

THE EFFECTS OF TAX EVASION AND THE INEFFICIENCY OF THE LEGAL SYSTEM ON
FIRMS' FINANCIAL CONSTRAINTS: ARE THEY COMPLEMENTS OR SUBSTITUTES?

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The effects of tax evasion and the inefficiency of the legal system on firms' financial constraints: are they complements or substitutes?

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Abstract

This paper analyzes the joint impact of tax evasion and the inefficiency of the legal system on firms' financial constraints. We find that both variables have a statistically significant effect on the difficulties that firms encounter when trying to access financing and this effect is nonlinear. In particular, tax evasion and the inefficiency of the legal system are substitute as they mitigate each other's effects on firms' credit constraints. It means that the negative impact of tax evasion on financial constraints faced by firms decreases in the presence of a lower efficiency of the legal system.

KEYWORDS: Financial constraints, Tax evasion, Legal system efficiency.

JEL: D2, G3, H26, K4

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1. Introduction

This paper is a first attempt to analyze the impact of tax evasion and the efficiency of the judicial system on financial constraints faced by firms.

The motivations of the study are twofold. First, we believe that the understanding of the determinants of credit market imperfections deserves particular attention, since credit lines are one of the main firms' financial sources, and the presence of credit market imperfections might create situations of financial constraints and credit rationing that threaten firm current and potential growth (Calcagnini et al. 2009a,b).

Second, informality is a widespread and continuously increasing phenomenon around the world and it represents a burden for governments in terms of its implications for the official economy (Schneider and Enste, 2000). A prospering informal sector is likely to exert a negative impact on the official economy and worsen both development and inequality, by the erosion of the tax and social security bases and the exacerbation of competition for official firms. Over the past few years the study of informality has attracted increasing interest. The economics literature on the topic concentrates on methods for estimating the size of the informal sector, as well as on the analysis of its possible determinant (Frey and Weck-Hanneman, 1984a; Frey and Pommerehne, 1984b; Schneider and Enste, 2002; Dell'Anno and Schneider, 2003; Schneider *et al.*, 2010). In particular, a number of studies find institutional characteristics as important sources of the development of unofficial economy (Johnson *et al.*, 1997; Friedman *et al.* 2000; Schneider, 2010; Teobaldelli, 2011; Teobaldelli and Schneider, 2012). If we consider the informal sector as a result of the failure of public institutions to enact efficiency-enhancing reforms able to support the market economy, a better comprehension of the quality of the institutional environment in which firms operate, is worth pursuing.

The phenomenon of informality is rather complex and it may refer to an array of different concepts. The terms *shadow economy*, *informal sector*, *unofficial activity* and *underground economy* are often used as synonyms to indicate all economic activities regarding the production of legal goods and services, unreported to the state (tax) authorities in order to avoid taxes and social security regulations compliance (Schneider, 2005). Firms may decide either to operate completely outside the formal sector, when they do not register their business, or to register their activity but evade taxation or social security contributions. A firm's choice not to comply, completely or partially, with tax and regulations produces consequences at the aggregate level. Informality might negatively affect aggregate productivity, since it proves to be flourishing particularly among small-sized and less productive firms. Moreover, it risks to compromise overall private sector development, by the exacerbation of competition among official firms.

Our paper aims at analyzing a specific aspect of this problem, i.e. whether informality restricts firms' access to credit and to external finance. In particular, we want to shed light on the transmission channels through which informality can limit the ability of firms to access financing. To this purpose we also take into account the quality of the legal system in our empirical investigation. Indeed, we believe that the legal system of a country plays a relevant role in determining both the level of the shadow economy, and the efficiency of the financial markets. Firms that operate in the informal sector and hide production to fiscal authorities trade off the burden of tax and regulation, at the risk of being subject to penalties if discovered, against the possibility to fully benefit from public services, especially those that secure enforceable property rights over their production and capital. As a consequence, unofficial firms not only are unable to use public facilities like social welfare, but are also inadequately protected by judicial courts from crimes committed against their property and lack the capacity to enter into legally binding contractual obligations. This, in turn, restrains their access to capital markets (Loayza, 1996). In such a contest, an inefficient judicial system can worsen dramatically the scenario that makes informality more or less attractive and it do influence the ways through which informality can affect productivity, too.

Previous studies focused either on the relationship between the level of informality and the firms' capacity to access credit markets (Beck and Levine, 2005; Dabla-Norris and Feltenstein, 2005; Straub, 2005; Antunes and Cavalcanti, 2007; Blackburn, *et al.*, 2008; Gatti and Honorati, 2007) or on the role of legal institutions in supporting credit markets (Jappelli *et al.*, 2005; Djankov *et al.*, 2007; Safavian and Sharma, 2007). We attempt to bring together these two distinct strands of the literature and to introduce a significant novelty that fills the gap in between. To this purpose, we consider the interaction effect between tax evasion and the efficiency of the legal system in explaining the difficulties that firms encounter when trying to access financing. We develop an empirical model that analyzes the joint impact of the two variables of interest in order to evaluate the marginal effect of tax evasion on financial constraints faced by firms, given the level of efficiency of judicial system.

