INFORMALITY, TAX EVASION AND THE QUALITY OF BUSINESS ENVIRONMENT: EVIDENCE FROM SOUTH CAUCASIAN COUNTRIES

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ABSTRACT

In many transition countries, a considerable part of economic activity takes place in the informal sector. On the other hand, tax evasion constitutes a major problem and causes improvements to all levels of the informal sector in which the volume of the informal sector in transition countries is much higher than in developed countries. Previous works have examined separately both the determinants of the size of the informal sector and the determinants of tax evasion for transition countries. But, this paper complements these significant works by examining cross sectional analysis based on firm-level data for South Caucasian countries. In addition, our paper has a new contribution to previous works by providing some empirical evidence for informality and tax evasion with the quality of business environment. Building on a simple analytical framework, we test the channels affecting the degree of informality in South Caucasian countries and vice versa, the channels affecting the degree of tax evasion. We use instrumental variable OLS and find that the extent of informality is determined by tax evasion, as well as the extent of tax evasion is determined by the informality for these countries. In addition, we find that the business environment has implications for both informal economy and tax evasion. These results suggest generally ameliorating the business environment in South Caucasian countries, while strengthening an access to land and financial sources, adequate provision of public capital such as telecommunication, transport and electricity infrastructure will reduce informality, reigning the corruption, tax administration and labor regulation will reduce tax evasion and ultimately lead to increasing government revenue collections.

KEY WORDS

tax evasion, informality, the quality of business environment, South Caucasian countries

JEL CODES

D22, H26, O17, H32

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1 INTRODUCTION

In transition countries tax evasion constitutes a major problem and causes improvements to all levels of the *informal sector* in which the volume of the informal sector in transition countries is much higher than in developed countries (Grgić and Terzić, 2014). Because of the concerns about tax evasion effects on economic growth and the government's ability to raise revenues, and hence provide sufficient public services, our recent work has focused on the quality of business environemt. The computation of the size and development of the informal economy in the transition countries has been undertaken since the late 80s starting with the work of Kaufmann and Kaliberda (1996), Johnson et al. (1997) and Lackó (2000). In this paper, *South Caucasian countries – Armenia, Azerbaijan and Georgia – will be examined as a part of transition countries.* Schneider (2006) predicted the size of Azerbaijan's informal economy at 61.3 percent of gross national income in 2003. The size of Armenia's and Georgia's informal economy at 49.1 and 68.0 percent of gross national income, respectively in the same year. More recent study such as Buehn and Schneider (2012) estimated the size of Azerbaijan's shadow economy to be 52 percent of gross national income. Armenia and Georgia are in the 41.1 and 62.1 percent of gross national income, respectively. It can be seen that, there are many obstacles to come up with the size of the shadow economy in all three countries. But, as this paper shows, some progress can be made for all three countries after our research and it will bring new light to the economy of *South Caucasian countries.*

According to the State Statistics Committee of the Republic of Azerbaijan, 93 percent of individual entrepreneurs in Azerbaijan operate mainly in the fields of retail trade and transportation. Only 2 percent of the individual entrepreneurs are doing business activity in the industrial sector. One of the explanations proposed for this is the impact of oppressive taxes (Nadirov and Aliyev, 2015). Also, this claim can be exemplified by Armenia and Georgia. In addition, the empirical literature relates the size of the informal sector to the tax burden (e.g., Cebula, 1997; Giles and Tedds, 2002). Moreover, we can add that the main problem apparent in the tax system of transition countries is about having weak tax administration procedures and pronounced tax exemptions. These weaknesses, in turn, encourage widespread tax evasion (Andrew and Jean, 2000).

According to Fig. 1, Azerbaijan is ranked 33 on the ease of operation of the attractiveness of business environment and in comparison with other two South Caucasian countries we are placed in the highest position. Armenia and Georgia are in the 41 and 38 ranking position, respectively. While the informal sector has implications for tax effort, there is limited research on the microeconomic level determinants of informality and tax evasion in South Caucasian economies. For these reasons, informality, tax evasion and the quality of business environment have now received renewed attention in policy debates. The main questions to this study are 'Does the quality of business environment encourage South Caucasian countries firms to operate informally and evade taxes?', 'If yes, how it differs among the three countries?'.

This paper follows the work of Dabla-Norris et al. (2008) and Mawajje (2013) who modelled informality as the failure by economic agents to fully comply with government determined regulations and taxes. This framework generates several predictions. In particular, we obtain that both the tax evasion and the quality of business environment are important determinants of informality. We also test adverse relationship that both an informality and the quality of business environment leads to tax evasion.

