Firms' growth, corruption, taxation and financial underdevelopment in developing countries

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Abstract

This paper examines how pair-wise interactions between corruption, taxation and financial underdevelopment are correlated with firms' growth using firm-level data from 28 developing countries. I build a theoretical model to interpret the empirical results. I find that taxation and corruption as well as taxation and financial underdevelopment are substitutes: both variables need to be at similar levels for their interaction to be negatively correlated with firms' growth. Corruption and financial underdevelopment are complements: these variables need to be at opposing levels for their interaction to be negatively correlated with firms' growth.

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1 Introduction

Institutional quality is a key component in promoting entrepreneurship and economic growth (Murphy et al., 1991; Hall and Jones, 1999; Acemoglu et al., 2005). However, corruption, tax predation, financial underdevelopment and other distortions are still scourges of the developing world and could explain as much as 50% of the cross-country variation in revenues (Restuccia and Rogerson, 2008).[1] Some attention has been devoted to different distortions on firms' growth (Fisman and Svensson, 2007; Aterido et al., 2011). However, few papers have focused on the mechanisms linking interactions between various distortions with firms' growth.[2]

An examination of the effect of the interactions between distortions faced by firms could provide policy makers with an alternative, or at least a complementary approach, to the Big Push and financing gap paradigms. The development strategies of the last six decades, i.e. massive international aid bundles, rest on a literature arguing that a Big Push is necessary to set the wheels of development in motion (Rosenstein-Rodan, 1943; Murphy et al., 1989; Easterly, 2002; Easterly, 2006). The rationale is that many dimensions of development exhibit complementarities and failure in one dimension might block development in other dimensions (Kremer, 1993). However, a Big Push is difficult to implement and evaluate (Kline and Moretti, 2014). So, if substitutabilities exist between some dimensions of development, policy makers could concentrate efforts on specific dimensions to initiate a virtuous cycle. The goal of this paper is to examine if such substitutabilties exist using an integrated theoretical and empirical framework. More particularly, I examine how pair-wise interactions between three distortions, i.e., corruption, taxation and financial underdevelopment, correlate with firms' growth for a set of developing and emerging economies.

I build on a simple textbook model of entrepreneurial behavior to examine how corruption, taxation and financial underdevelopment and their interactions affect firms' profits in a stationary

[1] For recent contributions on corruption, see Olken and Pande (2012) and Ugur (2014); on taxation, see Brautigam et al. (2008); and on financial underdevelopment, see Beck et al. (2006) and Goyette and Gallipoli (2015).

[2] Three exceptions are Ahlin and Pang (2008), Gauthier and Goyette (2014) and Goyette and Gallipoli (2015) (more on theses publications below).

equilibrium. The objective in building this theoretical model is to set the table for a discussion on the various interpretations of the empirical results, some of which are potentially contentious. In the model, I assume that overall tax liabilities are a combination of an effective tax rate and an effective bribe rate levied on firms' revenues. Financial underdevelopment is modeled as a wedge between the market rate of rental of capital and the actual price paid by entrepreneurs to rent capital, i.e., an intermediation rate. Hence, I use the expressions financial underdevelopment and financial intermediation interchangeably in what follows.

Comparative statics from this basic model predict a negative sign for the coefficient of the interaction between corruption and taxation and a positive sign for the coefficient of the interaction between corruption and intermediation as well as taxation and intermediation. According to the basic model, the coefficient of the triple interaction also has a positive sign. However, some of these basic theoretical predictions cannot be reconciled with the stubbornly robust results from the empirical section. More particularly, I suggest an alternate mechanism to explain how taxation could have a positive effect on growth and why there could be a negative sign in front of the interaction between taxation and intermediation as well as the triple interaction. The model is thus amended to include social infrastructures, a concept reminiscent of Hall and Jones (1999)'s seminal contribution. I assume that the level or the quality of these so-called social infrastructures is dependent on the effective tax rate and the rate of financial intermediation, as a government can finance these infrastructures by levying taxes and/or borrowing on financial markets. Moreover, I assume that these infrastructures enter directly in a firm's individual total factor productivity. The functional form used for these so-called social infrastructures is kept as general as possible to allow for various interpretations. One interpretation is that better infrastructures have a direct and positive impact on firms' productivity through better roads, better access to electricity and/or credit, etc. One could also interpret improvements in these infrastructures more broadly as growth enhancing policies and institutional reforms. In order to align the theory with the empirical results, a set of theoretical assumptions on the functional form of these social infrastructures must be posited. For taxation to have a positive effect on firms' growth, the tax-elasticity of social infrastructures must be positive and bounded below by a threshold defined in terms of total tax liabilities. In such a situation, I find that the positive

effect on firms' profits of enhanced social infrastructures due to improved tax collection could outweigh the direct negative effect of taxation on firms' profitability. I also show that the interaction between taxation and intermediation is unambiguously negative if the cross-elasticity of social infrastructures with respect to taxation and intermediation is also negative. As I show below, these theoretical assumptions find some validation in the data.

To test the theory, I use firm-level data from the World Bank Enterprise Surveys (WBES). Focusing on 2006, the data set consists in a sample of 14932 firms in 28 countries from Latin America, the Caribbeans and sub-Saharan Africa. I have information on revenues, corruption, taxation, internal and external financing as well as other firms characteristics such as the number of employees, type of ownership and degree of involvement in international trade. I use contemporary and lagged data on revenues to build a rate of growth for each firm. Corruption is measured as a bribes to sales ratio where bribes are paid to public officials with regard to custom, taxes, licenses, regulations, services, etc. Taxation is proxied with data on sales' declaration for fiscal purposes. I demonstrate theoretically that the rate of fiscal declaration is an acceptable proxy for the effective tax rate as long as the official tax rate and the rate of fiscal declaration (which enter multiplicatively in the effective tax rate equation) are not inversely related. I show in the empirical section that this is indeed the case for the sample of countries under study. Finally, financial underdevelopment is proxied by the rate at which firms' working capital is financed internally. As shown below, internal financing is highly correlated with firms choosing not to request a commercial loan due to intermediation problems such as the complexity of the procedures to obtain a loan, collateral and interest rate asked being too high, etc.

There are obvious concerns about endogeneity and measurement errors when running regressions of firms' growth on distortions such as those examined in this paper. I use two different sets of instruments and run various robustness checks to reduce these concerns. First, I use a standard identification strategy following Wald (1940) and Krueger and Angrist (2001) who suggest to use group-averages as instruments to mitigate some of the aforementioned issues. The identification strategy relies on the assumption that location-sector averages of the distortions are uncorrelated with the unobservables affecting each specific firm's growth trajectory.[3] This

[3]See for instance: Fisman and Svensson (2007), Aterido et al. (2011) and Gauthier and Goyette (2014).

identification assumption seems plausible if the *same* sector is not systematically favored by bureaucrats, tax inspectors and/or financiers across *all* countries at the same time. I find some validation in the data for such an assumption by controlling for country, location and sector while using group averages as instruments. Nevertheless, given the concerns related to unobservables being correlated with firms' growth trajectories, I use a second identification strategy suggested by Aterido et al. (2011) as another robustness check. In this second approach, I compute location-sector averages based on firms' average size across time and then assign to each firm a location-sector average based on its initial size. This second approach reduces concerns about reverse causality, about serial correlation (e.g. officials visiting the same firm over the years) and also about group unobservables (size, sector, location) which may be correlated with firms' growth. Finally, in order to reduce concerns about omitted variable bias, I use the available information in the WBES data to control for firms' age, initial productivity, type of ownership, involvement in trade, top manager's experience and time spent to deal with officials. Note that given the difficulty to identify causal effects with the available data, the results below should be interpreted with caution.

Examining each distortion in isolation, I find that corruption and financial underdevelopment are negatively related with firms' growth while taxation (fiscal declaration) is positively correlated with firms' growth. Examining pair-wise interactions between the distortions, I find that the interactions between corruption and fiscal declaration as well as financial intermediation and fiscal declaration are negatively related with firms' growth. From figure 1 in section 3.3.3 below, it is easy to see that corruption and taxation are substitutes because the correlation of the interaction with predicted firms' growth is positive and strongest when corruption is high and fiscal declaration is low and vice-versa. Another way to express this result is to note that the relationship is negative when both corruption and fiscal declaration are at high levels. I observe similar patterns for the interaction between taxation and intermediation in figure 3. Also, I find weak evidence that corruption and intermediation act as complements. In figure 2 in section 3.3.3 below, one can see that the relationship between this interaction and predicted firms' growth is positive and strongest when both corruption and intermediation are high or when both are low. Finally, the sign of the triple interaction between corruption, taxation and financial

underdevelopment is (weakly) negative.

Given the theoretical model is not a general theory of all potential distortions on entrepreneurial decisions, rather a tool to start a discussion on common grounds, I discuss other channels for the empirical results in the robustness section. As mentioned earlier, I use two different sets of instrumental variables to examine the results. This also allows testing for over-identifying restrictions and I show that there are no evidence to reject the fact that both sets of instruments are orthogonal. I examine whether the results could be driven by sample selection. Examining the data by regions, I find that the effect of taxation is negative in sub-saharan Africa but positive and highly significant in Latin America. However, the coefficient on the interactions are not significant anymore when looking at the smaller samples for each region in isolation. I then turn to another potential bias from sample selection, related this time to countries using a value-added tax (VAT). Indeed, the last decades have seen an expansion of the countries using the VAT (Keen and Lockwood, 2010). These tax schemes offer very different registration incentives than those offered by more conventional taxes. In total, 6 countries in the sample do not have a VAT system. The main results (not only taxation) hold for the VAT countries but not for the (much) smaller sample of firms from the non-VAT countries. Other concerns of potential importance are related to compositional effects. I examine subsamples according to sectoral composition and also in terms of firm size. The findings are not affected focusing solely on the manufacturing sector. With regard to firm size, the results become much more nuanced. The interaction between taxation and financial intermediation seems significantly problematic for small and medium firms while the interaction between corruption and taxation significantly affects medium and very large firms. Finally, I run some robustness checks using different sets of control variables at the firm level. I also control for sector, location and country while clustering standard-errors by sector-location-country. I also examine the use of another proxy for taxation, i.e, declared work force for fiscal purposes. I also check the effects of removing outliers, especially for the data on bribes and fiscal declarations which are particularly prone to mis-measurements. In all robustness checks, the main results remain qualitatively unaffected.

The findings of this paper shed a more nuanced light on some results from previous studies. Fisman and Svensson (2007) argue that corruption has three time the negative effect of taxation

on firms' growth in Uganda. According to the results presented here, it seems that accounting for the interaction between corruption and taxation, one should gauge the overall effect of one distortion depending on the level of the other distortion. For example, at low levels of fiscal declaration, corruption exhibits a positive relationship with firms' growth for the sample under study. One potential explanation is that bribing tax officials gets entrepreneurs a tax rebate as in Gauthier and Goyette (2014).[4] This is also in line with Greenwald and Stiglitz (1986) who argue that in a second-best environment, an additional distortion may enhance efficiency.

There are two contradicting forces at play that could explain the (weak) result found on the complementarity between corruption and intermediation. First, if bribes must be funded in part with external means, financial intermediation exacerbates the effect of corruption because entrepreneurs must pay intermediation fees not only on their productive investments but also on bribes (see Ahlin and Pang (2008)'s model for instance). Hence, a better situation in one of these two dimensions to start with leads to a greater effect on growth from an improvement in the other dimension, implying a certain degree of complementarity between the two distortions. Second, there is an additional and opposing effect. It could also be the case that the gains in terms of firms' growth from an improvement in financial development are outweighed by the effect of larger bribes when bribes are proportional to a "firm's capacity to pay", i.e. its production or growth performance, implying in this case a certain degree of substitutability between the two distortions. Ahlin and Pang (2008) also argue that the interaction between corruption and intermediation exhibits both complementarity and substitutability. More particularly, the authors show that these two distortions are substitutes under a somewhat restrictive assumption, i.e. the first order derivative of the density function of profitable projects is not too negative.[5]

[4]Gauthier and Goyette (2014) do not examine the effect of the interaction between corruption and taxation on firm's growth, something I do here. Moreover, I examine the effect of this interaction for a cross-section of countries whereas they only examine Uganda.