We use firm-level, cross-country data from *Voices of the Firms 2000* of the *World Business Environment Survey* (WBES). The dataset contains firm-level data for the period 1999-2000 for about 10000 firms located in 80 different countries. Firms have been interviewed randomly, and a minimum of 100 interviews for each country has been collected. We focus on firms' self reported tax compliance that can be considered as a proxy for informality. Our empirical strategy is based on both OLS estimates, that provide a useful benchmark, and a Probit specification. We control for a wide range of variables which account for firm and country specific characteristics in order to reduce the possibility of omitted variables. More-

over, we address the problems arising from possible endogeneity bias and reverse causation from access to credit to tax evasion by employing a two-step estimation. We employ corruption and regulatory burden, the way they are perceived by firms as obstacles to their business, to instrument for firm-level informality. The results obtained here indicate that the marginal impact of tax evasion on financial constraints faced by firms is stronger, the higher the efficiency of the legal system, i.e. tax evasion and the inefficiency of the judicial system are substitute as they mitigate each other's effects on firms' credit constraints. Our findings are robust to the inclusion of a wide array of control variables as well as instrumentation.

The remainder of the paper is organized as follows. Section 2 briefly reviews the related literature. In Section 3 we describe the data and discuss the empirical methodology implemented. Section 4 provides summary statistics and presents the results. The paper ends with some concluding remarks in Section 5.

2. A Short Literature Review

Our work is complementary and new to two distinct strands of literature: (i) the field of research that looks at the relationship between the firms capacity to access credit markets and the level of informality (Dabla-Norris and Feltenstein, 2005; Straub, 2005; Antunes and Cavalcanti, 2007; Blackburn *et al.*, 2008; Gatti and Honorati, 2007); (ii) the literature that investigates the role of legal institutions, such as legal creditor rights, in supporting credit markets (Jappelli *et al.*, 2005; Djankov *et al.*, 2007; Safavian and Sharma, 2007).

In particular, Dabla-Norris and Feltenstein (2005) construct a dynamic general equilibrium model that investigates the links among tax rates, access to credit and the size of the shadow economy and studies the impact of informal activity on public finance and aggregate economic performance. Their model simulations, based on stylized data from Pakistan, show that the rate of taxation sustainable from a macroeconomic point of view is such that it may induce a positive level of underground activity.

Straub (2005) develops a model of firms' choice between informal and formal sector. In a contest of moral hazard with credit rationing, this decision is influenced by costs and benefits of entry into formality, that are in turn affected by the efficiency of formal credit market compared with the informal one and by the quality of supporting institutions.

Antunes and Cavalcanti (2007) build a general equilibrium model with credit constrained heterogeneous agents who face an occupational choice over formal and informal business. Their objective is to analyze how government policies (regulation burden) and institutions (enforcement of financial contracts) account for the size of the informal sector and per capita GDP level. Entrepreneurs who operate in the formal sector have better access to external fi-

nancing. In particular, their quantitative exercise suggest that in developed countries like US and European Mediterranean Europe, the size of the informal sector may be affected by regulation costs rather than the degree of enforcement. However, for a developing country like Peru, regulatory burden and contract enforcement are both important in explaining the size of the informal sector.

Blackburn *et al.* (2008) employ data on 119 countries for the period 1999 to 2005 to examine the impact of banking development on the size of shadow economies. Their results indicate that the development of the banking sector, in terms of depth and efficiency, is associated with a smaller shadow economy in a wide cross-section of countries.

Gatti and Honorati (2008) use firm level, cross country data from Investment Climate surveys in 49 developing countries to investigate how the access to credit and external finance can affect productivity in the presence of a large informal sector. They find that more tax compliance is significantly associated with more access to credit.

Jappelli *et al.* (2005) explore the impact of the judicial enforcement of debt contracts on the amount of lending, loan interest rates and default rates theoretically and empirically. They develop a framework in which improvements in judicial efficiency reduce credit rationing and increase lending, with ambiguous effects on interest rates. These predictions are tested using a panel data on Italian provinces and a cross-country sample. Their results confirm the theory: judicial efficiency correlates negatively with proxies for credit rationing and positively with the volume of lending.

Capasso and Jappelli (2011) propose and test a theory on the impact of financial development on the underground economy. Their model predicts that financial development, and the resulting reduction in the cost of credit, encourages firms to disclose more assets and to invest in high-tech projects. This effect is stronger in mature sectors, such as constructions, retail and tourism. Moreover, the efficiency of judicial system reduces the cost of credit and the size of the informal sector. The empirical evidence on Italian microeconomic data for the period 1995-2004 is in accordance with the model's predictions and also shows that more competitive and innovative sectors exhibit a lower size of the shadow economy.