We test these predictions using data a 2013 Enterprise Survey compiled by World Bank for a South Caucauses countries. This data set enables us to make a contribution to the empirical literature about the different channels of informality, tax evasion and the business environment. Previous papers along these lines has only been done in Dabla-Norris et al. (2008) and Mawajje (2013), the former primarily using

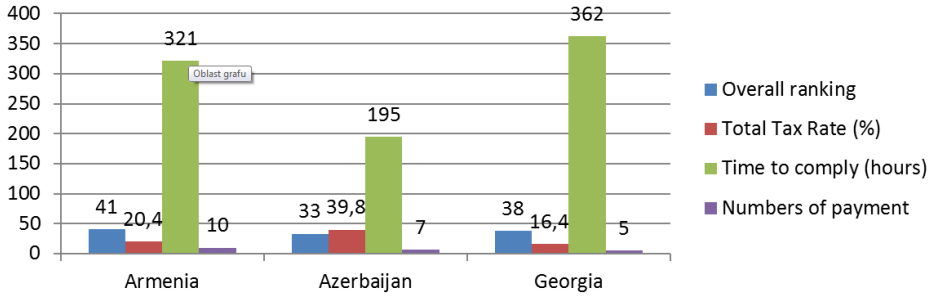

Fig. 1: The data tables. Overall Paying Taxes ranking, Tax Payments, Time to comply and Total Tax Rate
Source: PWC (2015)

much larger micro-sample which includes firms from many developing countries, and the latter in the context of firm-level data for Uganda. Our paper complements this significant work by examining cross sectional analysis based on firm-level data for South Caucasian countries.

Firstly, we find that the quality of business environment and the tax evasion plays a crucial role in determining the size of the informal sector, consistent with the presented all models. This reveals the fact that the desire of entrepreneurs to avoid taxes leads to higher informality. With Azerbaijan as the basis group condition, the research reveals that Armenia is the most informal country compared to Azerbaijan while Georgia is the least informal. However, informality differences between Georgia and Azerbaijan is not significantly strong. Secondly, we tested also adverse relation that the informality plays an important role in the spreading of tax evasion process. In this test, again Azerbaijan is the basis group, tax evasion attempts in Georgia and Armenia is lower in comparison with Azerbaian. However, the difference is statistically and economically significant for Georgia-Azerbaijan comparison, but for Armenia-Azerbaijan comparison, the difference is small and statistically insignificant. Overall, our results reinforce the view that tax evasion is the primary determinant of informality, and vice versa informality is the primary determinant of tax evasion in all three South Caucasus countries.

The rest of the paper is organised as follows: section two discusses the literature survey and analytical framework are discussed in section three while data and estimation strategy and empirical results are presented in section four and five, respectively. Lastly, the conclusions are presented section six.

2 LITERATURE REVIEW

In recent years, domestic revenue generation in developing countries has been gaining prominence in the policy debate. Especially in South Caucasus region Armenia, Azerbaijan and Georgia has experienced a range of political and economical conflicts about the ways of collecting more domestic revenue. In all the developing countries, the major problems of collection domestic revenue is large untaxed informal sector. While such studies hepled to understand the extent of tax evasion in an economy, they cannot describe explicitly the reasons behind a firm's decision to operate informally and evade taxes Mawajje (2013). For these reasons, issues of tax evasion, informality, and the quality of business environment have now received renewed attention in policy debates. The significance of a good business environment for firm performance has been well investigated in the literature. Reinikka and Svensson (2002) provided that firms crucially reduce investments in productive capacity when faced with insufficient provision of complementary public capital. Following papers has shown

investment climate has implications for firm level productivity (Dollar et al., 2002; Ingram et al., 2007) and growth (Dollar et al., 2003).

Djankov et al. (2002) suggest in his research that many activities that now take place in the informal or semi-formal economy in transition countries will be legalized if entrepreneurs see the costs of informality rising and its benefits falling. He indicate that the tax base is increased, as firms at the margin of the informal economy see their benefits of formality increase and current tax-payers become more compliant.

Dabla-Norris et al. (2008) test this prediction using data for a large number of developing and developed countries. They indicate that tax burden, excessive regulations, financial constraints, and weaknesses of the legal framework has a large effect on the tendency to operate informally for both small and large firms. They found that the quality of the legal framework is significantly important in determining the size of the informal sector, whereas the significance of taxes, regulations and financial constraints is reduced in the context of a well functioning legal system.

Recently, the literature identifies tax evasion as one of the worst determinant for making poor business environment in every developed and developing countries. Mawajje (2013) provided some emirical evidence on how a poor business environment causes tax evasion in Uganda. He found that the extent of tax evasion is determined by the quality and efficiency of legal systems, bureaucratic bribery and inadequate provision of public capital.