[5]Given the widespread results on firms' size distribution which usually follow log-normal or Pareto distribution with negative first order derivative of the density function (see for a review of this literature: Goyette and Gallipoli (2015)), the assumption on which Ahlin and Pang (2008)'s substitutability result holds seems indeed quite restrictive and my results tend to favor the complementarity part of the interaction between corruption and intermediation. For a more complete discussion, I refer the interested reader to the discussion following proposition 1 in Ahlin and Pang (2008).

My results are however not fully comparable to Ahlin and Pang (2008)'s since their analysis is at the country-level and mine is at the firm-level. Indeed, Ahlin and Pang (2008) measure the impact of corruption and financial intermediation on the number of productive projects undertaken at the country level whereas I am examining the impact of these two distortions on firms' production decisions and performance. In other words, Ahlin and Pang (2008) examine the extensive margin of the effect of the interaction of corruption and financial intermediation on firms' growth whereas I examine the intensive margin, i.e., once a project is under way, what is the impact of the two distortions and their interaction.

Finally, the effect of the interaction between taxation and financial intermediation on firms' growth has not received a lot of attention in the literature.[6] The effect however can be of considerable importance. Goyette and Gallipoli (2015) show that the interaction between tax distortions and credit constraints in Uganda could cause as much as a 34% annual loss in output per worker. One can think of various channels through which this interaction affects entrepreneurial decisions. For example, tax evading entrepreneurs might find themselves in a dilemma when in need of external financing, pondering whether they should disclose their revenues to financial agencies and run the risk of being reported to fiscal agencies. An alternate story could be that a tax evading entrepreneur who applies for a loan has no proof of revenue in order to guarantee his loan and is thus limited in ways to finance its activities. I suggest two specific mechanisms in this paper. First, the interaction between financial development and taxes could have a growth enhancing effect through social infrastructures. Indeed, in the model presented below, a reduction in financial constraints entices entrepreneurs to hire more capital, increasing output and consequently, taxes. The direct negative effect of taxes levied on firms' profitability could then be counterbalanced (depending on a country specific characteristics) by the positive effect of taxes on firms' TFP through enhanced social infrastructures. Finally, these two distortions may be substitutes because entrepreneurs prefer to pay one rent instead of two, either to tax inspectors or bankers, just as in the case of corruption and taxation above.

[6] Fama and French (1998) find that information on profitability out-weights any effect from taxation on financial decision. The focus of their paper however is on the tax treatment of dividends and debt and how these affect the cost of capital and firm value.

The rest of the paper is organized as follows. Section 2 presents the theory. Section 3 presents the data, the empirical strategy and results. Section 4 concludes with some policy suggestions. The Appendix includes a list of the countries studied in the empirical section as well as some of the results discussed in the robustness section.

2 Theoretical foundations

In order to guide the interpretation of the empirical results, I build a toy-model of firm's behavior to examine how financial underdevelopment, taxation and corruption affect firm's growth. I start by presenting a baseline model and then extend it to include social infrastructures.

2.1 Baseline model

There are four entities in the model: the government, a representative household, the financial sector and a representative firm.

Government In the baseline model, the government taxes firms' production at tax rate τ_t and tax revenues are paid to households through a lump-sum, L.

Household The household chooses consumption c_t and investment i_t to maximize its life-time expected utility subject to its budget constraint and the transition of capital:

$$\max_{c_t, i_t} E_t \sum_{t=0}^{\infty} \psi^t u(c_t) \tag{1}$$

subject to

$$c_t + i_t \leq r_t k_t + L \tag{2}$$

and

$$i_t = k_{t+1} - (1 - \delta) k_t \tag{3}$$

where ψ is the discount rate, $u(c)$ is a standard concave utility function, r_t is the rate of rental of capital and k_0 is given. To make matters simple, I assume that households invest in capital k_t which denotes broad capital and I abstract from labor choices. Assuming there exists

a stationary equilibrium with constant r_t, standard first order condition yields:

$$r = \frac{1}{\psi} - 1 + \delta \tag{4}$$

Financial sector Underdeveloped financial markets are modeled as a simple budget constraint:

$$\phi k_t \geq r k_t + C(k_t) \tag{5}$$

where ϕ is the intermediation rate asked by the financial sector to compensate for the costs of intermediation $C(.)$ which are increasing and convex. These costs could be justified in the context of a financially underdeveloped country by increased risks of default due to difficulties in assessing borrowers' creditworthiness (Banerjee and Duflo, 2008), it could be also due to difficulties associated with the lack of financial depth (Valickova et al., 2014) or other distortions such as corruption in lending (Beck et al., 2006).

Entrepreneurs Entrepreneurs are risk neutral, maximize their utility and rent capital from the market at the rate ϕ_t. I assume that the production function is given by: $F(k_t) = k_t^{\gamma}$ where $0 < \gamma < 1$, i.e., it exhibits decreasing returns to scale.[7] Indeed, Basu and Fernald (1997) estimate total returns to scale for a typical industry in the U.S., γ, to lie between 0.8 and 0.9.

Overall tax liabilities face by an entrepreneur are a combination of a rate of taxes effectively paid τ and a bribe rate b. Tax revenues may be invested to improve social infrastructures (see next section) but bribe revenues are a net loss for the economy. I assume that the tax and bribe rates are imperfect substitutes and, below, I use a simple Cobb-Douglas functional form for overall tax liabilities: $T_t = \tau_t^{\alpha} b_t^{\beta}$ where $0 < \alpha, \beta < 1$.[8]

Let's now examine the components of the effective tax rate. Suppose that the official tax rate at the country level is ξ and the amount of sales declared for tax purposes is $1 - \nu$ where ν is the tax evasion rate. The effective tax rate is thus given by:

[7]The model could easily be extended to account for technological progress with $F(k_t) = Ak_t^{\gamma}$, where A would grow at a certain predetermined rate. With positive profits, this would ensure that the economy is on a balanced growth path as in a standard neoclassical model of growth.

[8]The results hold using a more general form for overall tax liabilities but the Cobb-Douglas yields expressions that are more intuitive. Results using general functional forms are available upon request.

$$\tau = \xi(1-\nu) \tag{6}$$

Note that τ and $1-\nu$ are positively correlated as long as ξ and $1-\nu$ are not inversely related. This will be important as I use data on sales declaration for fiscal purposes as a proxy for effective taxation in the regressions below. I show in the empirical section that ξ and $1-\nu$ are in fact positively related, reducing therefore such concerns about confounding multiplicative effects.

The objective of the entrepreneur is to maximize its profits:

$$\max_{k_t}(1-T_t)F(k_t) - \phi_t k_t \tag{7}$$

subject to the technology.

Deriving the first order conditions with respect to capital yields:

$$k = \left[\frac{\gamma(1-T_t)}{\phi_t}\right]^{\frac{1}{1-\gamma}} \tag{8}$$

and thus profits are:

$$\pi = \left[\frac{(1-T_t)}{\phi_t^{\gamma}}\right]^{\frac{1}{1-\gamma}} \theta \tag{9}$$

where $\theta = \left[\gamma^{\frac{\gamma}{1-\gamma}} - \gamma^{\frac{1}{1-\gamma}}\right]$.

Definition of an equilibrium A competitive equilibrium for this economy is a set of quantities $\{c_t, k_t\}$, prices $\{r_t\}$ and institutional distortions $\{\tau_t, \phi_t, b_t\}$ such that, given prices and institutional distortions:

1) Household maximize their utility subject to their budget constraint;

2) Firms maximize their profits subject to the technology;

3) The government balances its budget;

4) The financial sector balances its budget;

5) There is market clearing on the goods and capital markets.

2.1.1 Basic comparative statics

The goal of the theoretical exercise is to derive a set of implications which allow interpreting the empirical results in the empirical section. More particularly, I examine the effect of the main variables of interest, i.e., corruption, intermediation and taxation on profits. Given the profits are for a stationary equilibrium, I drop time subscripts for the sake of brievity.

The effect of bribery is:

$$\frac{d\pi}{db} = \frac{\theta}{1-\gamma}\left[\frac{1-T}{\phi^{\gamma}}\right]^{\frac{1}{1-\gamma}}\left[\frac{-\beta\tau^{\alpha}b^{\beta-1}}{1-T}\right] < 0 \tag{10}$$

We get a similar expression for taxation:[9]

$$\frac{d\pi}{d\tau} = \frac{\theta}{1-\gamma}\left[\frac{1-T}{\phi^{\gamma}}\right]^{\frac{1}{1-\gamma}}\left[\frac{-\alpha\tau^{\alpha-1}b^{\beta}}{1-T}\right] < 0 \tag{11}$$

The effect of intermediation is:

$$\frac{d\pi}{d\phi} = \frac{-\theta\gamma(1-T)^{\frac{1}{1-\gamma}}}{1-\gamma}\left(\frac{1}{\phi}\right)^{\frac{1}{1-\gamma}} < 0 \tag{12}$$

Interactions First, I examine the interaction between corruption and taxation by calculating their cross-derivative:

$$\frac{d\pi}{dbd\tau} = \frac{\alpha\beta\theta}{\tau b(1-\gamma)}\left[\frac{(1-T)}{\phi}\right]^{\frac{\gamma}{1-\gamma}}\left[\frac{\gamma}{1-\gamma}\frac{T^2}{1-T} - T\right] \tag{13}$$

Equation 13 is negative if $T < 1-\gamma$.[10]

The cross-derivative of profits with respect to corruption and intermediation is unambiguously positive:

$$\frac{d\pi}{dbd\phi} = \frac{\beta\theta\tau^{\alpha}b^{\beta-1}}{1-\gamma}(1-T)^{\frac{\gamma}{1-\gamma}}\left[\frac{\gamma}{1-\gamma}(\frac{1}{\phi})^{\frac{1}{1-\gamma}}\right] > 0 \tag{14}$$

[9]Note that the fact that τ and $1-\nu$ move in the same direction allows deriving comparative statics in terms of τ or $1-\nu$ without any loss of generality.

[10]Whether this condition is satisfied depends on a country's specific characteristics. For example, based on Ugandan data from the WBES, the effective rate of taxes paid is 14% and the bribe rate is 3% (see for instance, Gauthier and Goyette (2014)). Hence, the total effective tax rate is $T = 17\%$. As mentioned before, Basu and Fernald (1997) estimate that $0.1 < 1-\gamma < 0.2$. Thus, for $\gamma < 0.83$, the model would predict that the effect of the interaction is potentially negative.

The cross-derivative of profits with respect to taxation and intermediation is unambiguously positive:

$$\frac{d\pi}{d\tau d\phi} = \frac{\alpha\theta\tau^{\alpha-1}b^{\beta}}{1-\gamma}(1-T)^{\frac{\gamma}{1-\gamma}}\left[\frac{\gamma}{1-\gamma}(\frac{1}{\phi})^{\frac{1}{1-\gamma}}\right] > 0 \tag{15}$$

Finally, the cross-derivative of profits with respect to corruption, taxation and intermediation is:

$$\frac{d\pi}{dbd\phi d\tau} = \frac{\alpha\beta\theta T}{\tau b(1-\gamma)}\left[\frac{-\gamma}{1-\gamma}(\frac{1}{\phi})^{\frac{1}{1-\gamma}}\right](1-T)^{\frac{\gamma}{1-\gamma}}\left[\frac{\gamma+T-1}{(1-\gamma)(1-T)}\right] \tag{16}$$

Equation 16 is positive if $T < 1-\gamma$.