Djankov *et al.* (2007) investigate cross-country determinants of private credit for 129 countries. They find that both creditor protection through an effective legal system and supporting institutions are associated with higher ratios of private credit to GDP, especially in richer countries. Moreover, legal reforms aimed at improve creditor rights and information sharing are likely to raise credit.

Finally, Safavian and Sharma (2007), using firm level data from 27 European countries in 2002 and 2005, find that firms have more access to bank credit when the effectiveness of

creditor rights is linked to the efficiency of contract enforcement, so that legal protections of creditors and efficient courts appear to be important complements.

We try to improve on the existing literature and introduce a significant novelty by considering the joint impact of tax evasion and the inefficiency of the legal system on firms' financial constraints, as we think that both variables play a crucial role in the ability of firms to access financing.

3. Model Specification and Data Description

We employ the dataset *Voices of the Firms 2000* from the World Bank, that contains enterprise data based on a survey of more than 10,000 firms in 80 countries, carried out between late 1999 and mid 2000 (Batra *et al.*, 2002).

The empirical model assumes that the conditional probability of the firm to be financially constrained, $\Pr(CREDIT=1|X)$, depends, given a cumulative distribution function $\Phi = (\cdot)$, on a set of independent variables and a constant term, as follows:

$$p_{ij} = \Pr(CREDIT_{ij}=1|X) = \Phi(X'\beta)$$

with

$$X'\beta = \beta_0 + \beta_1 TAXEV_{ij} + \beta_2 JUDS_{ij} + \beta_3 TAXEVJUDS_{ij} + \beta_4 Z_{ij} + \beta_5 C_j + \varepsilon_{ij} \quad (1)$$

where i refers to firms, j to countries and ε_{ij} is an *i.i.d.* error term. Z_{ij} is the vector of the firm specific characteristics, C_j is the vector of the country level variables.

Our dependent variable, *CREDIT*, is a binary index that assumes value equal to 1 if the firm is financially constrained, and 0 otherwise. In the dataset we use the original variable is obtained by asking the managers to judge on a four-point scale, where “4” means a major obstacle, “3” means a moderate obstacle, “2” means a minor obstacle and “1” means it is no obstacle, how problematic the general constraint-financing is for the operation and growth of your business. In this case we construct a dummy variable equal to 1 when the original variable takes the values 3 or 4, and it is equal to 0 otherwise.

The main variables of interest in explaining the difficulties of firms to access the credit markets are respectively, tax evasion (*TAXEV*), measured as percentage of sales unreported to tax authorities (higher values correspond to a lower compliance);¹ the efficiency of legal system (*JUDS*), which indicates the functioning of the judiciary as observed by the firms and as-

¹ In this case the questionnaire asks the manager what percentage of total sales would he/she estimate the typical firm in his/her area of activity keeps “off the books”. The variable (*TAXEV*) ranges from 1 to 7, being associated to the value 1 none evasion at all, to the value 2, 1-10% of total sales unreported, to the value 3, 11-20%, to the value 4, 21-30%, to the value 5, 31-40%, to the value 6, 41-50% and to the value 7, more than 50%.

sumes higher values in correspondence of a greater inefficiency; an interaction term between tax evasion and the efficiency of legal systems (*TAXEVJUDS*) which intends to capture how much the effect of tax evasion on the difficulty that firms face in borrowing may depend on the value of the conditioning variable efficiency of legal system. The idea is that being formal allows the firms to rely on key public goods, enforcement of contracts and a proper flow of information that facilitate the access to credit. However, the inadequacy of judicial system in securing legal rights and efficiently supporting the institutional arrangements that govern credit markets could vanish this positive effect.

Moreover, we consider a country-varying measure of the efficiency of judicial system to control for a country level effect of the quality of the legal system on the probability of firm to have difficulties with credit access. The variable used (*CONFIDENCE*) reflects the average level of confidence of firms in the national legal system and is taken from the dataset *Doing Business* of the World Bank (World Bank, 2004; Djankov *et al.* 2007). Specifically, the questionnaire asks the managers the degree to which they believe the system will uphold contracts and property rights in a business dispute. The scale ranges from 1 to 6, where a higher score means a higher degree of confidence in the system.² This variable is negatively correlated (-0.33) with the (in)efficiency of legal system at country level (*JUDS_CL*) as shown in Figure 1.

Control variables include both firm and country specific characteristics. We consider different measures related to the financial structure of the firms that in principle influence their ability to rely on external financing. In particular, we take into account the past and the expected sales variation (*PASTSALES* and *NEXTSALES*), as well as the past and expected investment variation (*PASTINV* and *NEXTINV*) to control for the profit opportunities of firms. Moreover, we consider the degree of firms' openness to foreign commerce by including exportations (*EXPORT*) and whether the firm operates in other countries or not (*OUTSIDE*).