Altogether, while this literature contains a relatively rich offering of the potential determinants of informality for developing and developed countries, very few studies have tested them for South Caucasian countries. To the best of our knowledge, about this issue there has been no research directly focused on the economies of South Caucasian countries. In this paper, therefore, we take a fresh look at the causes of informality by employing a comprehensive firm-level dataset that includes information on various potential determinants of informality for South Caucasian countries. For this reason, we use a simple general equilibrium model developed by Mawajje (2013). This simple general model will be explained more fully in the next section.

3 THEORETICAL FRAMEWORK

The theoretical framework of our analysis is adopted from Rauch (1991), Dabla-Norris et al. (2008) and Mawajje (2013). The production function is expressed as below:

$$y_i = a_i f(L, K, G). \tag{1}$$

Variable a_i denotes firm's productivity form other sources L, K and G denotes the amount of labour employed, private capital investment and public capital, respectively. Here, labour earns a wage w and private investment earns a return r.

As you know, the quality of business environment depends on provision of public capital by government that is complimentary to private capital. Provided public capital is anticipated to help on the development of private firms. Mawajje (2013) assumed in his production function that governments can only provide the public good by imposing a taxation rate t on the firm's output and labour. All collected taxes can be demonstrated by T, while the efficient provision of complimentary public capital G is equal to T ($G = T$), because we mentioned above that government public capital can be funded by imposing tax to firm's output and labour. In the first i period firms notice government's commitment to provide public good and make a decision to operate formally or informally (evade tax) in the second $i+1$ period. Normally, firms choose to do their business activity formally in period $i+1$ if their perceptions of government's commitment to providing complementary capital is satisfactory. If not, firms will do their business activity informally or will be reluctant to reveal their

actual output. To be unwilling to reveal actual outuput in that case, it means that firms will avoid a proportion of taxes. On the other hand, employees will choose to engage in informal employment, if their work in firms does not make any economic sense for them. Employees in the informal sector earn a wage w which is not taxed, but employees in the formal sector earn a wage w_f and pay a tax t_f such that their net wage is $w_f - t_f$.

In the same way, firms do their business activity formally if they expect government to provide public complementary capital to at least a minimum level g_f, otherwise firms will do their business activity informal sector or avoid paying taxes. Nevertheless, doing business activity formally is also costly because it includes a cost τ that is associated with meeting government regulatory requirements. The high regulatory requirements can change the strategy of firms and it will lead to operate informally their business activity. Firms that doing business activity in the formal sector earn a profit

$$\pi_f = af(L,K,G) - wL - rK - \tau - C,$$

while those that doing their business activity in the informal sector earn a profit equivalent to

$$\pi_{nf} = af(L,K,G) - wL - rK - C.$$

Letting C denotes the cost of complying with regulatory requirement and bribes in the formal sector.

The formula mentioned above just only shows us informal sector without risks or penalties. But in reality, we know that firms can face penalties by government if they hide output or under declare their tax obligations. If the firms chooses to operate informally, it avoids the direct cost of regulatory requirements but faces a likelihood of being caught and punished as shown by Dabla-Norris et al. (2008). Here, p will denote us the probability of being caught when operating informally. We assume that, when caught, the firms is fined by the full amount of their profits. For this reason, the supposition above insinuate that the profits of an informally operating firm can be expressed as follows:

$$\begin{aligned} \pi_{nf}\,(\text{not caught}) &= af(L,K,G) - wL - \\ &\quad - rK - C, \end{aligned} \tag{2}$$

with probability $1-p$,

$$\pi_{nf}\,(\text{caught}) = 0, \tag{3}$$

with probability p, so that expected profits for a firm operating informally are given as:

$$\begin{aligned} \pi_{nf} &= \big[af(L,K,G) - wL - \\ &\quad - rK - C\big](1-p). \end{aligned} \tag{4}$$

4 DATA AND ESTIMATION STRATEGY

4.1 The data

The study uses data from the World Bank Enterprise Surveys (2013) for South Caucasus economies. The data for our research was selected from three countries namely; Armenia, Azerbaijan and Georgia involved 360, 390 and 360 firms, repectively. The data contains information on South Caucasus firms' perceptions of the quality of government provision of public services, the strength of the legal framework and tax evasion as well as other constraints in doing business. It is often said that firms make unofficial payments/gifts, private payments or other benefits to public officials to gain advantages in the drafting of laws, decrees, regulations, and other binding government decisions. About the informality, we use this following statement and question as a proxy: It is common for firms in my line of business to have to pay some irregular "additional payments or gifts" to get things done with regard to customs, taxes, licenses, regulations, services etc. Would you say the following statement is always, usually, frequently, sometimes, seldom or never true?