2.2 Social infrastructures

Some of the empirical results cannot be reconciled with the predictions of the baseline model. In particular, I need a theory to explain why effective taxes paid could affect positively firms' profits and growth and why the interaction between taxation and intermediation as well as the triple interaction between corruption, taxation and intermediation could be negative. Using a concept reminiscent of Hall and Jones (1999)'s, I augment the model with social infrastructures which are produced by the government and used by firms. The problem of the representative household is unaffected and the budget constraint of the financial sector is essentially the same except that capital is now rented to firms and the government. I thus focus on the two entities affected by the introduction of social infrastructures: the government and firms.

Government Taxes collected from firms' production are no longer rebated to consumers through a lump-sum but are used to increase the quantity or improve the quality of social infrastructures G. This implies that social infrastructures depend on the effective rate of taxes paid τ_t. The relationship should be positive as more taxes collected should allow a government to build more, or improve existing, infrastructures. I further assume that financial underdevelopment also affects social infrastructures. This could be the case, for example, if a government needs to borrow to develop its social infrastructures. In this case, a higher cost of capital implies

lower quantities or quality of infrastructures.[11] Based on these assumptions, one would expect the following conditions over G to hold: $G_\tau > 0$ and $G_\phi < 0$. Moreover, for some of the results, I further need to assume that $G_{\tau\phi} < 0$. In the empirical section, I provide some evidence that the first two assumptions, i.e., $G_\tau > 0$, $G_\phi < 0$ hold in the data (more on this below).

The government budget constraint is:

$$\tau_t F_t + B_t \geq G_t + \phi_t B_{t-1} \tag{17}$$

where B_t represents the government's borrowing on financial markets at time t.

Entrepreneur Social infrastructures enter directly into each individual firm's TFP. As before, the entrepreneur maximizes its profits:

$$\max_{k_t} (1 - T_t) G(\tau_t, \phi_t) F(k_t) - \phi_t k_t \tag{18}$$

subject to the technology. Taking the first order condition with respect to capital, I find that profits are:

$$\pi = \left[\frac{(1 - T_t) G(\tau_t, \phi_t)}{\phi_t^\gamma} \right]^{\frac{1}{1-\gamma}} \theta \tag{19}$$

Extended comparative statics I examine again the effect of each variable of interests and their interaction on profits. I first look at the effect of bribes on profits:

$$\frac{d\pi}{db} = \frac{\theta}{1-\gamma} \left[\frac{(1-T)G}{\phi^\gamma} \right]^{\frac{1}{1-\gamma}-1} \left[\frac{-\beta \tau^\alpha b^{\beta-1} G}{\phi^\gamma} \right] < 0 \tag{20}$$

As can be noted from equation 20, bribes have an unambiguously negative effect on profits given the structure of the model. Next, I examine the effect of taxation on profits:

$$\frac{d\pi}{d\tau} = \frac{\theta}{1-\gamma} \left[\frac{(1-T)G}{\phi^\gamma} \right]^{\frac{\gamma}{1-\gamma}} \left[-\alpha \tau^{\alpha-1} b^\beta G + (1-T) G_\tau \right] \tag{21}$$

The sign of this derivative is ambiguous. The effect of taxation on profits is positive if:

$$\frac{G_\tau \tau}{G} > \frac{\alpha T}{(1-T)} = x^* \tag{22}$$

[11] The bribe rate, b, could also enter in the social infrastructures functional form. However, given that the baseline results are in line with the data concerning corruption, I keep G as simple and as general as possible. Adding b in G would yield similar results as those obtained for τ.

The effect of taxation could be positive if the tax-elasticity of social infrastructures is larger than a certain value, x^*, which is a function of overall tax liabilities. In other words, when social infrastructures are of high quality, entrepreneurs get a good return for their buck since tax collected increase social infrastructures and this, in turns, increases firms' growth.[12]

Finally, the effect of intermediation on profits is:

$$\frac{d\pi}{d\phi} = \frac{\theta}{1-\gamma}\left[(1-T)\right]^{\frac{1}{1-\gamma}}\left[\frac{G}{\phi^{\gamma}}\right]^{\frac{1}{1-\gamma}-1}\left[\frac{G_{\phi}\phi^{\gamma}-\gamma G\phi^{\gamma-1}}{\phi^{2\gamma}}\right] \tag{23}$$

The effect is negative if the term in the last square bracket is negative. This can be rewritten as follows:

$$\frac{G_{\phi}\phi}{G} < \gamma \tag{24}$$

In other words, the elasticity of public capital with respect to the intermediation rate must be smaller than the value of the decreasing returns to scale parameter. This condition is always satisfied if $G_{\phi} < 0$.

Interactions Given the structure of the model I find that the cross-derivative of profits with respect to the tax and bribe rates is:

$$\frac{d\pi}{dbd\tau} = \frac{\theta}{1-\gamma}\left[\frac{-\beta T}{b}\right]\left[\frac{(1-T)G}{\phi^{\gamma}}\right]^{\frac{\gamma}{1-\gamma}}\left\{\frac{-\gamma G}{\tau}\frac{\gamma+T-1}{(1-\gamma)(1-T)}+\frac{G_{\tau}}{1-\gamma}\right\} \tag{25}$$

As long as the term in curly bracket is positive, the cross-derivative of profits with respect to the tax and bribe rates is negative and taxation and bribery are substitutes. This expression can be re-written as:

$$\frac{G_{\tau}\tau}{G} > \frac{\alpha}{1-T}(\gamma+T-1) = x^{**} \tag{26}$$

[12]The interpretation maybe somewhat different if I consider G as an enterpreneur's perception about infrastructures' quality. In this case, taxes collected are perceived as increasing (or not) profits through better infrastructures. This could induce (or not) greater tax morale among entrepreneurs and thus affect sales declaration for fiscal purposes which is the proxy used for taxation in the empirical section. For example, Frey and Torgler (2007) show that fiscal evasion is negatively related with institutional quality. I discuss this possibility in the robustness section

Hence, I observe a negative effect of the interaction between corruption and taxation when the tax elasticity of public capital is greater than x^{**}. If condition 22 holds, condition 26 should hold as well since $x^* > x^{**}$ as long as $\gamma < 1$.

Let's examine the interaction between bribery and financial intermediation:

$$\frac{d\pi}{dbd\phi} = \chi \left\{ \frac{1}{1-\gamma} \left[\frac{G_\phi \phi^\gamma - \gamma G \phi^{\gamma-1}}{\phi^{2\gamma}} \right] \right\} \tag{27}$$

where $\chi = \frac{1}{1-\gamma} \left[(1-T)\right]^{\frac{1}{1-\gamma}-1} \left[-\beta \tau^\alpha b^{\beta-1}\right] \theta$. Now the interaction between bribery and intermediation is positive, i.e., bribery and intermediation are complements, as long as equation 24 is satisfied.

The sign of the interaction between taxation and financial intermediation is given by:

$$\frac{d\pi}{d\tau d\phi} = \zeta \left\{ \left[-\alpha \tau^{\alpha-1} b^\beta G + (1-T) G_\tau\right] \left[\frac{\gamma}{1-\gamma}\right] \left[\frac{G_\phi}{G} - \frac{\gamma}{\phi}\right] + (1-T) G_{\tau\phi} - \alpha \tau^{\alpha-1} b^\beta G_\phi \right\} \tag{28}$$

where $\zeta = \frac{\theta}{1-\gamma} \left[\frac{(1-T)G}{\phi^\gamma}\right]^{\frac{\gamma}{1-\gamma}}$. By inspection of equation 28, I note three things. First, the first square bracket in 28 can be rewritten as the expression for condition 22 and is thus positive. Second, the third square bracket in 28 can be rewritten as the expression for condition 24 and is thus negative. Finally, the last term in equation 28 is positive since $G_\phi < 0$. Now, rearranging terms, I find a condition on the cross-derivative of public capital with respect to the tax rate and the intermediation rate such that:

$$G_{\tau\phi} < \frac{1}{1-T} \left\{ (-1) \left[-\alpha \tau^{\alpha-1} b^\beta G + (1-T) G_\tau\right] \left[\frac{\gamma}{1-\gamma}\right] \left[\frac{G_\phi}{G} - \frac{\gamma}{\phi}\right] + \alpha \tau^{\alpha-1} b^\beta G_\phi \right\} \tag{29}$$

Hence, the effect of the interaction of taxation and intermediation is likely to be negative if condition 29 holds. This condition is satisfied by assumption: $G_{\tau\phi} < 0$.

Finally, I examine the triple interaction between bribery, financial intermediation and taxation, given by:

$$\frac{d\pi}{dbd\tau d\phi} = \varpi \left\{ \alpha(1-\gamma-T) \left[(\frac{G_\phi}{G} - \frac{\gamma}{\phi}) \frac{\gamma G}{1-\gamma} + G_\phi \right] + \tau(1-T) \left[(\frac{G_\phi}{G} - \frac{\gamma}{\phi}) \frac{\gamma G_\tau}{1-\gamma} + G_{\tau\phi} \right] \right\}$$

(30)

where

$$\varpi = \frac{-\beta T\theta}{b(1-\gamma)^2(1-T)}\left[\frac{(1-T)G}{\phi^{\gamma}}\right]^{\frac{\gamma}{1-\gamma}} \tag{31}$$

In order for the triple interaction to be negative, the expression in curly bracket in equation 30 must be positive since ϖ is unambiguously negative. By inspection of 30, the are three things to note. First, as mentioned earlier, the sign of $(1-\gamma-T)$ is ambiguous and depends on a country's specific characteristics. Second, the first term in both square bracket is the expression for condition 24 and it thus follows that these terms are negative. Finally, I have assumed that $G_{\phi} < 0$ and $G_{\tau\phi} < 0$. Rearranging terms, I find the following condition for the triple interaction to be negative:

$$G_{\tau\phi} < \frac{\alpha(1-\gamma-T)}{\tau(1-T)}\left[(\frac{G_{\phi}}{G}-\frac{\gamma}{\phi})\frac{\gamma G}{1-\gamma}+G_{\phi}\right]-(\frac{G_{\phi}}{G}-\frac{\gamma}{\phi})\frac{\gamma G_{\tau}}{1-\gamma} \tag{32}$$

Now, if $(1-\gamma-T)<0$, this condition is likely to be satisfied as the right hand side (RHS) is unambiguously positive. However, if $(1-\gamma-T)>0$ then $G_{\tau\phi}$ has to be more negative than the RHS of 32.

Table 1 presents a summary of the results and the expected signs on the variables of interest each taken separately and interacted.

3 Empirics

3.1 Data

The data is taken from the World Bank Enterprise Surveys (WBES). It covers 14932 firms in 28 countries in two regions: sub-Saharan Africa, as well as Latin America and the Caribbeans.[13] All data is for 2006. This is because there are no other years in the dataset which have enough data on corruption and taxation. The sample is random and stratified by size, industry, location.[14]

[13]For a list of countries, see the Appendix.

[14]I present the results of unweighted regressions in what follows. The results do not hold using survey weights. Note that the econometric literature does not agree whether survey weights should be applied in the context of structural modeling as is the case here, see for instance: Angrist and Pischke (2008) and Cameron and Trivedi (2005).