According to Berger and Udell (1998), who analyze a life-cycle theory of firm financial models and state that the optimal strategy for firms is to use different sources of funding at different stages of their dimensional/age/informational growth, we control for both firm size and firm age. We add three dummy variables based on the number of employees: *SMALL*, *MEDIUM*, and *LARGE* that are equal to 1 respectively if the firm has less than 50 employees; more than 50 and less than 500; more than 500. Then, we include a variable (*OLD*) which measures the numbers of years passed from firm foundation. The theory assumes that small

² Furthermore, *CONFIDENCE* is positively correlated with *RULEOFLAW* (+0.58). The latter measures the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence (Kaufmann *et al.*, 2005).

firms suffer informational opaqueness and asymmetric information problems more heavily and, therefore, might be more likely finance constrained than large firms. At the same time, the number of years passed from firm foundation proves to be an important determinant of firms' financial structure: younger firms may have more difficulties accessing capital markets than older firms. The latter have had time to build up a reputation compared to younger firms that, therefore, are considered riskier.

We take into account the sector of firms' activity (*MANUFACTURING, SERVICES, CONSTRUCTION* and *AGRICULTURE*) and the presence of government ownership (*GOVERNMENT*).

Our specification also contains controls for country specific characteristics related to the degree of economic development and the institutional quality. We use information available in the dataset *Doing Business* of World Bank (World Bank, 2004; Djankov *et al.* 2007). Specifically, we employ the log of the Gross National Product in 1999 (*LOG_GNP*) to capture the degree of economic development of each country; we include the level of people education (*SCHOOL*) to control for human capital of each country.

As institutional variables, following La Porta *et al.* (1999) and Glaeser and Shleifer (2003), we add dummies to identify the legal origins of the company law or commercial code of each country (*ENGLISH, FRENCH, SOCIALIST, GERMAN, SCANDINAVIAN*). In particular, La Porta *et al.* (1999) show that the legal origin to which a legal system belongs, the content of laws, and the quality of law enforcement influence not only the degree of protection afforded to creditors' rights, but also the performance of capital markets. Further, 'common law' countries (i. e. those with an Anglo-Saxon legal origin) provide stronger protection for investors than do 'civil law' countries (i. e. those with a German, French or Scandinavian legal origin).

Finally, we control for the degree of ethnic fractionalization (*ETHNIC*), since in the empirical literature it has been shown that the ethnic fractionalization of a country is linked to the level of government intervention into the economy and to different levels of efficiency and corruption of the public administrations (Mauro, 1995; Easterly e Levine, 1997; La Porta *et al.*, 1999; Alesina *et al.* 2003). The variable is realized considering the probability that two persons, randomly chosen from a population, belong to different groups.³

We estimate Model (1) by considering both a linear probability and a probit model. Table (4) summarizes our findings.

³ Additional information on the variables used in this work are available in the unpublished appendix.

4. Discussion of Results

Table (1) reports the correlation among some variables of interest and reveals that all measures of the quality of judicial system used are positively correlated with tax compliance. Moreover, there is a positive correlation between the measures of the efficiency of legal system employed. As expected, we observe a positive correlation between the presence of tax evasion and the difficulties faced by firms in entering the credit markets. The same is true for all the measures of inefficiency of legal system used and credit constraints.

Table (2) provides some descriptive statistics, sorted by firm-size categories in Table (3). The mean level of tax evasion among small-sized firms is higher than that of the whole sample (12% *versus* 16%, approximately). At the same time, small and medium-sized firms prove to be subject to stronger difficulties in entering the credit markets with respect to large-sized firms.

Column (1) of Table (4) reports OLS estimates of model (1) in which the variable *TAXEV* is assumed to be exogenous. The results show that tax evasion and the quality of the legal systems are both important determinants of the firms' financing constraints. We obtain that the higher the level of tax evasion, the higher the probability that firms will be subject to restraints in the access to finance ($\beta_1=0.039$). The efficiency of the legal system affects positively the capacity of the firms to borrow from the financial market. The probability to encounter difficulties in access to credit increases when the efficiency of the legal system is lower ($\beta_2=0.085$). Both coefficients are statistically significant at 1 percent level.

Our focus is on the joint significance of these two terms, specifically on the marginal effect of each one of the two variables of interest on the dependent variable. The coefficient of the interaction term is negative and statistically significant ($\beta_3=-0.01$). The inclusion of an interacting term implies that the coefficient β_1 (β_2) only captures the impact of tax evasion (efficiency of the legal system) on credit constraints when the efficiency of the legal system (tax evasion) is equal to zero. We are now interested in investigating the marginal effect of tax evasion on credit constraints, that will depend on the sign and magnitude of the coefficient β_1 of tax evasion index, the coefficient of the interaction term (β_3) and the level of the efficiency of the legal system. The marginal effect of tax evasion, $\Delta TAXEV$, on the degree of credit constraints is now given by $\Delta CREDIT = (\beta_1 + \beta_3 JUS) \Delta TAXEV$. Thus, we calculate the marginal effects by derivation of equation (1) with respect to the *tax evasion* variable first, then to the *judicial efficiency* indicator and run the following F test:

$$H_0: \beta_1 + \beta_3 \overline{JUDS} = 0 \quad (2)$$

$$H_0: \beta_2 + \beta_3 \overline{TAXEV} = 0 \quad (3)$$

where \overline{JUDS} and \overline{TAXEV} are the sample mean value of $JUDS$ and $TAXEV$ respectively. The F test results of both (2) and (3) rejected the null in favor of a negative impact of both variables on firms' financial constraints.