Additionally, the survey questionnaires have the following question that we use as a proxy for tax evasion: "How often would firms make payments/gifts for the dealing with taxes and tax collection?"

Of equal importance, the survey asked questions about the specific components of the business environment and on a scale of 0–4 where 0 represents no obstacle and 4 represents very severe obstacle, entrepreneurs or the business managers were required to specify whether the stated factors presented any obstacles to the operations of the establishment. The evaluated factors included: functioning of the courts; practices of competitors in the informal sector; corruption; macroeconomic instability; access to finance; access to land; business licensing and permits; crime, theft and disorder; customs and trade regulations; labor regulations; political instability; inadequately educated workforce; tax administration; tax rates; transportation and electricity.

Tab. 3 (in Annex) includes descriptive statistics of the variables of interest to this paper. It covers a measure of informality and tax evasion; the constraints in doing business; as well as various firm and industry level characteristics. The data indicates that more than 64 percent of all firms are part of informal sector and 66 percent of all firms are engaged in some degree of tax evasion.

The empirical analysis laid special emphasis on the effects of tax evasion on informal sector and vice versa the effects of informal sector on tax evasion, as well as the current situtation of quality of business environment and the functioning of firm size and industrial distinctions. In our paper, tax evasion is considered as a part of informal sector. However, informality is thought as an affect for tax evasion cases. Determining a valid casual relationship between informality and tax evasion requires that our econometric model satisfies these two conditions. In the next section, our econometric model and its empirical analysis will be described very comprehensively.

4.2 The estimation strategy

This is a cross sectional analysis based on the survey data for South Caucasian economies, namely Georgia, Azerbaijan, and Armenia. Ordinary Least Squares (OLS) method is used to estimate multiply regression models for each country individually, and pooled data covering whole observations of all three region countries.

Two distinct regression equation is estimated here. In the first case, all independent variables including *tax evasion* are regressed against the variable of *informality*. In the second case, tax evasion is taken as the dependent variables with *informality* and the same group of independent variables as the explanatory variables. Each regression model is estimated for Georgia, Azerbaijan, and Armenia as separate estimations, and additionally for pooled data including all.

Individual OLS models

Quick view to the equations for the modelling presented below with details. Equation 5 shows the model equation for the first case where the dependent variable (Y) is informality. Variable x_1 denotes *tax evasion*:

$$Y_{j,i} = \beta_0 + \beta_1 x_{1j,i} + \beta_k \sum_{k=2}^{15} Q_{j,i} + \\ + \beta_k \sum_{k=16}^{19} C_{j,i} + u_{j,i}. \quad (5)$$

Q encompasses the group of independent variables measuring quality of business environment, numbered by $k \in \{2, 3, \ldots, 15\}$ sequenced as the following: *outage, court, infrastructure, tradecustom, competitors, access, crime, tax rate, tax administration, license, political instability, labor regulations, corruption, workforce*. To reveal if the informality differs across firm size and industrial distinctions, C covers dummy variables demonstrating firm characteristics, namely firm size dummies (*small*, and *medium* where *large* is the base group) and industrial dummies (*retail*, and *core* where *manufacturing* is the base group) numbered by $k \in \{16, 17, 18, 19\}$ sequenced as *small, medium, retail*, and *core*. All β are coefficients. J indicates for which country the estimated regression is belonging, covering

Georgia, Azerbaijan, and Armenia, and i means each single observation. And u is the error term in the model.

In the second case where the dependent variable is *tax evasion*, the model is represented in equation 6. To avoid confusion, coding of the variables is kept the same as in equation 5. Only the tax evasion (coded as X_1) and informality (coded as Y) are replaced. Thus, informality is included to the model as an independent variable in equation 6:

$$\begin{aligned} Y_{1j,i} &= \gamma_0 + \gamma_1 y_{j,i} + \gamma_k \sum_{k=2}^{15} Q_{j,i} + \\ &+ \gamma_k \sum_{k=16}^{19} C_{j,i} + u_{j,i}. \end{aligned} \tag{6}$$

Note that Q, C, J, i and u denote the same meanings with the equation 5, above. Here, coefficients are presented by using γ.

Pooled OLS models

In these models, whole estimable observation from Georgia, Azerbaijan, and Armenia are pooled and estimated within one pooled cross sectional OLS model separately for each case of mentioned above.