Table 1: Expected sign

	Sign data	Sign Baseline Model	Condition needed with public capital G to obtain sign in data
Single variables			
$\frac{d\pi}{db}$	$(-)$	$(-)$	—
$\frac{d\pi}{d\tau}$	$(+)$	$(-)$	Condition 22
$\frac{d\pi}{d\phi}$	$(-)$	$(-)$	Condition 24
Pairwise interaction			
$\frac{d\pi}{dbd\tau}$	$(-)$	$(-)$	Condition 26
$\frac{d\pi}{dbd\phi}$	$(+)$	$(+)$	Condition 24
$\frac{d\pi}{d\tau d\phi}$	$(-)$	$(+)$	Condition 29
Triple interaction			
$\frac{d\pi}{dbd\phi d\tau}$	$(-)$	$(+)$	Condition 32

The sample covers both the manufacturing and services sectors.[15] In all countries, respondents were invited to give information on sales, technology, labor, capacity, infrastructures, financing, relations with the administration, corruption and taxation. The questions were standardized so as to allow for comparability across countries.

3.1.1 Main variables

There are too many missing observations on costs to be able to calculate firms' profits. I thus use the growth of firms' sales as my dependent variable.[16] Each firm's growth rate is calculated based on the differential in log sales three years apart:

$$Growth_t = \frac{log(Sales_t) - log(Sales_{t-3})}{3} \tag{33}$$

[15]Manufacturing accounts for 83% of the sampled firms.

[16]Note that the link between theory and the empirics readily follows from the fact that, assuming TFP grows at some exogenous rate, one only needs profits to be positive to ensure positive growth on a balanced growth path.

Data on corruption was collected indirectly as suggested by Reinikka and Svensson (2006) who describe how to extract valuable information on sensitive issues such as corruption.[17] I use the percentage of sales paid in informal payments to proxy for corruption.

Data on taxation is also collected indirectly. Firms' owner were asked about the percentage of sales declared for fiscal purposes.[18] As argued in the theoretical section, based on equation 6, the effective tax rate is positively related to the rate of declaration of sales for fiscal purposes, given declaration are not inversely related to the official tax rate (I show that it is indeed the case below). Moreover, I discuss in the robustness section other implications from using fiscal declarations as a proxy for the level of taxation faced by firms.

The WBES contains questions on internal and external financing in the short and long run to test for the effect of intermediation.Unfortunately, the use of data on long-term investment generates an important reduction in sample size. I thus use the percentage of overall financing in the short run by internal means as a proxy for financial underdevelopment.[19] The internal finance variable seems a suitable proxy for financial underdevelopment or intermediation. Indeed, in the sample, 64% of the firms did not request a loan. The correlation coefficient between internal finance and the propensity of not applying for a loan is positive (0.19) and significant at the 1% level. Among these firms, 40% gave a reason related to financial intermediation for not requesting a loan: collateral or interest rate was too high, procedures were too complex, size or maturity of the loan was insufficient, or the owner was not confident enough the application would get through.

[17]The question was: "We've heard that establishments are sometimes required to make gifts or informal payments to public officials to get things done with regard to customs, taxes, licenses, regulations, services etc. On average, what percent of total annual sales, or estimated total annual value, do establishments like this one pay in informal payments or gifts to public officials for this purpose?"

[18]The question was: "Recognizing the difficulties many business establishments face in fully complying with taxes and regulations, what percent of total annual sales would you estimate the typical firm in this establishment's line of business declares for tax purposes?

[19]The measure of external of financing for short-term investment is just the mirror image of the internal funding proxy.

3.1.2 Excluded variables

Overall, 3700 firms did not report bribes paid, fiscal declaration or failed to answer the question on financing. These missing observations raise concerns about a potential bias due to selection. I thus check whether respondent and non-respondent differ on observables by running a set of regressions of firms' observable characteristics on a dummy taking a value of one if the firm is included in the final sample, i.e., if it has answered all three questions related to corruption, declaration and finance. The results are reported in table 8 in the Appendix.[20] Reassuringly, the two groups do not differ in terms of their growth rates and number of employees as the dummy does not enter significant in the first and last column of table 8. However, there seems to be significant differences between the two groups in terms of foreign ownership, involvement in international trade, age and the initial level of sales. I include these variables as controls in the regressions (more on this below). Nevertheless, there are no observable evidence that the reduced sample is not representative to study the relationship between growth and the three distortions of interest.

Table 2 presents some descriptive statistics for the sample used in this paper.

Table 2: Summary statistics

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**
growth	0.137	0.312	-2.303	3.849
Corruption	0.022	0.062	0	1
Declaration	0.714	0.36	0	1
Int. Finance	0.629	0.358	0	1
Initial capital	16.335	3.103	2.565	35.017
Age	18.763	16.507	0	172
Foreign (%)	0.115	0.302	0	1
Trade (%)	0.053	0.175	0	1
N		6957		

[20] I have also examined the results conditioning only on one of the three variables of interest for inclusion/exclusion in the sample. The results are qualitatively the same and available upon request.

As observed in table 2, average firms' growth is 13.7% but some firms have experienced negative growth rates.[21] Bribes account for 2.2% of sales and about 71% of firms' sales are declared for tax purposes. Also, firms in the sample rely a great deal on internal finance. Indeed, 63% of short term investment is financed internally.[22] Average firms' age is 19 years. Finally, foreign ownership accounts for 11.5% of the firms of the sample and, on average, 5.3% of the firms engage in trade.

3.1.3 Empirical validity of the theoretical conditions

In table 3, I examine whether the theoretical assumptions regarding G_τ and G_ϕ make sense. The dataset contains information on some infrastructures used by firms such as electricity, roads, water, etc. The information is however incomplete for some of these infrastructures. The number of observations for electricity imposes the smallest loss in attrition. I thus use the number of power outages as a measure of the (inverse) quality of infrastructures.[23] As shown in table 3, the correlations between this measure of the quality of infrastructures is positively related to taxes and inversely related to the cost of capital, in accordance with the assumptions of the model.[24]

3.1.4 Correlations at the country level

In table 4, I present correlation coefficients for the three variables of interest from the WBES averaged at the country level and three common global indicators in the literature. First, I check how the average bribes paid by country from the WBES compares to the Corruption Perception Index from Transparency International. Note that a higher score on the CPI indicates better governance. Second, I compare the WBES average measure of fiscal declaration at the country

[21] Note that given the definition of the growth variable, defined as a ratio, it is possible to observe growth ratio over 1 or under -1.

[22] A similar figure is obtained for long term investment. However, sample size decreases dramatically.

[23] The results hold using monetary losses due to power outages.

[24] It would have been interesting to check whether conditions 22 and 24 are likely to hold in the data. However, the elasticities of social infrastructure with respect to taxation are very small using the number of outages and none of the countries in the sample meet the requirement of condition G_τ (results available upon request). A more suited empirical measure of social infrastructures would be required to conduct such a test. I leave this to future research.

Table 3: OLS results: dependent variable: Social Infrastructure

	(1)	(2)
	Social infrastructure: power outages (inverse)	
Declaration	0.00653***	
	(4.74)	
Int. Finance		-0.00272***
		(-3.71)
N	7086	6501

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

level to total tax rates (as a percentage of commercial profits) from the World Development indicators. Finally, I check how my proxy for financial underdevelopment compares to a standard measure of financial depth in the literature, i.e., the ratio of domestic credit to private firms over GDP from the IMF International Financial Statistics and Data accounts.[25]

In the first column of table 4, I present the correlation between average bribes paid at the country level and the other variables. As can be noted, average bribes are inversely correlated with fiscal declaration but positively correlated with total tax rates, indicating, as in Gauthier and Goyette (2014), that firms tend to pay more bribes to reduce their tax liabilities in countries with high tax rates. Also, from the first column, note that the correlation between average bribes paid and internal funding is not significant but that there is a negative correlation between average bribes paid and private credit to GDP ratio, i.e., there seems to be less bribes being paid in countries with more financial depth. Examining the second column of table 4, fiscal declaration are inversely related to internal funding but positively related to a higher score on the Corruption Perception Index, a higher total tax rate and a larger ratio of private credit to GDP. In the third column, internal funding is negatively correlated with the CPI and financial depth but positively

[25]For a discussion on the measurement of financial development, I refer the interested reader to Valickova et al. (2014).

associated with higher total tax rates.

One concern about using sales declaration for fiscal purposes as a proxy for taxation is that the rate of declaration $1-\nu$ and the official rate of taxation ξ could be inversely related (see equation 6). However, column 2 in table 4 shows that this does not seem to be a concern as fiscal declaration are positively related to total tax rates (which is a proxy for official tax rates across countries).

Table 4: Cross-correlation table

Variables	Average bribe	Fisc. declaration	Internal fund.	CPI_2005	Tot. tax rate
Fisc. declaration	-0.227	1.000			
	(0.000)				
Internal fund.	-0.004	-0.269	1.000		
	(0.345)	(0.000)			
CPI_2005	-0.348	0.291	-0.247	1.000	
	(0.000)	(0.000)	(0.000)		
Tot. tax rate	0.267	0.049	0.180	-0.300	1.000
	(0.000)	(0.000)	(0.000)	(0.000)	
Private credit/GDP	-0.184	0.211	-0.338	0.593	-0.323
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

p-value in parentheses.

3.2 Empirical strategy

A log-linearized version of the profit equation can be used as a point of departure to develop an estimating equation:

$$Growth_i = \alpha_0 + \alpha_1 d1_i + \alpha_2 d2_i + \alpha_3 d1d2_i + \delta' X_i + \epsilon_i \tag{34}$$

where d1 and d2 are two of the distortions of interest, i.e., corruption, taxation or financial intermediation, X is a vector of firms' characteristics and ϵ is a random idiosyncratic component

of firm's individual productivity.

Choice of controls The test of excluded variables above serves as a guide for the choice of the control variables. These controls are moreover quite standard in the literature. Indeed, it has been argued that as firms get older they are able to establish better relationships with public and financial administration (Gauthier and Goyette, 2014). Initial sales are meant to control for convergence: as firms get bigger their growth rate as been observed to become smaller (Evans, 1987). Foreign ownership could affect growth in two ways. It should have a positive effect due to broader financing and technology opportunities and a negative effect due to more visibility and thus more tax and bribe extractions from local administrations. Trade should capture technology and productivity advantages of the most productive firms. Finally, in all regressions, standard-errors are clustered by sector, location and country.

Identification Regression analysis of the effect of bribery, fiscal declaration and internal financing is prone to measurement errors and to endogeneity issues due to reverse causality and/or omitted variable bias. On the one hand, sensitive issues such as corruption and fiscal declaration are certainly prone to measurement errors as firm's owners have incentives not to disclose true values for these variables. Olken and Pande (2012) argue that there are two potential biases. First, respondents fearing being caught cheating might give values that seem socially acceptable. Thus, corruption would be underestimated and fiscal declaration overestimated. In this case, results for corruption and taxation should be interpreted as lower bounds on their true effect on firms' growth. Second, researchers collecting the data could be tempted to focus on situation where issues under study are likely to be observed. In the context of the WBES, this is unlikely, as the surveys were intended to report on a host of other characteristics apart from corruption and tax evasion for each of the firms interviewed. Wald (1940) and Krueger and Angrist (2001) suggest the use of group-averages to mitigate measurement issues. Indeed, measurement errors are likely to be specific to a firm and should not be correlated to the average of some predetermined group.

For omission bias, various controls are available from the WBES as mentioned earlier. Finally, to reduce concerns about reverse causality, group-averages can also be helpful. Take bribes for

example. As argued by Fisman and Svensson (2007), growth and bribes could be determined simultaneously for various reasons. First, if bureaucrats tailor bribes based on a firm's "capacity/willingness to pay" then the difference in bribe payments between two firms in the same sector and same location may be due to unobservables affecting firms' growth.[26] Second, there exist competing growth strategies: some firms rely on developing preferential relationships with the administration and others may focus on improving their productivity. Which strategy proves more productive is an empirical issue.