The results obtained demonstrate that the marginal impact of tax evasion on financial constraints decreases as the quality of the judicial system worsen, i.e. tax compliance and the efficiency of the judicial system reinforce each other to affect firms' credit constraints. A possible explanation of this result is that a low level of tax evasion allows firm to rely on credible documentation, like balance sheets and financial statements, that ensures a solid flow of information from borrowers to lenders. This favors the access to credit, by facilitating judicial recovery of loans and reducing the losses of creditors. However, this effect holds mainly if the legal system is efficient in ensuring the enforcement of property rights and contracts. The two variables of interest turn out to be substitute in explaining the difficulty of firms' to access external finance: the marginal effect of tax evasion on firm financial constraints is higher, the lower the inefficiency of the legal system.

Further, the higher the efficiency of the legal system at country level, as measured by *CONFIDENCE*, the lower the probability that firms face difficulties in the access to credit. This effect reinforces the previous finding about the impact of inefficiency of legal system as perceived by firms (*JUDS*). When juridical systems are more efficient, they ensure better investor protection, and enforceability of property rights, and lower transaction costs. Therefore, in the presence of more efficient juridical systems, capital markets are more developed and firms find the use of external finance cheaper.

Among other controls, firms that experimented the highest investment variation in the past (*PASTINV*), are those with higher probability of difficulties in the access to credit; as well as small (*SMALL*) and medium (*MEDIUM*) size firms have a higher probability of being credit constrained than firm of large size.

Column (2) of Table (4) shows OLS estimates of model (1) and accounts for potential endogeneity and reverse causation problems between firm decision to evade tax and contributions and the availability of financial sources. Indeed, even if our analysis is in line with Dabla-Norris and Feltenstein (2005) and Gatti and Honorati (2007), it must be noted that the related literature has reached different conclusions on the potential mechanisms underlying the link between informality and access to credit. In principle, one could claim that less productive firms, which find it hard to access financing, have an incentive not to fully comply, in

order to self-finance their activity. We instrument *TAXEV* with a variable that measures the availability of laws and regulations (*AV_LREG*) and an index that quantifies how much corruption affects firm activity (*G_CORR*). Our choice is consistent with a number of works that emphasize the negative correlation between informality and different aspects of the quality of institutions, like corruption and regulatory burden (Johnson *et al.* 1998; Friedman *et al.*, 2000; Dreher and Schneider, 2010). We then instrument the interaction term *TAXEVJUDS* with the interactions *AV_LREG*JUDS* and *G_CORR*JUDS* and we use the over identified restrictions to test the instrument validity with a Sargan test (p-value=0.27). The endogeneity of *TAXEV* is tested by using a Durbin score test whose null hypothesis of exogenous *TAXEV* and *TAXEVJUDS* is rejected (p-value=0.00). Estimates confirm previous findings.

Columns (3) and (4) of Table (4) show estimates of a probit model in which *TAXEV* and *TAXEVJUDS* are treated as exogenous and endogenous variables, respectively. Results remain unchanged. The findings are robust to the alternative specification in which we treat *TAXEV* and *TAXEVJUDS* as endogenous variables (column (4)).⁴

4. Conclusions

Previous studies pointed out that, on the one hand, firms' ability in rising external finance is positively associated with higher tax compliance and, on the other hand, the degree of development of credit markets increases with improvements in the efficiency of legal institutions in protecting private credit.

Our results suggest that tax evasion and the inefficiency of the judicial system are substitute as they mitigate each other's effects on firms' credit constrains. Remarkably, the impact of tax evasion on financial constraints faced by firms is lower, the lower the efficiency of the legal system. A possible explanation of this result may be that a low level of tax evasion allows firm to rely on credible documentation, like balance sheets and financial statements, that ensures a solid flow of information from borrowers to lenders. This favors the access to credit, by signaling firm soundness and credit worthiness, so facilitating judicial recovery of loans and reducing the eventual losses of creditors. However, this effect holds mainly if the legal system is efficient in ensuring the enforcement of property rights and contracts.

Conversely, in an environment where informality is pervasive, and the legal system is inefficient, banks might tend to develop alternative ways to evaluate firm soundness. Likewise, firms might tend to rely on informal sources of financing. Furthermore, the findings suggest

⁴ In column (4) we report estimated coefficients because we could not compute marginal effects for the probit model. The Newey's efficient two-step estimator has been used to obtain the coefficient estimates.

that tax evasion and the inefficiency of the legal system affect the access to credit of small- and medium- sized firms, while larger firms suffer less of financial constraints in countries characterized by a higher degree of confidence in the judicial system.