For the each case, equation 7 and 8 represents, respectively the first case with informality as the dependent variable, and second case with tax evasion as the dependent variable:

$$\begin{aligned} Y_i &= \beta_0 + \beta_1 x_1 + \beta_k \sum_{k=2}^{15} Q_{j,i} + \\ &+ \beta_k \sum_{k=16}^{19} C_{j,i} + \beta_{20} D_1 + \\ &+ \beta_{21} D_2 + u_i, \end{aligned} \tag{7}$$

$$\begin{aligned} X_{1i} &= \gamma_0 + \gamma_1 y_1 + \gamma_k \sum_{k=2}^{15} Q_{j,i} + \\ &+ \gamma_k \sum_{k=16}^{19} C_{j,i} + \gamma_{20} D_1 + \\ &+ \gamma_{21} D_2 + u_{j,i}. \end{aligned} \tag{8}$$

In these models, all codes are identical of equation 5 and 6, respectively except country dummies D_1 and D_2. An additional contribution of pooled OLS models is the possibility of comparing the situation of informality and tax evasion among the case countries. For this purpose, country dummies are added to the models. D_1 is the dummy variable equals 1 if the observed entrepreneurship object is from Georgia, otherwise 0. With the same logic, the dummy variable (D_2) equals 1 if the observed entrepreneurship object is from Armenia, otherwise 0. Azerbaijan is left as the basis group for comparison.

It is noteworthy to mention that in all regressions, HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 5.0000) standard errors is used which is robusted against heteroscedasticity and autocorrelation problems. Residuals are tested and found normally distributed.

5 EMPIRICAL RESULTS

Determinants of *informality* and *tax evasion* are presented below as a matter of fact from OLS multiply regression and pooled OLS multiple regression model results. Tab. 1 and 2 embodies those empirical findings. While the Tab. 1 presents findings related to factors affecting informality (equation 5 and 7), the second table provides evidence about the associations of interest related to tax evasion (equation 6 and 8).

As expected, there is a significant positive impact of tax evasion over the informality

attempts in all models. This reveals the fact that desire of entrepreneurs to avoid taxes leads to higher informality. The outage is a significant determinant towards a positive direction in Azerbaijan and Armenia, and a result in pooled case as well. In the case of Georgia, the impact is negative and statistically insignificant.

Perception of entrepreneurs about the efficiency of how the courts working, trade and customs regulations, attitudes of competitors, and corruption is not found as the significant factors affecting informality attempts in all models. Infrastructure (electricity, telecommunication, and transport) has a significant effect only in case of Azerbaijan, and in pooled cars. Access to land and financial sources is a key significant factor in Azerbaijan. More precisely, if an entrepreneur object faces with obstacles to access land and finance tends to higher informal attitudes. The interesting finding is about the role of the criminal situation in informality attempts which is only significant in Azerbaijan, but the impact is unexpectedly negative. Moreover, only licensing and permits an obstacle to the informality in Georgia.

According to the research findings, the tax rates push entrepreneur objects in Azerbaijan toward the higher informal actions. This influence is only statistically significant in the case of Azerbaijan. In contrast, tax administration and labor regulation issues are the significant factors in Armenia increases informality.

The role of firm size and the field of industry the object is operating in do not lead significant differences in informality issue. The coefficients provides that the most informal attitudes belongs to large firms in Georgia, small and medium enterprises in Azerbaijan and Armenia, and as a result in pooled model. However the firm size differences impact is not statistically significant.

Similarly, industry dummies also provide insignificant differences among firms across the sectoral distinctions. Only in Azerbaijan, core sector is significantly less informal in comparison with manufacturing. The most informal sectors are retail in Georgia, manufacturing in Azerbaijan, and core in Armenia.

Country dummies ensure informality comparison among the region countries. With Azerbaijan as the basis group condition, the research reveals that Armenia is the most informal country with significant positive coefficient of difference compared with Azerbaijan while Georgia is the least informal one with negative coefficient. However, the coefficient is statistically insignificant demonstrates not strong informality differences between Georgia and Azerbaijan.

What about tax evasion's determinants? This is even more interesting than the previous one. Estimation of equation 6 and 8 provides evidence about several determinants of tax evasion in these countries individually, and as pooled cross sectional data analysis. Regression outputs are given in Tab. 2.

According to the Tab. 2, *informality* is one of the main causes that encourages entrepreneurs to perform some kind of informal actions for tax evasion purpose. The impact is positive, statistically significant at 5% level of significance. The influence is also economically significant as the coefficients are very large. However, it is fairly small in case of Georgia, almost 3 times in comparison with Azerbaijan and Armenia. Someone can argue how this evidence is reliable. Nevertheless, to go some deeper, it is acceptable that if an entrepreneurship object evaluates an economy as high informal based on previous experience or experience of others in the market, then the entrepreneur will be encouraged to present gifts or something different due to conceal taxes.