Reverse causality is also an issue for fiscal declaration and growth. First, in discretionary environments such as the countries examined in this paper, bureaucrats could negotiate tax payments based on a entrepreneur's "capacity/willingness to pay" and it could also be the case that the most productive are also those who declare more. Such an argument relies however on the extreme assumption that honesty would be systematically correlated with ability. Third, if an entrepreneur believes that paying more taxes will result in better public infrastructures and improved productivity, he is bound to increase his tax payments. Again such a pattern would hinge on a systematic selection of entrepreneurs who have a favorable perception of social infrastructures and are more productive. Finally, it could be, as in the case for bribes, that tax compliance results in better relationship with the administration, thus relieving entrepreneurs from lengthy meetings with bureaucrats and leaving more time for production.

For financing, there is also a potential bias due to simultaneity. For example, more productive firms might be more likely to revert to external financing and banks might be more willing to support such firms than the less productive ones. In all cases discussed in the last few paragraphs, reverse causality arises mainly because of some specific unobservable characteristics at the firm level.

The identifying assumption thus relies on disentangling the effect of each distortion d_i in terms of an idiosyncratic component and an group-average component:

$$d_i = D_i + D_k \tag{35}$$

[26]The capacity to pay is dependent on specific characteristics of the bureaucrat and owner of the firm (negotiation power, honesty, etc.), as well as on a firm's specifics (sectoral demand, firm's need in terms of public infrastructures, etc.).

where subscripts refer to firm i and group k, D_i is the idiosyncratic component of the distortion and D_k is the average component of the distortion common to group k. If one is willing to assume that D_k is uncorrelated with unobservables dictating firms' growth then group-averages may be used to instrument for the distortions at the individual level. In this paper, the group of reference will be at the location-sector level.

Now the plausibility of the identifying assumption might be subject to critics if some processes at the location-sector level are correlated with unobservables for growth. As this is secondary data, I cannot tell as in Fisman and Svensson (2007) whether there is systematic or anecdotal evidence that some location-sector have been favored or not by state agencies or banks. However, the WBES data was gathered in the wake of the data collection on which relies Fisman and Svensson (2007) who argue that such systematic biases seem not to have occurred in Uganda. Moreover, it is unlikely that the *same* sector has been systematically favored across *all* countries at the same time in the sample under study. Based on this strategy, I build location-sector averages for each firms for corruption, taxation and financial intermediation and use these group averages as instruments. As a further robustness check below, I control for country, location and sector while using group-averages as instruments to alleviate concerns related to group unobservables.

I use a second set of instrumental variables which is developed using a similar reasoning but with the added advantage of controlling for unobserved time trends and correlation of a group unobservables with a specific firm's growth trajectory. More particularly, Aterido et al. (2011) argue that conditions faced by firms vary as they grow but that conditions in a location-sector cluster stay the same over relatively short (say, the three years available in the dataset) period of time. One can thus attribute to a firm the location-sector average of a distortion, using the average associated to a cluster of firms of size similar to the initial size of the firm. The procedure is as follows. First, average size over time is calculated for each firm in the sample. Second, location-sector averages for each distortion are calculated based on this time-average of firm size. Finally, for each distortion, a firm is attributed a location-sector average based on its initial size. This set of instrumental variables has the added advantage of reducing concerns related to unvarying factors affecting distortions and growth trajectories both at the individual

and location-sector levels.

3.3 Results

In this section, I first present OLS and reduced form results. The main 2SLS results are then presented. Finally, I perform a series of robustness checks.

3.3.1 Basic OLS results

The OLS results are shown in table 5. Note that from this point on all regression tables follow the same format. In the first three columns of a table, I present the estimates for each distortion in isolation. Columns 4 to 9 exhibit pair-wise estimates with the interaction term introduced in odd columns. Column 10 shows the results of a horse race between the three distortions, then columns 11 to 13 show results with the three distortions and all pair-wise interactions and/or their triple interaction.

As can be observed in most columns of table 5, corruption and fiscal declaration do not enter significant and exhibit the opposite of their expected sign based on the basic theoretical predictions. For corruption, this is due to reverse causality as the reduced form results will show below. For taxation, this results will remain stubbornly robust to a host of robustness checks. Financial intermediation enters with the expected sign in most columns, except those where the interaction term is present and significant (more on this below). Note also that the interactions have their expected sign based on the infrastructure-augmented theory.

The main results of this paper are presented in columns 5, 7, 9 and 11 where the distortions and their pair-wise interactions are used in a same specification. Note that when the interactions are introduced in these columns, some of the coefficients on the variables of interest become significant. More precisely, corruption, taxation and their interaction are significant in column 5. The relationship between corruption/taxation and firms' growth thus depends on their interaction which has a negative coefficient (more on this below). In column 7, only the coefficient on intermediation is significant but note that the interaction between corruption and intermediation is associated with a positive sign. In column 9, taxation and the interaction between taxation and intermediation enter significant with the expected sign based on the infrastructure augmented

theory. Finally, column 11 exhibits significant coefficients only for taxation in isolation and the interaction between corruption and taxation. Introducing controls for country, location and sector in table 13 in the appendix, the results remain qualitatively the same except that some of the coefficients are no longer significant.

Table 5: Effects on firms' growth: OLS estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Corruption	0.000845			0.00740	0.343**	0.000428	-0.299			0.00673	0.0537	-0.0735	0.497
	(0.107)			(0.108)	(0.163)	(0.107)	(0.280)			(0.108)	(0.217)	(0.208)	(0.401)
Declaration		0.0129		0.0130	0.0239*			0.0124	0.0454*	0.0125	0.0513**	0.00966	0.0637***
		(0.0130)		(0.0132)	(0.0136)			(0.0131)	(0.0249)	(0.0133)	(0.0250)	(0.0150)	(0.0241)
Int. Finance			-0.0182*			-0.0182*	-0.0288**	-0.0179	0.0196	-0.0179	0.00379	-0.0206*	0.0204
			(0.0110)			(0.0110)	(0.0124)	(0.0110)	(0.0239)	(0.0110)	(0.0270)	(0.0114)	(0.0248)
CxT					-0.497*						-0.497*		-1.164
					(0.301)						(0.283)		(0.793)
CxF							0.515				0.500		-0.243
							(0.389)				(0.374)		(0.522)
TxF									-0.0517*		-0.0436		-0.0652**
									(0.0303)		(0.0316)		(0.0316)
CxTxF												0.204	1.116
												(0.374)	(1.029)
N	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957
adj. R^2	0.048	0.048	0.048	0.048	0.049	0.048	0.049	0.048	0.049	0.048	0.050	0.048	0.051

Standard errors in parentheses

All regressions include a constant, controls for age, initial sales, foreign ownership and trade.

Std err. are clustered by country -location-sector

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

3.3.2 Reduced form results

In table 6, I present OLS results, replacing individual values by location-sector averages for the three distortions of interest and their interactions. Corruption is now significant and with its expected sign. Taxation is significant when interactions with one or the two other distortions are included but note that its sign remains positive. Financial intermediation enters significant with the expected sign, except in columns 9, 12 and 13 (I discuss issues of colinearity in the main results section below). The interactions between corruption and taxation and that between taxation and intermediation are significant with their expected sign. The interaction between corruption and intermediation is not significant but its t-statistics has a p-value of 0.16. Below, the 2SLS results are marginally non-significant at 11%. Finally, note how highly significant the results become when the distortions are introduced in conjunction with their interactions in columns 5, 7, 9 and 11.

Table 6: Effects on firms' growth: OLS group-averages estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Corr.	-0.455**			-0.396*	2.755***	-0.398*	-1.600*			-0.360	2.973**	1.761**	0.519
mean	(0.217)			(0.230)	(0.870)	(0.219)	(0.890)			(0.230)	(1.415)	(0.698)	(4.195)
Declaration		0.0440		0.0288	0.150***			0.0332	0.412***	0.0205	0.486***	0.0978***	0.419***
mean		(0.0268)		(0.0284)	(0.0413)			(0.0274)	(0.123)	(0.0290)	(0.128)	(0.0365)	(0.158)
Int. Finance			-0.0722**			-0.0611*	-0.0960**	-0.0632*	0.363***	-0.0566*	0.334**	-0.00559	0.256
mean			(0.0328)			(0.0331)	(0.0420)	(0.0335)	(0.134)	(0.0336)	(0.139)	(0.0392)	(0.169)
CxT					-4.381***						-4.306***		-0.937
mean					(1.195)						(1.220)		(5.446)
CxF							1.843				-0.386		3.191
mean							(1.310)				(1.340)		(5.673)
TxF									-0.563***		-0.520***		-0.420*
mean									(0.173)		(0.175)		(0.215)
CxTxF												-4.594***	-4.955
mean												(1.453)	(7.491)
N	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957
adj. R^2	0.056	0.056	0.056	0.056	0.059	0.057	0.057	0.056	0.058	0.057	0.061	0.059	0.061

Standard errors in parentheses

All regressions include a constant, controls for age, initial sales, foreign ownership and trade.

Std err. are clustered by country -location-sector

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

3.3.3 Main results

Turning to the main results, I examine the estimates of 2SLS regressions where distortions and interactions are instrumented with their location-sector averages. The first stage estimates are presented in tables 9, 10, 11 and 12 in the appendix. There are two things to note from these first-stage tables. First, the correlations between the instruments and the instrumented variables all have the expected sign. Indeed, in all four tables, group-averages are positively related to the individual-level variable they are supposed to instrument. Second, at the bottom of the three tables, F-statistics for the first stage are shown. According to Stock and Yogo (2005)'s rule of thumb, all F-stats are above 10 and indicate that there are no evidence that the instruments are weak.

The second stage estimates for the main results are found in table 7. As mentioned earlier, the most interesting results are found in columns 5, 7, 9 and 11. Indeed, a quick examination of table 7 shows that the coefficients of our variables of interest become highly significant when one regresses the distortions and their interaction jointly.

Table 7: Effects on firms' growth: Second stage estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Corruption	-0.428			-0.319	2.667***	-0.377	-1.823*			-0.290	2.063	1.628*	-3.889
	(0.264)			(0.286)	(0.879)	(0.270)	(1.004)			(0.290)	(1.539)	(0.857)	(5.768)
Declaration		0.0473		0.0344	0.139***			0.0397	0.333***	0.0291	0.368***	0.0927**	0.266*
		(0.0289)		(0.0314)	(0.0400)			(0.0293)	(0.113)	(0.0316)	(0.118)	(0.0372)	(0.150)
Int. Finance			-0.0581*			-0.0442	-0.0814*	-0.0465	0.283**	-0.0389	0.201	0.00642	0.104
			(0.0347)			(0.0352)	(0.0426)	(0.0349)	(0.122)	(0.0352)	(0.124)	(0.0445)	(0.170)
CxT					-4.476***						-4.412***		5.010
					(1.234)						(1.202)		(8.326)
CxF							2.329				1.009		9.947
							(1.454)				(1.814)		(8.965)
TxF									-0.443***		-0.352**		-0.208
									(0.159)		(0.159)		(0.216)
CxTxF												-4.772**	-14.52
												(2.291)	(13.18)
N	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957
F	187.2	3969.8	2205.3	71.37	22.30	121.6	9.148	1080.8	118.1	51.27	6.322	6.657	0.772

Standard errors in parentheses. F statistic for weak identification: Cragg-Donald or Kleibergen-Paap.
All regressions include a constant, controls for age
initial sales, foreign ownership and trade
and clustering at the location-sector level
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

First, columns 4 and 5 of table 7 show the results for corruption and taxation. Focusing on column 5, note that the coefficients of corruption, taxation and their interaction are all highly significant. Now, let's interpret the overall effect of each distortion when an interaction term is included in a regression. Recall from equation 34 that the overall effect of $d1$ is equal to $\alpha_1 + \alpha_3 d2$ where $d2$ is called the moderator variable. In other words, the overall effect of $d1$ will vary depending on the level of $d2$. For example, let's examine how the effect of corruption depends on the level of fiscal declarations and vice-versa. The best way to present the effect of an interaction is graphically. Figure 1 depicts the relationship between the corruption-taxation interaction and predicted firms' growth. The colored areas represent different levels of predicted growth depending on the interaction between bribes and fiscal declaration based on the coefficients from column 5 in table 7. I have restricted the interval for bribes to include firms with bribe to sales ratio below 0.2 but the results are qualitatively similar using the whole interval for bribes.