Our findings suggest that the quality of government institutions, like the judicial system, is an essential precondition for the development of effective financial institutions, especially in the context of widespread informality.

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Figure 1: Correlation of alternative measures of legal system efficiency.

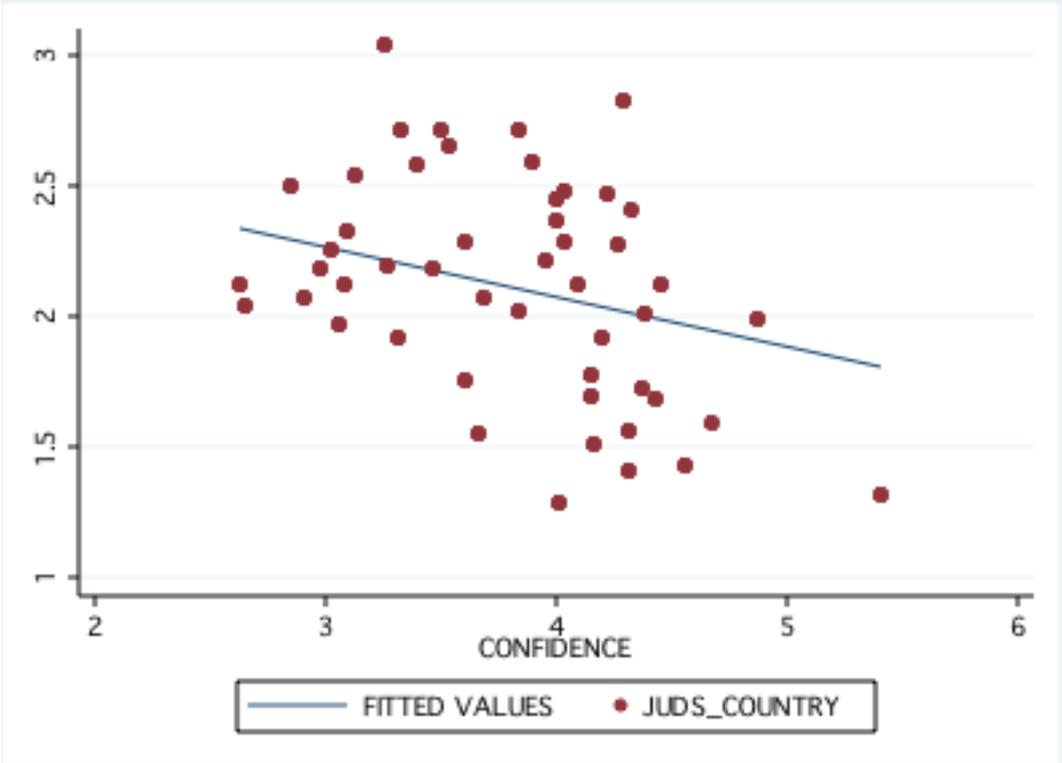


Table 1: Correlation matrix of the main variables of interest

	Constraints to Credit Access	Tax Evasion	Efficiency of Legal System	Confidence in the Judicial System
<i>Constraints to Credit Access</i>	1.00			
<i>Tax Evasion</i>	0.14	1.00		
<i>Efficiency of Legal System</i>	0.16	0.10	1.00	
<i>Confidence in the Judicial System</i>	-0.20	-0.10	-0.14	1.00

Source: Voices of the Firms 2000, World Business Environment Survey.

Table 2: Descriptive statistics of the main variables of interest

	Obs.	Mean	Std. Dev.
<i>Constraints to Credit Access</i>	7274	0.62	0.48
<i>Tax evasion</i>	6614	2.73	1.98
<i>Efficiency of Legal System</i>	5654	2.14	1.03
<i>Confidence in the Judicial System</i>	7975	3.72	0.64

Source: Voices of the Firms 2000, World Business Environment Survey.

Table 3: Descriptive statistics of variables by firm-size category

	<i>Constraints to Credit Access</i>		
	Obs.	Mean	Std. Dev.
Small-sized Firm	2715	0.67	0.47
Medium-sized Firm	3037	0.63	0.48
Large-sized Firm	1507	0.53	0.50

	<i>Tax Evasion</i>		
	Obs.	Mean	Std. Dev.
Small-sized Firm	2463	3.07	2.07
Medium-sized Firm	2775	2.66	1.96
Large-sized Firm	1364	2.29	1.76

	<i>Efficiency of Legal System</i>		
	Obs.	Mean	Std. Dev.
Small-sized Firm	2048	2.08	1.04
Medium-sized Firm	2480	2.16	1.03
Large-sized Firm	1113	2.21	1.00

Source: Voices of the Firms 2000, World Business Environment Survey.