Most indicators of the quality of business environment have statistically and economically insignificant influence over the tax evasion. Thus coefficients are both very small and statistically insignificant at conventionally adopted significance levels. There are several exceptions but not as much as considerable level.

Two indicators of quality of business environment – *tax administration* and *corruption* are revealed to be very influential factors leading to much more tax evasion purposed attempts. In all models, an increase the amount of obstacles from tax administration system affect the tax evasion positively and statistically and

Tab. 1: OLS results: Informality as the dependent variable

	Model 1	Model 2	Model 3	Model 4
Variables	**Georgia**	**Azerbaijan**	**Armenia**	**Pooled**
Tax evasion	0.241105**	0.498354***	0.553357***	0.549550***
Quality of business environment indicators				
Outage	−0.052987	0.246721**	0.184577**	0.116463**
Court	−0.000643	−0.001798	0.029307	0.012020
Infrastructure	0.000339	−0.055061*	−0.024755	−0.021791**
Trade & custom	0.022605	−0.056636	0.035543	0.022213
Competitors	0.014773	−0.028969	0.057220	0.019163
Access	−0.016066*	0.059745***	−0.010292	−0.000173
Crime	−0.013817	−0.275382***	0.097222	0.039360
Tax rate	0.008002	0.204536***	−0.014959	0.037771
Tax administration	0.017653	−0.011140	0.101044**	0.062194**
Licensing & permits	0.323513***	−0.060473	0.003609	0.005606
Political instability	−0.013808	0.007426	−0.009503	−0.029502*
Labor regulation	−0.054251	−0.072998	0.167507**	0.089472*
Corruption	0.013865	−0.004335	0.004622	0.031560
Workforce	0.034619	−0.038354	−0.084762*	−0.021877
Firm size and industrial dummies				
Small	−0.049451	0.041132	0.124517	0.069994
Medium	−0.078382	0.056817	0.140982	0.047599
Large	*Base group*	*Base group*	*Base group*	*Base group*
Retail	0.023015	−0.014835	−0.013649	0.031886
Core	−0.077413	−0.201738**	0.131681	−0.018886
Manufacturing	*Base group*	*Base group*	*Base group*	*Base group*
Country specific dummies				
D_1	–	–	–	−0.073138
D_2	–	–	–	0.191008***
C	0.132432	0.125357	0.049687	0.015174
R-squared	0.521880	0.572983	0.539875	0.558451
Included observations	265	310	337	912

Note: ***, **, and * denotes statistical significance level at 1%, 5%, and 10%, respectively.

economically significant. Again, lowest impact of tax administration belongs to Georgia, and the highest belongs to Azerbaijan. The role of corruption related obstacles faced by entrepreneurship objects in increasing tax evasion is also economically and statistically significant. In Georgia and Azerbaijan, the significance is comparatively weak in comparison with Armenia. Size of coefficients also confirm this finding. The lowest coefficient belongs to again Georgia, and the highest one belongs to Armenia.

When tax evasion attempts considered, the research discovers that there is not any significant difference due to the firm size and industrial distinctions among entrepreneurship objects. All coefficients are statistically and economically insignificant. However, country dummies are matter to an interesting discussion. Again Azerbaijan is the basis group. Tax evasion attempts in Georgia and Armenia is lower in comparison with Azerbaian. However, the difference is statistically and economically significant for Georgia-Azerbaijan comparison.

Tab. 2: OLS results: Tax evasion as the dependent variable

	Model 1	Model 2	Model 3	Model 4
Variables	**Georgia**	**Azerbaijan**	**Armenia**	**Pooled**
Informality	0.232813**	0.682958***	0.618216***	0.575872***
Quality of business environment indicators				
Outage	−0.015605	−0.114271	0.007842	−0.018664
Court	0.006350	−0.028416**	0.014499	−0.010468
Infrastructure	−0.004439	−0.026531	−0.024308	−0.018956*
Trade & custom	0.028430	0.016859	−0.036221	−0.039193*
Competitors	0.020628	−0.007773	−0.062222	−0.024655
Access	0.002398	−0.014829	0.008027	0.010001
Crime	−0.022922	0.154462	−0.053739	−0.020407
Tax rate	0.008007	0.010252	0.009143	0.023782
Tax administration	0.075963**	0.188770**	0.129095***	0.153136***
Licensing & permits	−0.103309	0.080534	0.003637	0.036727
Political instability	0.034686*	0.073917	−0.019527	0.011518
Labor regulation	0.024681	0.129624	−0.148771**	−0.094678*
Corruption	0.098788*	0.134096*	0.156053***	0.132332***
Workforce	−0.019396	0.007322	0.009023	−0.020223
Firm size and industrial dummies				
Small	−0.064340	0.017447	−0.134092	−0.058012
Medium	−0.100637	−0.036930	−0.143579	−0.056469
Large	*Base group*	*Base group*	*Base group*	*Base group*
Retail	−0.082450	−0.083965	−0.085919	−0.095141
Core	−0.095306	−0.061990	−0.044001	−0.081082
Manufacturing	*Base group*	*Base group*	*Base group*	*Base group*
Country specific dummies				
D_1	–	–	–	−0.238640***
D_2	–	–	–	−0.062141
C	0.091459	0.308839	0.368566	0.380413
R-squared	0.190483	0.556670	0.545029	0.579558
Included observations	265	310	337	912