Figure 1 portrays a more nuanced representation of the effect of bribes and taxation that is generally admitted in the literature. Only at very high levels of bribe payments and high levels of fiscal declaration do we observe a negative relationship with firms' growth (colder regions; upper right in the graph). On the contrary, a positive relationship is observed when on dimension is at a low level while the other dimension is at a high level (warmer regions; bottom right or upper-left).

To have a sense of the magnitude of these relationships, I calculate the overall correlation of each distortion with firms' growth using the mean of the moderator variable. Examining the correlation between corruption and firms' growth using the average level of declaration (0.71), I find that an increase of 1% in the bribes per sales ratio is associated with a decrease in firms' growth of half a percentage point. Using the average level of bribery (0.02) instead, an increase in 1% in fiscal declaration would be associated with an increase growth of 0.05%.

Figure 1: The effect of the interaction of corruption and taxation on predicted firms' growth

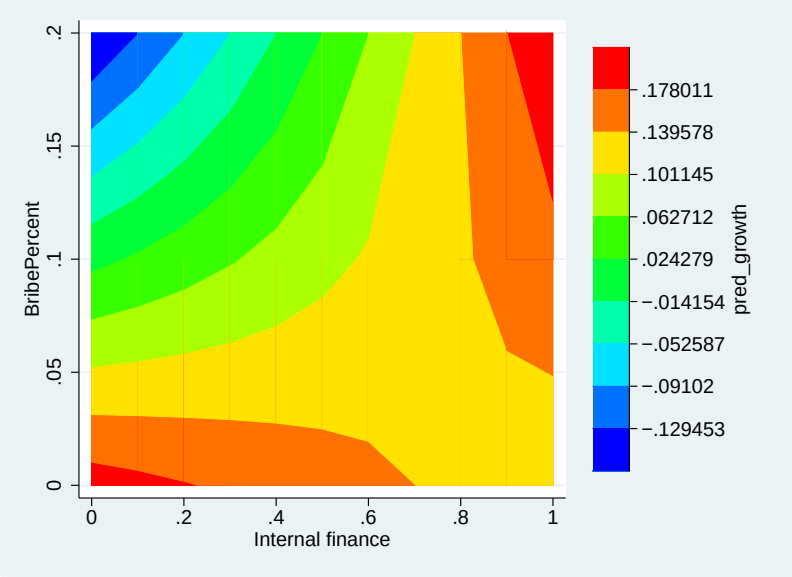
In columns 6 and 7 of table 7, I examine the relationship between the corruption-financial intermediation interaction and firms' growth. As observed in column 7, corruption and intermediation enter significant and with the expected sign when their interaction term is introduced in

the regression. The interaction between corruption and intermediation is positive and marginally significant (p-value = 0.109), exhibiting weak evidence that these two constraints are complements. There are two contradicting forces behind this result. First, in a situation where a firm must rely on external finance, bribes are more costly in terms of growth because they must also be financed externally. This is in line with Ahlin and Pang (2008)'s model where bribes enter in the profit equation as an additional cost, just like other inputs. Second, according to the theoretical model in this paper, an increase in the cost of capital generates a decrease in capital hiring, production and consequently, corruption since bribes are taken at a proportional rate on production. Hence, the negative effect on growth of increasing intermediation could be counterbalanced by smaller bribes. These two competing forces are certainly at play and might explain the weak empirical result. Figure 2 presents graphically this interaction. As we can note, the relationship between the interaction and firms' growth is positive and strongest for extreme values of both distortion, i.e., when both are very low or very high at the same time (lower-left or upper-right).

An analysis at the mean of internal financing (63%) indicates that the correlation between corruption and firms' growth is such that a 1% increase in corruption is related to a drop in firms' growth of 0.35 percentage point. Using the average level of bribes (0.02), a 1% increase in intermediation is associated with a decrease of 0.03 percentage point in firms' growth.

In columns 8 and 9 of table 7, I examine taxation and financial intermediation. In column 9, all three coefficients of interest enter significant and with the expected sign. This implies that as a firm increasingly finances its activities with internal funds, declaring sales for fiscal purposes is negatively related with firms' growth. Vice-versa: as a firm increasingly declares its sales for fiscal purposes, internal financing is negatively related with firms' growth. This has interesting implications for policy. Suppose that there is a decrease in the intermediation rate, this results in an increase in rented capital, production and taxes. If taxes are used to improve infrastructures which in turn improve firms' individual TFP then it could be the case that the direct negative effect of taxes on profitability is outweighed by the positive effect of tax-enhanced social infrastructures on profits. Figure 3 clearly shows the interaction of taxation and intermediation and its relationship with predicted firms' growth. As in the case of corruption and

Figure 2: The effect of the interaction of corruption and intermediation on predicted firms' growth

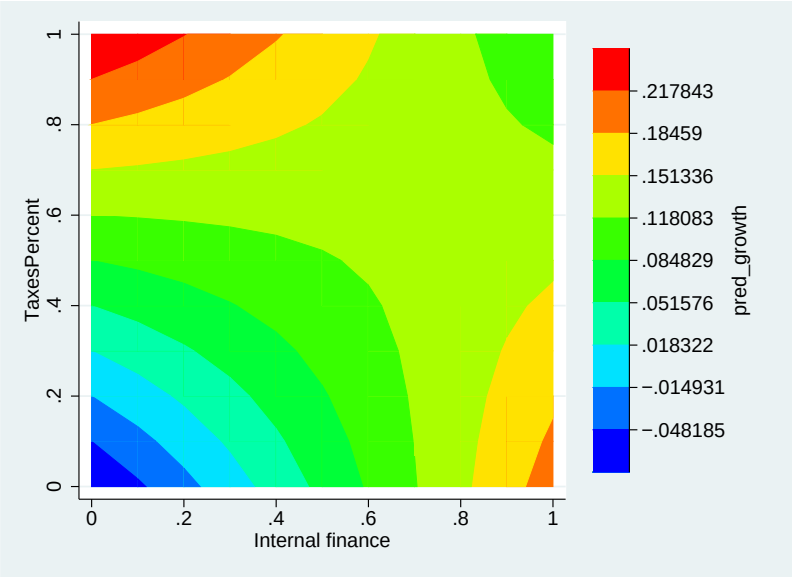


taxation, a positive relationship with firms growth is observed when on dimension is at a low level while the other dimension is at a high level (warmer regions; bottom right or upper-left). Using the mean of internal financing (63%), I find that a 1% increase in fiscal declaration is associated with a 0.05% increase in firms growth. Finally, an analysis with average fiscal declaration (71%) shows that 1% increase in intermediation is related to a 0.03 decrease in firms growth.

Columns 10 to 13 of table 7 show the results with all three distortions included at the same time. In the horse race of column 10, none of the variables of interest are significant. However, in column 11, the tax variable enters significant and with a positive sign and the interactions between corruption and taxation, and that between taxation and intermediation enter significant with their expected sign. The triple interaction, taken in isolation is also significant with its expected sign in column 12. However, including all distortions and all interactions in column 13, none of the results hold. The next paragraph offers one potential explanation for this last result.

In the last row of table 7, I present F-statistics for weak identification (Cragg-Donald or Kleibergen-Paap) to check whether the instruments are weak. As can be observed in most columns, the F-statistics are well above 10, using (Stock and Yogo, 2005)'s rule of thumb. For columns 7, 11, 12 and 13, the lower F-statistics are probably due to unavoidable co-linearity

Figure 3: The effect of the interaction of taxation and intermediation on predicted firms' growth



between the instruments as the same group-averages used to instrument each distortion in isolation are also used to compute the instruments for the interactions. In the robustness section, I re-visit these results with another set of instrumental variables and show evidence that this other set of instruments is not weak. Nevertheless, the main results remain qualitatively the same. Finally, table 14 in the appendix presents results when controls for country, location and sector are introduced in each specification. The results remain qualitatively the same. More particularly, the coefficients of columns 5, 7, 9 and 11 retain their significance with these added controls.

3.4 Robustness and discussion

In this section, I discuss the robustness of the results. First, I discuss the validity of the instruments. Second, I check issues related to outliers and mis-measurement. Third, I examine compositional, regional and size effects. Finally, I examine the limitations associated with the taxation variable.

Other IVs and overidentifying restrictions In order to test the robustness of the results, I examine the 2SLS results with an alternative sets of instruments, using a procedure suggested

by Aterido et al. (2011). Results with these new set of instruments are shown in table 15 in the appendix. As one can note, the results do not differ qualitatively. Moreover, none of the instruments appear to be weak using Aterido et al. (2011)'s IVs.

I use these extra instruments to test for overidentifying restrictions in table 16 in the appendix. More precisely, I check whether the null hypothesis that the instruments are orthogonal is rejected. As can be noted in table 16, p-values for the Hansen J statistic are above 0.1 in most cases and I cannot reject the orthogonality of the instruments, except in column 5 and the last two columns. In these three columns, the instruments are also weaker than in the other cases. As mentioned before, there are potential issues due to colinearity as I am using the same group-average to construct an instrument for a distortion as well as for its interaction with another distortion.

Outliers In the main sample, there are 5070 firms declaring they did not pay a bribe and 3478 who report full disclosure (100%) of their sales for tax purposes. As mentioned earlier, entrepreneurs may be tempted to give socially exceptable answers for corruption and tax evasion. Removing all these observations, none of the results remain significant as the sample drops from 6957 to 1174 observations (results available upon request). Examining a subsample (N=1691) where I remove observations with a bribe equal to zero, the results remain significant only for corruption (results available upon request). Finally, examining only the removal of firms reporting full disclosure of their sales for tax purposes, the main results remain significant with the addition that the interaction between corruption and intermediation enters significant but the instruments for that specification are weak (see table 18).

Compositional, regional and size effects The sample is composed of manufacturing and service firms. As a check, I focus solely on manufacturing firms and find that the qualitative nature of the results is not affected (results available upon request).

I examine a selection bias that could be driven by the different schemes of taxation prevalent across countries. More particularly, the last decades have seen an expansion in the use of value-added taxes (Keen and Lockwood, 2010). The VAT offers very different compliance incentives than more standard taxes. Indeed, VAT-registered firms may file for reimbursement of the VAT

paid on intermediary products. There are 6 countries in the sample that do not use a VAT. Applying a test of excluded variables similar to the one use for bribes earlier on, I find no evidence that the firms in the VAT countries are significantly different in terms of observable characteristics, and more specifically in terms of growth patterns, than the firms in non-VAT countries. As observed in tables 19 and 20, the results for taxation and intermediation are robust for both subsamples. The results for corruption and taxation are robust for VAT countries. Interestingly, the interaction between corruption and intermediation is significant for non-VAT countries, but the instruments seem weak in this regression (column 7).

I check whether the results are driven by a regional effect. In table 21, I control for regional fixed effects where regions are Sub-saharan Africa, Latin America and the Caribbeans, and the results hold. However, if I divide the sample between sub-Saharan Africa and Latin America, as can be noted in table 22 and 23, the results seem to be driven by Latin America, except that the interaction terms do not enter significant anymore. These differences could be due to institutional, historical and other reasons (see for instance Akyeampong et al. (2014)).[27]

One concern is also that the results could be driven by size. I thus revisit the results for four size categories. Small firms have up to 10 employees, medium firms 11 to 50, large firms 51 to 200 and very large firms have more than 200 employees. Tables 24, 25, 26 and 27 show more nuanced results. The results on taxation and intermediation (column 9) hold for small and medium firms while the results on corruption and taxation (column 5) hold for medium and very large firms. These findings should come as no surprise. A vast literature argues that small and medium firms are credit constrained and stay small to avoid corrupt tax officials and other dishonest bureaucrats. Also, it is not surprising that very large firms report such high coefficients on the effect of corruption, taxation and their interaction: tax officials target larger firms because the expected benefits from an additional inspection are greater than its cost.

