from a Randomized Tax Audit Experiment in Denmark', *National Bureau of Economic Research*, Working Paper No. 15769.
- Marjit S., Seidel A., Thum M. (2017), 'Tax Evasion, Corruption and Tax Loopholes', *German Economic Review*, 18(3), 283-301.
- Marrelli M. (1984), 'On Indirect Tax Evasion', *Journal of Public Economics*, 25, 181-196.
- Marrelli M., Martina R. (1988), 'Tax Evasion and Strategic Behavior of the Firms', *Journal of Public Economics*, 37, 55-69.
- Mason R., Calvin L. (1978), 'A study of admitted income tax evasion', *Law and Society Review*, 12, 73-89.
- McCaffery E., Slemrod J. (2004), 'Toward an Agenda for Behavioral Public Finance', *University of Southern California Law School Law and Economics*, Working Paper Series. No. 21.
- Minor W. (1978), 'Deterrence Research: Problems of Theory and Method', in: J. A. Cramer (ed.), *Preventing Crime*, 21-45, Sage, Beverly Hills.
- Nerre B. (2001), 'The Concept of Tax Culture. The proceedings of the 94th annual conference', *National Tax Association*, 288-295.
- Nur-tegin K. (2008), 'Determinants of Business Tax Compliance', *The Berkeley Electronic Journal of Economic Analysis and Policy*, 8(1), 1-26.
- Park C., Hyun J. (2003), 'Examining the determinants of tax compliance by experimental data: a case of Korea', *Journal of Policy Modeling*, 25, 673-684.
- Pesaran H. (2004), 'General Diagnostic Tests for Cross Section Dependence in Panels', *IZA Discussion Papers*, 1240.
- Pashev K. (2005), 'Corruption and Tax Compliance: Challenges to tax policy and administration', *Center for the Study of Democracy*, Sofia 2005.
- Plumper T., Troeger V. (2004), 'The estimation of time-invariant variables in Panel Analyses with Unit Fixed Effects', *Social Science Research Network*, Working Paper.
- Plumper T., Troeger V. (2007), 'Efficient Estimation of Time Invariant and Rarely Changing Variables in Finite Sample Panel Analyses with Unit Fixed Effects', *Political Analysis*, 15, 124-139.
- Plumper T., Troeger V. (2011), 'Fixed Effects Vector Decomposition: Response', Working Paper Version of: Plümper, T., Troeger, V. (2011). Fixed Effects Vector Decomposition: Properties, Reliability, and Instruments, *Political Analysis*. 19(2) (Spring).

- Picur R., Riahi-Belkaoui A. (2006), 'The Impact of bureaucracy, corruption and tax compliance', *Review of Accounting and Finance*, 5, 174-180.
- Pirttila J. (1999), 'Tax Evasion and Economies in Transition: Lessons from Tax Theory', *Bank of Finland. Institute for Economies in Transition*, No.2.
- Pommerehne W., Weck-Hannemann H. (1996), 'Tax Rates, Tax Administration and Income Tax Evasion in Switzerland', *Public Choice*, 88, 161-170.
- Porcano T. (1988), 'Correlates of tax evasion', *Journal of Economic Psychology*, 9, 47-6.
- Riahi-Belkaoui A. (2004), 'Relationship between tax compliance internationally and selected determinants of tax morale', *Journal of International Accounting, Auditing and Taxation*, 13, 135-143.
- Richardson G. (2006), 'Determinants of tax evasion: A cross-country investigation', *Journal of International Accounting, Auditing and Taxation*, 15, 150-169.
- Sandmo A. (2004), 'The Theory of Tax Evasion: A retrospective view', *Norwegian School of Economics and Business Administration*, Discussion Paper, No 31.
- Seidel A., Thum M. (2016), 'Tax Evasion, Corruption and Market Entry', *Scottish Journal of Political Economy*, 63(4), 377-398.
- Scholz J., Pinney N. (1993), 'Do Intelligent Citizens Free Ride? The Duty Heuristic, Low-Information Rationality, and Cheating on Taxes', *Department of Political Science, State University of New York, Stony Brook*.
- Schwartz R., Orleans S. (1967). 'On Legal Sanctions. University of Chicago Law Review', 34, 282-300.
- Sillamaa M., Veall M. (2000), 'The Effect of Marginal Tax Rates on Taxable Income: A Panel Study of the 1988 Tax Flattening in Canada', *Quantitative Studies in Economics and Population Research Reports*, No 354. McMaster University.
- Slemrod J. (2007), 'Cheating Ourselves: The Economics of Tax Evasion', *Journal of Economic Perspectives*, 21(1), 25-48.
- Slemrod J., Blumenthal M., Christian C. (2001). 'Taxpayer response to an increased probability of audit: evidence from a controlled experiment in Minnesota', *Journal of Public Economics*, 79, 455-83.
- Sookram S., Watson P. (2005), 'Tax evasion, Growth and the Hidden Economy in Trinidad and Tobago' Working Paper. *Sir Arthur Lewis Institute of Social and Economic Studies*.
- Spicer M., Becker L. (1980), 'Fiscal Inequity and Tax Evasion: An Experimental Approach', *National Tax Journal*, 33, 171-175.
- Spicer M., Hero R. (1985), 'Tax Evasion and Heuristics', *Journal of Public Economics*, 26, 263-267.
- Strumpel B. (1969), 'The contribution of survey research to public finance', in: A. T. Peacock (ed.). *Quantitative Analysis in Public Finance*. 13-22. *New York: Praeger*.
- Tanzi V. (1980), 'Inflation and the Personal Income Tax', *Cambridge University Press*.
- Tirole J. (1996), 'A theory of collective reputation', *Review of Economic Studies*, 63, 1-22.
- Tittle C. (1980), 'Sanctions and social deviance: The question of deterrence', *New York: Praeger*.
- Torgler B., Schneider F. (2006), 'What Shapes Attitudes Toward Paying Taxes? Evidence from Multicultural European Countries', *IZA Discussion Papers*, 2117.
- Torgler B. (2007), 'Tax Compliance and Tax Morale: A Theoretical and Empirical Analysis', *Edward Elgar Pub*, September 2007.
- Torgler B. (2011), 'Tax Morale and Compliance: Review of Evidence and Case Studies for Europe', Policy Research Working Paper, 5922. *The World Bank*.
- Trivedi V., Shehata M. Bernadette L. (2004), 'Impact on personal and situation factors on taxpayer compliance: An experimental analysis', *Journal of Business Ethics*, 47(3), 175-197.

- Virmani A. (1989), 'Indirect Tax Evasion and Production Efficiency', *Journal of Public Economics*, 39, 223-237.
- Vogel J. (1974), 'Taxation and Public Opinion in Sweden: An interpretation of recent survey data', *National Tax Journal*, 27(4), 499-513.
- Webley P. *et al.* (1991), 'Tax evasion: An experimental approach', Cambridge, *Cambridge University Press*.
- Witte A., Woodbury D. (1985), 'The effect of tax laws and tax administration on tax compliance: The case of the U.S. individual income tax', *National Tax Journal*, 38, 1-13.
- World Bank (2012), 'Fighting corruption in public services: chronicling Georgia's reforms. Directions in development : public sector governance', Washington, DC: *World Bank*..
- Yitzhaki S. (1974), 'A Note on Income Tax Evasion: A Theoretical Analysis', *Journal of Public Economics*, 3, 201-2.

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