Table 4. Financial Constraints, Tax Evasion and the Efficiency of Legal Systems

Dependent variable <i>CREDIT</i>	(1) OLS-Exogenous Taxev	(2) OLS-Endogenous Taxev	(3) Probit-Exogenous Taxev	(4) Probit-Endogenous Taxev
<i>TAXEV</i>	0.039*** (0.008)	0.385*** (0.078)	0.106*** (0.024)	1.196*** (0.250)
<i>JUDS</i>	0.085*** (0.012)	0.168** (0.079)	0.239*** (0.034)	0.531** (0.248)
<i>TAXEVJUDS</i>	-0.010*** (0.003)	-0.049* (0.027)	-0.025** (0.010)	-0.159* (0.086)
<i>CONFIDENCE</i>	-0.055*** (0.014)	-0.050** (0.022)	-0.165*** (0.040)	-0.152** (0.066)
<i>PASTSALES</i>	-0.027 (0.019)	-0.027 (0.030)	-0.079 (0.056)	-0.081 (0.090)
<i>NEXTSALES</i>	0.007 (0.018)	-0.025 (0.030)	0.018 (0.054)	-0.081 (0.091)
<i>PASTINV</i>	0.032** (0.016)	0.063** (0.025)	0.096** (0.046)	0.192** (0.076)
<i>NEXTINV</i>	-0.014 (0.015)	0.003 (0.024)	-0.044 (0.044)	0.008 (0.074)
<i>EXPORT</i>	-0.015 (0.017)	-0.050* (0.028)	-0.041 (0.050)	-0.148* (0.084)
<i>OUTSIDE</i>	0.046** (0.020)	-0.011 (0.033)	0.127** (0.057)	-0.043 (0.099)
<i>SMALL</i>	0.137*** (0.023)	-0.053 (0.049)	0.392*** (0.066)	-0.188 (0.151)
<i>MEDIUM</i>	0.092*** (0.020)	0.017 (0.034)	0.259*** (0.057)	0.038 (0.104)
<i>OLD</i>	-0.001 (0.000)	-0.000 (0.001)	-0.002 (0.001)	-0.001 (0.002)
<i>MANUFACTURING</i>	-0.011 (0.022)	0.020 (0.037)	-0.027 (0.069)	0.068 (0.112)
<i>SERVICES</i>	-0.102*** (0.022)	-0.046 (0.036)	-0.292*** (0.065)	-0.128 (0.109)
<i>CONSTRUCTION</i>	0.050* (0.030)	0.034 (0.050)	0.162* (0.097)	0.118 (0.153)
<i>GOVERNMENT</i>	-0.053** (0.024)	-0.142*** (0.041)	-0.157** (0.071)	-0.435*** (0.124)
<i>LOG_GNP</i>	-0.059*** (0.010)	0.017 (0.020)	-0.170*** (0.027)	0.064 (0.060)
<i>ENGLISH</i>	0.107* (0.060)	0.186* (0.100)	0.303 (0.186)	0.557* (0.311)
<i>SOCIALIST</i>	0.158*** (0.057)	0.127 (0.097)	0.436** (0.178)	0.361 (0.302)
<i>FRENCH</i>	0.143** (0.059)	0.167* (0.099)	0.407** (0.184)	0.502 (0.307)
<i>GERMAN</i>	0.255*** (0.079)	-0.068 (0.139)	0.692*** (0.230)	-0.279 (0.426)
<i>SCHOOL</i>	0.009* (0.005)	0.017** (0.008)	0.032** (0.014)	0.056** (0.023)
<i>ETHNIC</i>	0.100** (0.046)	-0.151* (0.086)	0.275** (0.131)	-0.474* (0.260)
<i>CONSTANT</i>	0.832*** (0.140)	-0.323 (0.331)	0.960** (0.407)	-2.676*** (1.038)
<i>OBSERVATIONS</i>	4,258	4,080	4,258	4,080
<i>TAXEV TEST(P-VALUE)</i>	0.00	0.00	0.00	0.00
<i>JUDS TEST (P-VALUE)</i>	0.00	0.02	0.00	0.03
<i>DURBIN /WALD (P-VALUE)</i>	-	0.00	-	0.00
<i>SARGAN (SCORE)(P-VALUE)</i>	-	0.27	-	-