Other controls I have also tested the robustness of the results using other controls such as senior time spent dealing with officials, top manager's years of experience, and the quality of answers to the survey. The main results with these additional controls are presented in table 28.

[27] An examination of the causes behind these differences is left for future research.

Note that all results present in this paper hold with these additional controls (results available upon request).

Declaration for tax purposes Since the taxation variable captures the amount of sales officially declared for tax purposes it could also be interpreted as a measure of the willingness to pay taxes. This has at least two implications. First, it could proxy for tax evasion. In this case, taxes are seen as detrimental to growth from the vantage of a firms' owner. However, a firm's owner could think that it is even worst for the growth of his firm not to declare taxes due to rapacious tax inspectors and/or ensuing penalties. Thus, in this case, amounts of sales declared need not be inversely related to growth rates. Second, the taxation variable could also capture the perception that entrepreneurs entertain about the usefulness of taxes in their country. Indeed, owners with a firm exhibiting a positive growth rate might be biased in believing that their taxes are put to good use, that this partly explains their firm's success and thus that they should declare more taxes. The use of a group-average to instrument for taxation certainly diminishes such concerns since it breaks the feed-back relationship from growth towards the perception variable.

I examine another proxy for taxation, using information on the percentage of the workforce declared for tax purposes. This variable also presents some caveats similar to those mentioned for the declaration of sales. As a matter of fact, the two variables are highly correlated.[28] Nonetheless, the declaration of employees serves other taxation purposes (employees pension schemes) than the declaration of sales (corporate tax). So, this alternate proxy might capture different effects. Also, the number of employees is more difficult to hide than the level of sales.[29] The results are not qualitatively affected by the use of this variable (results available upon request).

[28]The coefficient of correlation is 0.64, significant at 1%.

[29]However, firms have reported 72% of their sales and 72% of their workforce for tax purposes.

4 Conclusion

This paper examines theoretically and empirically the correlation between firms' growth and pairwise interactions between three distortions: corruption, taxation and financial intermediation. I first develop a simple theoretical model of firms' profit maximization. In the model overall tax liabilities at a given firm are a combination of an effective tax rate and an effective bribe rate levied on the firm's revenues. Intermediation is modeled as a wedge between the market rate of rental of capital and the actual price paid by entrepreneurs due to financial intermediation. Finally, in order to reconcile the model with some empirical facts I augment it with social infrastructures that directly affects firms' total factor productivity.

The main predictions of the model are tested using firm-level data from the World Bank Enterprise Surveys. An effort is made to reduce concerns about endogeneity and mismeasurement issues using location-sector averages and size-location-averages for three distortions of interest.

The main empirical results are in line with a model of firm's behavior augmented with social infrastructures. Corruption and intermediation taken each in isolation are negatively correlated with firms' growth while firms' fiscal declarations are positively correlated with firms' growth. Also, corruption and taxation as well as taxation and intermediation are substitutes and their interaction exhibit a negative relationship with growth while corruption and intermediation act as complements. Given the difficulty to identify causal effects, these results should be interpreted with caution. Nonetheless, the evidence presented in this paper indicate that some of the previous results in the literature should be nuanced and that the interactions between various distortions of need to be taken into account when examining firms' performance.

There are a number of avenues to think of relevant policies based on these interactions. First, the negative sign on the interaction between corruption and taxation corroborates the fact that bribes buy a tax rebate to firms' owner. As argued by Gauthier and Goyette (2014), a double-dividend policy could be devised such that a reduction in tax evasion could at the same time reduce corruption. Policy-wise, anti-corruption mechanisms and a reduction in financial intermediation appear to be complements: actions in both dimensions need to be taken at the same time in order to improve firms' growth prospects. Finally, the fact that taxation and intermediation are substitutes indicate that improving external finance could entice entrepreneurs

to pay their taxes if these are put to good use through better infrastructures and policies.

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5 Appendix

5.1 List of countries

Latin America and the Caribbeans: Argentina, Bolivia, Chile, Colombia, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela. Sub-Saharan Africa:Angola, Botswana, Burundi, Democratic Republic of Congo, Gambia, Guinea, Guinea Bissau, Mauritania, Namibia, Rwanda, Swaziland, Tanzania, Uganda.

5.2 Excluded variables

Table 8: Test of excluded observations

	(1)	(2)	(3)	(4)	(5)	(6)
included	-0.0130	0.0155**	-0.0192***	0.303*	-3.121***	-13.19
	(0.00800)	(0.00717)	(0.00528)	(0.166)	(0.553)	(8.608)
_cons	0.150***	0.0993***	0.0728***	16.03***	22.03***	87.20***
	(0.00856)	(0.00661)	(0.00610)	(0.201)	(0.562)	(9.372)
N	10657	10657	10657	10657	10657	10655
adj. R^2	0.000	0.001	0.002	0.002	0.007	0.000

Standard errors in parentheses; excluded =0, included =1

All regressions include a constant and allow for clustering by country,

localisation and sector. Column 1: growth; column 2: foreign ownership;

column 3: trade; column 4: initial sales; column 5: age; column 6: nb. employees.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 9: First stage estimates, Each in isolation

	(1)	(2)	(3)
	Corruption	Declaration	Int. Finance
Corr. mean	0.860***		
	(0.0629)		
Decla. mean		1.015***	
		(0.0161)	
I.Fin. mean			0.961***
			(0.0205)
N	6957	6957	6957
adj. R^2	0.118	0.279	0.146
F	54.70	854.8	511.4

Standard errors in parentheses

All regressions include a constant, controls for country, localisation, sector and age.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 10: First stage estimates, Pair-wise

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Corruption	Declaration	Corruption	Declaration	CxT	Corruption	Int. Finance
Corr. mean	0.848***	-0.372**	1.098***	0.381	0.0717	0.858***	-0.166
	(0.0683)	(0.149)	(0.142)	(0.504)	(0.123)	(0.0652)	(0.133)
Decla. mean	-0.00739*	0.994***	0.00201	1.023***	-0.000139		
	(0.00402)	(0.0184)	(0.00428)	(0.0242)	(0.00397)		
I.Fin. mean						0.00660*	0.943***
						(0.00391)	(0.0201)
CxT_mean			-0.346	-1.044	0.673***		
			(0.229)	(0.663)	(0.209)		
CxF_mean							
TxF_mean							
N	6936	6936	6936	6936	6936	6936	6936
adj. R^2	0.121	0.278	0.122	0.278	0.083	0.121	0.149
F	50.39	445.0	57.70	416.6	11.97	38.51	276.6

Standard errors in parentheses

All regressions include a constant, controls for age, quality etc.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 11: First stage estimates, Pair-wise (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Corruption	Int. Finance	CxF	Declaration	Int. Finance	Declaration	Int. Finance	TxF
Corr. mean	0.270	-0.180	-0.437**					
	(0.278)	(0.480)	(0.197)					
Decla. mean				1.020***	0.0377**	0.987***	0.134**	0.0488
				(0.0174)	(0.0170)	(0.0639)	(0.0662)	(0.0614)
I.Fin. mean	-0.0103*	0.942***	-0.00883**	0.0658***	0.948***	0.0285	1.057***	0.00761
	(0.00525)	(0.0241)	(0.00421)	(0.0226)	(0.0201)	(0.0807)	(0.0755)	(0.0708)
CxT_mean								
CxF_mean	0.902**	0.0210	1.483***					
	(0.368)	(0.723)	(0.278)					
TxF_mean						0.0492	-0.143	0.973***
						(0.0950)	(0.0927)	(0.0877)
N	6936	6936	6936	6936	6936	6936	6936	6936
adj. R^2	0.123	0.149	0.117	0.278	0.149	0.278	0.149	0.158
F	49.76	251.5	35.68	448.0	276.2	418.9	257.3	249.5

Standard errors in parentheses

All regressions include a constant, controls for age, quality etc.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 12: First stage estimates, triple interaction

	(1) Corruption	(2) Declaration	(3) Int. Finance	(4) Corruption	(5) Declaration	(6) Int. Finance	(7) CxT	(8) CxF	(9) TxF	(10) Corruption	(11) Declaration	(12) Int. Finance	(13) CxTxF
Corr.	0.844***	-0.441***	-0.0543	0.494	-0.498	0.422	-0.499*	-0.209	1.000	0.824***	-0.369	0.148	-0.0718
mean	(0.0688)	(0.147)	(0.136)	(0.324)	(0.823)	(0.746)	(0.269)	(0.249)	(0.850)	(0.168)	(0.420)	(0.369)	(0.0900)
Decla.	-0.00461	1.009***	0.0215	0.0196	0.998***	0.120*	0.00192	0.00530	0.0637	-0.00532	1.012***	0.0287	-0.00278
mean	(0.00366)	(0.0167)	(0.0170)	(0.0135)	(0.0639)	(0.0711)	(0.0110)	(0.0104)	(0.0660)	(0.00549)	(0.0212)	(0.0207)	(0.00285)
I.Fin.	0.00486	0.0656***	0.970***	0.0102	0.0165	1.069***	-0.00610	-0.00761	0.00346	0.00437	0.0673***	0.975***	0.00213
mean	(0.00334)	(0.0209)	(0.0209)	(0.0177)	(0.0845)	(0.0840)	(0.0152)	(0.0140)	(0.0807)	(0.00391)	(0.0236)	(0.0229)	(0.00238)
CxT				-0.194	-0.610	-0.485	0.811***	-0.246	-1.753**				
mean				(0.218)	(0.676)	(0.646)	(0.196)	(0.182)	(0.729)				
CxF				0.755**	0.772	-0.200	0.721**	1.397***	0.0429				
mean				(0.381)	(0.907)	(0.763)	(0.332)	(0.298)	(0.975)				
TxF				-0.0258	0.0444	-0.127	-0.00276	-0.000725	0.996***				
mean				(0.0190)	(0.0926)	(0.0968)	(0.0154)	(0.0149)	(0.0902)				
CxTxF										0.0429	-0.156	-0.437	0.874***
mean										(0.315)	(0.808)	(0.730)	(0.205)
N	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957
aR^2	0.118	0.280	0.146	0.119	0.279	0.146	0.082	0.117	0.158	0.117	0.279	0.146	0.071
F	71.36	610.5	371.1	78.27	459.7	264.5	17.55	55.11	269.4	69.13	537.7	326.6	19.33

Standard errors in parentheses
All regressions include a constant, controls for country, localisation, sector and age.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 13: Effects on firms' growth: OLS estimates, controling for sector, location and country

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
BribePercent	-0.0112			-0.00864	0.169	-0.0178	-0.336			-0.0153	-0.156	-0.179	0.316
	(0.1000)			(0.100)	(0.151)	(0.100)	(0.256)			(0.101)	(0.210)	(0.192)	(0.353)
TaxesPercent		0.0168		0.0167	0.0223*			0.0174	0.0270	0.0173	0.0265	0.0114	0.0399*
		(0.0118)		(0.0118)	(0.0131)			(0.0118)	(0.0221)	(0.0118)	(0.0222)	(0.0130)	(0.0237)
k3a_pc			-0.0334***			-0.0335***	-0.0450***	-0.0337***	-0.0226	-0.0338***	-0.0403	-0.0395***	-0.0222
			(0.0111)			(0.0110)	(0.0124)	(0.0111)	(0.0242)	(0.0110)	(0.0267)	(0.0113)	(0.0261)
BxT					-0.262						-0.261		-0.971
					(0.273)						(0.258)		(0.697)
BxFintct							0.552				0.550		-0.251
							(0.347)				(0.341)		(0.462)
TxFintct									-0.0153		-0.00645		-0.0301
									(0.0300)		(0.0309)		(0.0328)
BxTxFintct												0.417	1.201
												(0.338)	(0.917)
N	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957
adj. R^2	0.155	0.155	0.156	0.155	0.155	0.156	0.158	0.156	0.156	0.156	0.158	0.157	0.158