Note: ***, **, and * denotes statistical significance level at 1%, 5%, and 10%, respectively.

For Armenia-Azerbaijan comparison, the coefficient shows less tax evasion attempts in Armenia but the difference is small and statistically insignificant.

6 CONCLUDING REMARKS

Using a rich 2013 World Bank Enterprise Survey data set on a cross section of South Caucasian firms, we examine the causes of business environemt, tax evasion and informality. The firm-level survey we employ elicits explicit responses about the obstacles the firms view as most restraining. As predicted in the theoretical part, the tax evasion is found to be an important factor for informality. Therefore, we examine whether tax evasion are associated with informality. We employ ordinary least square method to estimate two predictions:

both the effect of the business environment and tax evasion on informality, and vice versa, both the effect of the busines environment and informality on tax evasion. These empirical results are consistent with our simple general equilibrium model. Former result indicates that: While an access to land and financial sources, insufficient provision of complementary public capital (outage) and infrastructure such as electricity, telecommunication and transport are associated with informal economy in Azerbaijan, the tax administration and labor regulation is the most problematic causes for informal economy in Armenia. In addition, firm sizes and industrial sectors are much less concentrated to informal economy in all three countries. On the other hand, latter result indicates that the tax administration and corruption is very influential factors leading to much more tax evasion purposed attempts. Again, the latter result discovers that there is not any significant difference due to the firm size and industrial distinctions among entrepreneurship objects. Finally, we find some very preliminary evidence that the quality of business environment and the tax evasion plays a crucial role in determining the size of the informal sector and vice versa the informality and the quality of business environment plays an important role in the spreading of tax evasion process as well. Firstly, with Azerbaijan as the basis group condition, the research reveals that Armenia is the most informal country compared to Azerbaijan while Georgia is the least informal. However, informality differences between Georgia and Azerbaijan is not significantly strong. Secondly, again Azerbaijan is the basis group, tax evasion attempts in Georgia and Armenia is lower in comparison with Azerbaian. However, the difference is statistically and economically significant for Georgia-Azerbaijan comparison, but for Armenia-Azerbaijan comparison, the difference is small and statistically insignificant.

For policy recommendation our results have some implications and it suggests for South Caucasian countries to take determinative steps to deal with informal sector and tax evasion. First, governments in South Caucasian countries should provide sufficient public capital such as telecommunication, transport and electricity infrastructure for strengthening the legal environment. Second, diverse government intervention such as prevailing the corruption, tax administration and labor regulation in those countries will reduce tax evasion.

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8 ANNEX

Tab. 3: Variables and sources

Variable	Definition
(Informality.) It is common for firms in my line of business to have to pay some irregular "additional payments or gifts" to get things done with regard to customs, taxes, licenses, regulations, services etc.	(0) never, (1) seldom, (2) sometimes, (3) frequently, (4) very frequently, (5) always
(Tax evasion.) To deal with taxes and tax collection	(0) never, (1) seldom, (2) sometimes, (3) frequently, (4) very frequently, (5) always
(Outage.) Over fiscal year, did this establishment experience power outages?	Yes = 1, No = 0
Firm size dummies	A firm is defined as micro size less than 5 employee, small if it has between 5 and 19 employees, medium size if it has between 20 and 99 employees and large if it has more than 100 employees.
Industry level dummies	manufacturing, retail, core
General constraint – infrastructure (electricity/ telecommunication/transport)	To what degree is electricity/telecommunication/transport an obstacle to the current operations of this establishment: (0) no obstacle, (1) a minor obstacle, (2) a moderate obstacle, (3) a major obstacle, (4) very severe obstacle
General constraint – customs and trade regulation	To what degree is customs and trade regulation an obstacle to the current operations of this establishment: (0) no obstacle, (1) a minor obstacle, (2) a moderate obstacle, (3) a major obstacle, (4) very severe obstacle
General constraint – practices of competitors in the informal sector	To what degree is practices of competitors in the informal sector an obstacle to the current operations of this establishment: (0) no obstacle, (1) a minor obstacle, (2) a moderate obstacle, (3) a major obstacle, (4) very severe obstacle