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Data Appendix

CREDIT	Binary index that assumes value equal to 1 if the firm is financially constrained, and 0 otherwise. The original variable drawn from the <i>Voices of the Firms 2000</i> dataset is obtained by asking the managers to judge on a four-point scale, where “4” means a major obstacle, “3” means a moderate obstacle, “2” means a minor obstacle and “1” means it is no obstacle, how problematic the general constraint-financing is for the operation and growth of your business. In this case we construct a dummy variable equal to 1 when the original variable takes the values 3 or 4, and equal to 0 otherwise.
TAXEV	Index of tax evasion measured as percentage of sales unreported to tax authorities. It has been realized by asking the manager what percentage of total sales would he/she estimate the typical firm in his/her area of activity keeps “off the books”. The variable ranges from 1 to 7, being associated to the value 1 none evasion at all, to the value 2, 1-10% of total sales unreported, to the value 3, 11-20%, to the value 4, 21-30%, to the value 5, 31-40%, to the value 6, 41-50% and to the value 7, more than 50%.
JUDS	Measure of the efficiency of legal system which indicates the functioning of the judiciary as observed by firms. It is based on the following question asked to the company: please judge on a four-point scale, where “4” means a major obstacle, “3” means a moderate obstacle, “2” means a minor obstacle and “1” means it is no obstacle, how problematic the general constraint-functioning of the judiciary is for the operation and growth of your business.
CONFIDENCE	Country-varying measure of the efficiency of judicial system which reflects the average level of firms’ confidence in the national legal system. In this case the questionnaire asks the managers the degree to which they believe the system will uphold contracts and property rights in a business dispute. The scale ranges from 1 to 6, where a higher score means a higher degree of confidence in the system.
PASTSALES	Variable that reflects the manager’s estimate of the growth of company’s sales over the past three years.
NEXTSALES	Variable that reflects the manager’s estimate of the growth of company’s sales over the next three years, by the time of the interview.
PASTINV	Variable that reflects the manager’s estimate of the growth of company’s investment over the past three years.
NEXTINV	Variable that reflects the manager’s estimate of the growth of company’s investment over the next three years.
EXP_YN	Variable that takes the value 1 if the company exports outside its country and 2 otherwise.
OUTSIDE_YN	Variable that takes the value 1 if the company operates in other countries and 2 otherwise.
GOVERNMENT	Variable equal to 1 if the firm is government-owned, equal to 2 otherwise.
OLD	Number of years since the firm’s establishment.
SECTOR_M	Dummy variable equal to 1 if the firm operates in the manufacturing sector, equal to 0 otherwise.
SECTOR_S	Dummy variable equal to 1 if the firm operates in the service sector, equal to 0 otherwise.
SECTOR_A	Dummy variable equal to 1 if the firm operates in the agricultural sector, equal to 0 otherwise.
SECTOR_C	Dummy variable equal to 1 if the firm operates in the construction sector, equal to 0 otherwise.
SMALL	Dummy variable equal to 1 if the firm is small-sized (number of employees 5-50), equal to

	0 otherwise.
MEDIUM	Dummy variable equal to 1 if the firm is medium-sized (number of employees 51-500), equal to 0 otherwise.
LARGE	Dummy variable equal to 1 if the firm is large-sized (number of employees 500+), equal to 0 otherwise.
LOG_GNP	Log of the GNP per capita in 1999. It is calculated according to the World Bank Atlas method of converting data in national currency to US dollars.
LEGAL_ORIGIN	Dummy variables for the origin of the legal system in a country, classifying a country's legal system as having its origins in French civil law (FR), German civil law (GE), Scandinavian law (SC), Socialist law (SO), or Anglo-Saxon common law (UK). Source: La Porta et al. (1999).
SCHOOL	Average years of schooling of population over 25 years of age in 1992.
ETHNIC	Index of Ethnolinguistic fractionalization. It is computed as one minus the Herfindahl index of group shares and reflects the probability that two randomly selected individuals from a population belong to different groups. The variable takes values in the range between zero and one that are increasing in the degree of ethnic fractionalization. Source: Alesina, Devleeschauwer, Easterly, Kurlat and Wacziarg (2004).
RULE OF LAW	Index reflecting the quality of the legal system. It ranges between -2.5 and 2.5 with higher values corresponding to better outcomes. The index includes perceptions of the predictability and effectiveness of the judiciary, the incidence of crime and the enforceability of contracts. Source: Kaufmann et al. (2005), data available on www.worldbank.org
AV_LREG	Index that reflects the firm's perception about the availability of rules and regulations. It ranges between 1 and 6; lower values are associated to better outcomes.
G_CORR	Index of perceptions of corruption. It is based on the following question asked to the company: please judge on a four-point scale, where "4" means a major obstacle, "3" means a moderate obstacle, "2" means a minor obstacle and "1" means it is no obstacle, how problematic the corruption of bureaucracy is for the operation and growth of your business.

Countries

Albania, Argentina, Armenia, Azerbaijan, Bangladesh, Belarus, Belize, Bolivia, Bosnia, Botswana, Brazil, Bulgaria, Cambodia, Cameroon, Canada, Chile, China, Colombia, Costa Rica, Cote d'Ivoire, Croatia, Czech Republic, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Ethiopia, France, Georgia, Germany, Ghana, Guatemala, Haiti, Honduras, Hungary, India, Indonesia, Italy, Kazakhstan, Kenya, Kyrgyzstan, Lithuania, Madagascar, Malawi, Malaysia, Mexico, Moldova, Namibia, Nicaragua, Nigeria, Pakistan, Panama, Perù, Philippines, Poland, Portugal, Romania, Russia, Senegal, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Tanzania, Thailand, Trinidad & Tobago, Tunisia, Turkey, Uganda, UK, Ukraine, Uruguay, USA, Uzbekistan, Venezuela, West Bank Gaza, Zambia, Zimbabwe.