(to be continued on the next page)

Variable	Definition
General constraint – access to land and finance	To what degree is access to land and finance in the informal sector an obstacle to the current operations of this establishment: (0) no obstacle, (1) a minor obstacle, (2) a moderate obstacle, (3) a major obstacle, (4) very severe obstacle
General constraint – crime, theft and disoder	To what degree is crime, theft and disorder an obstacle to the current operations of this establishment: (0) no obstacle, (1) a minor obstacle, (2) a moderate obstacle, (3) a major obstacle, (4) very severe obstacle
General constraint – tax rate	To what degree is tax rate an obstacle to the current operations of this establishment: (0) no obstacle, (1) a minor obstacle, (2) a moderate obstacle, (3) a major obstacle, (4) very severe obstacle
General constraint – tax administration	To what degree is tax administration an obstacle to the current operations of this establishment: (0) no obstacle, (1) a minor obstacle, (2) a moderate obstacle, (3) a major obstacle, (4) very severe obstacle
General constraint – license	To what degree is business licensing and permits an obstacle to the current operations of this establishment: (0) no obstacle, (1) a minor obstacle, (2) a moderate obstacle, (3) a major obstacle, (4) very severe obstacle
General constraint – political instability	To what degree is political instability an obstacle to the current operations of this establishment: (0) no obstacle, (1) a minor obstacle, (2) a moderate obstacle, (3) a major obstacle, (4) very severe obstacle
General constraint – corruption	To what degree is corruption an obstacle to the current operations of this establishment: (0) no obstacle, (1) a minor obstacle, (2) a moderate obstacle, (3) a major obstacle, (4) very severe obstacle
General constraint – courts	To what degree is courts an obstacle to the current operations of this establishment: (0) no obstacle, (1) a minor obstacle, (2) a moderate obstacle, (3) a major obstacle, (4) very severe obstacle
General constraint – labor regulations	To what degree is labor regulations an obstacle to the current operations of this establishment: (0) no obstacle, (1) a minor obstacle, (2) a moderate obstacle, (3) a major obstacle, (4) very severe obstacle
General constraint – workforce	To what degree is an inadequately educated workforce an obstacle to the current operations of this establishment: (0) no obstacle, (1) a minor obstacle, (2) a moderate obstacle, (3) a major obstacle, (4) very severe obstacle

Tab. 5: Summary statistics of variables to be used in estimation

Variable names	*N*	Mean	Standard deviation	Min	Max
(Informality.) It is common for firms in my line of business to have to pay some irregular "additional payments or gifts" to get things done with regard to customs, taxes, licenses, regulations, services etc.	1031	0.644035	0.927655	0.000	5.000
(Tax evasion.) To deal with taxes and tax collection	968	0.665289	0.964496	0.000	5.000
(Outage.) Over fiscal year, did this establishment experience power outages?	1029	0.257532	0.437487	0.000	1.000
Firm size dummies					
Small	1031	0.563531	0.496188	0.000	1.000
Medium	1031	0.357905	0.479617	0.000	1.000
Large	1031	0.078565	0.269188	0.000	1.000
Industry level dummies					
Retail	1031	0.329777	0.470360	0.000	1.000
Core	1031	0.355965	0.479037	0.000	1.000
Manufacturing	1031	0.315228	0.464832	0.000	1.000
General constraint – infrastructure (electricity/telecommunication/transport)	1027	1.398247	2.213312	0.000	12.000
General constraint – customs and trade regulation	1025	0.495610	1.066276	0.000	4.000

(to be continued on the next page)

Variable names	*N*	Mean	Standard deviation	Min	Max
General constraint – practices of competitors in the informal sector	1012	0.753953	1.164822	0.000	4.000
General constraint – access to land and finance	1019	1.754661	1.741853	0.000	8.000
General constraint – crime, theft and disoder	1031	0.178468	0.682060	0.000	4.000
General constraint – tax rate	1029	1.310982	1.318267	0.000	4.000
General constraint – tax administration	1030	0.766990	1.204977	0.000	4.000
General constraint – license	1023	0.218964	0.675944	0.000	4.000
General constraint – political instability	1026	0.994152	1.384219	0.000	4.000
General constraint – corruption	1027	0.456670	0.996496	0.000	4.000
General constraint – courts	1030	3.386408	1.980029	0.000	6.000
General constraint – labor regulations	1028	0.149805	0.559010	0.000	4.000
General constraint – workforce	1030	0.341748	0.872707	0.000	4.000

Source: Author's calculations based on the 2013 World Bank Enterprise Surveys for Armenia, Azerbaijan and Georgia.

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