Country-location-sector clustered standard errors in parentheses

All regressions include a constant, controls for age, initial sales, foreign ownership trade, quality of survey answers, manager's years of experience, senior time spent with officials

Fixed effects for country -location-sector

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 14: Effects on firms' growth: Second stage estimates, controlling for sector, location, country

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
BribePercent	-0.527**			-0.455	2.781***	-0.477*	-1.994*			-0.424	2.486	1.721**	1.217
	(0.254)			(0.278)	(0.877)	(0.260)	(1.014)			(0.283)	(1.529)	(0.848)	(5.010)
TaxesPercent		0.0435		0.0255	0.142***			0.0351	0.396***	0.0197	0.447***	0.0907**	0.409***
		(0.0265)		(0.0296)	(0.0399)			(0.0269)	(0.117)	(0.0299)	(0.122)	(0.0362)	(0.146)
k3a_pc			-0.0762**			-0.0607*	-0.0998**	-0.0682*	0.341***	-0.0579	0.267**	-0.00817	0.233
			(0.0349)			(0.0354)	(0.0422)	(0.0352)	(0.129)	(0.0354)	(0.132)	(0.0454)	(0.153)
BxT					-4.876***						-5.026***		-3.089
					(1.256)						(1.226)		(7.126)
BxFintct							2.438				0.751		2.347
							(1.480)				(1.808)		(7.316)
TxFintct									-0.550***		-0.467***		-0.424**
									(0.170)		(0.170)		(0.201)
BxTxFintct												-5.341**	-2.496
												(2.257)	(10.62)
N	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957

Country-location-sector clustered standard errors in parentheses
All regressions include a constant, controls for age
initial sales, foreign ownership, trade, country
location and sector.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 15: Effects on firms' growth: Second stage estimates, IV: Aterido et al. (2011)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Corruption	-0.404			-0.362	1.223*	-0.383	-0.954			-0.346	0.804	-0.616	5.293***
	(0.293)			(0.319)	(0.672)	(0.301)	(0.757)			(0.325)	(0.741)	(0.712)	(1.388)
Declaration		0.0382*		0.0264	0.0770***			0.0347	0.173***	0.0235	0.210***	0.0149	0.307***
		(0.0226)		(0.0269)	(0.0291)			(0.0227)	(0.0625)	(0.0270)	(0.0603)	(0.0358)	(0.0668)
Int. Finance			-0.0474*			-0.0443*	-0.0690**	-0.0436*	0.114	-0.0420	0.103	-0.0533*	0.245***
			(0.0258)			(0.0261)	(0.0322)	(0.0258)	(0.0708)	(0.0258)	(0.0759)	(0.0295)	(0.0853)
CxT					-2.170**						-1.930**		-7.091***
					(1.074)						(0.773)		(1.615)
CxF							1.108				0.488		-6.560***
							(1.109)				(0.922)		(2.077)
TxF									-0.215**		-0.217**		-0.373***
									(0.0909)		(0.0892)		(0.101)
CxTxF												0.800	8.483***
												(1.359)	(2.424)
N	6751	6751	6751	6751	6751	6751	6751	6751	6751	6751	6751	6751	6751
F	279.2	14638.6	7222.1	150.0	56.21	166.5	142.9	3697.7	614.3	92.25	27.77	63.13	7.262

Standard errors in parentheses. F statistic for weak identification: Cragg-Donald or Kleibergen-Paap.
All regressions include a constant, controls for age
initial sales, foreign ownership and trade
and clustering at the location-sector level
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 16: Effects on firms' growth: Second stage estimates, Overid: Aterido et al. (2011)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Corruption	-0.412			-0.367	1.229*	-0.391	-0.977			-0.351	0.869	-0.584	5.268***
	(0.283)			(0.310)	(0.670)	(0.290)	(0.743)			(0.316)	(0.718)	(0.700)	(1.359)
Declaration		0.0395*		0.0273	0.0787***			0.0356	0.181***	0.0241	0.213***	0.0170	0.304***
		(0.0227)		(0.0268)	(0.0290)			(0.0228)	(0.0627)	(0.0270)	(0.0605)	(0.0355)	(0.0666)
Int. Finance			-0.0491*			-0.0452*	-0.0700**	-0.0449*	0.120*	-0.0427	0.105	-0.0520*	0.242***
			(0.0258)			(0.0262)	(0.0320)	(0.0259)	(0.0705)	(0.0260)	(0.0750)	(0.0293)	(0.0839)
CxT					-2.186**						-1.976**		-7.072***
					(1.067)						(0.770)		(1.582)
CxF							1.127				0.419		-6.614***
							(1.089)				(0.912)		(2.006)
TxF									-0.225**		-0.217**		-0.368***
									(0.0904)		(0.0886)		(0.0993)
CxTxF												0.682	8.524***
												(1.323)	(2.352)
N	6751	6751	6751	6751	6751	6751	6751	6751	6751	6751	6751	6751	6751
F	1026.9	11386.3	6972.9	441.2	41.03	440.8	78.88	3845.6	352.9	237.1	27.48	39.59	6.402
jp	0.641	0.335	0.255	0.724	0.0654	0.791	0.659	0.583	0.201	0.909	0.0692	0.0684	0.0168

Standard errors in parentheses. F statistic for weak identification: Cragg-Donald or Kleibergen-Paap.
All regressions include a constant, controls for age
initial sales, foreign ownership and trade
and clustering at the location-sector level
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 17: Effects on firms' growth: Second stage estimates, Overid: sector average

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Corruption	-0.428			-0.455	2.619***	-0.505	-1.611			-0.299	2.146	1.664*
	(0.262)			(0.499)	(0.870)	(0.463)	(0.983)			(0.286)	(1.517)	(0.859)
Declaration		0.0474		0.0303	0.136***			0.0398	0.331***	0.0279	0.362***	0.0919**
		(0.0289)		(0.0405)	(0.0400)			(0.0293)	(0.113)	(0.0314)	(0.118)	(0.0372)
Int. Finance			-0.0577*			-0.0506	-0.0799*	-0.0463	0.280**	-0.0392	0.201	0.00480
			(0.0347)			(0.0494)	(0.0429)	(0.0350)	(0.122)	(0.0353)	(0.124)	(0.0446)
CxT					-4.421***						-4.267***	
					(1.232)						(1.204)	
CxF							2.020				0.725	
							(1.419)				(1.760)	
TxF									-0.440***		-0.352**	
									(0.159)		(0.159)	
CxTxF												-4.855**
												(2.308)
N	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957	6957
adj. R^2	0.040	0.046	0.046	0.039	-0.026	0.037	0.029	0.046	0.020	0.043	-0.037	-0.072
F	107.8	1989.0	1115.3	12.29	12.93	23.47	5.016	551.8	59.82	26.52	3.994	3.623
jp	0.925	0.580	0.696	0.620	0.724	0.883	0.322	0.745	0.617	0.746	0.473	0.590

Standard errors in parentheses. F statistic for weak identification: Cragg-Donald or Kleibergen-Paap.
All regressions include a constant, controls for country, localisation, sector, age
initial sales, foreign ownership and trade.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 18: Effects on firms' growth: Second stage estimates, Outliers: Tax evaders only

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Corruption	-0.0624			-0.00935	2.992***	-0.0515	-2.843**			-0.00390	0.364	1.551**	-5.136
	(0.281)			(0.277)	(1.068)	(0.282)	(1.234)			(0.279)	(1.966)	(0.789)	(4.910)
Declaration		0.0482		0.0479	0.248***			0.0461	0.483***	0.0460	0.731***	0.137**	0.345
		(0.0511)		(0.0503)	(0.0747)			(0.0486)	(0.152)	(0.0481)	(0.217)	(0.0566)	(0.249)
Int. Finance			-0.0118			-0.0102	-0.108**	-0.00724	0.301***	-0.00713	0.228*	0.0337	0.0588
			(0.0402)			(0.0401)	(0.0527)	(0.0398)	(0.110)	(0.0399)	(0.121)	(0.0485)	(0.160)
CxT					-6.901***						-6.063**		7.673
					(2.407)						(2.669)		(10.19)
CxF							4.395**				3.713		10.83
							(1.765)				(2.742)		(7.598)
TxF									-0.680***		-0.789***		-0.270
									(0.224)		(0.272)		(0.359)
CxTxF												-5.715**	-18.22
												(2.811)	(15.48)
N	3479	3479	3479	3479	3479	3479	3479	3479	3479	3479	3479	3479	3479
F	63.78	382.2	952.4	26.91	5.147	37.18	4.856	371.7	58.72	21.39	2.512	3.129	0.896

Standard errors in parentheses. F statistic for weak identification: Cragg-Donald or Kleibergen-Paap.
All regressions include a constant, controls for age
initial sales, foreign ownership and trade
and clustering at the location-sector level
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 19: Effects on firms' growth: Second stage estimates, Only VAT countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Corruption	-0.522*			-0.556*	2.992***	-0.455	-1.128			-0.529	4.098**	2.699**	-13.31
	(0.294)			(0.326)	(1.069)	(0.300)	(1.035)			(0.329)	(2.027)	(1.344)	(16.23)
Declaration		0.0190		-0.0105	0.114**			-0.0000214	0.293**	-0.0246	0.313**	0.0609	0.159
		(0.0370)		(0.0420)	(0.0531)			(0.0388)	(0.145)	(0.0433)	(0.148)	(0.0502)	(0.192)
Int. Finance			-0.0697*			-0.0512	-0.0687	-0.0697*	0.266*	-0.0572	0.183	0.0163	0.0825
			(0.0393)			(0.0400)	(0.0470)	(0.0400)	(0.160)	(0.0402)	(0.157)	(0.0572)	(0.265)
CxT					-5.316***						-5.937***		21.32
					(1.483)						(1.602)		(23.99)
CxF							1.110				-1.102		25.50
							(1.545)				(2.156)		(26.12)
TxF									-0.449**		-0.318		-0.106
									(0.203)		(0.198)		(0.329)
CxTxF												-8.580**	-43.72
												(3.985)	(39.90)
N	5988	5988	5988	5988	5988	5988	5988	5988	5988	5988	5988	5988	5988
F	150.6	3475.0	1756.1	53.39	11.87	109.2	7.419	665.0	82.43	36.45	4.515	2.962	0.199

Standard errors in parentheses. F statistic for weak identification: Cragg-Donald or Kleibergen-Paap.
All regressions include a constant, controls for age
initial sales, foreign ownership and trade
and clustering at the location-sector level
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 20: Effects on firms' growth: Second stage estimates, No VAT countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Corruption	0.815			1.098	-0.0110	0.919	-5.464*			1.126*	-4.714	-0.211	-9.339
	(0.674)			(0.678)	(1.296)	(0.609)	(3.221)			(0.626)	(3.472)	(1.180)	(6.289)
Declaration		0.0907*		0.112**	0.0693			0.0654	0.382***	0.0853**	0.259*	0.0254	-0.000307
		(0.0501)		(0.0475)	(0.0740)			(0.0427)	(0.148)	(0.0416)	(0.155)	(0.0724)	(0.265)
Int. Finance			0.116			0.124*	-0.00437	0.106	0.397***	0.114*	0.0695	0.108*	-0.106
			(0.0710)			(0.0689)	(0.0867)	(0.0698)	(0.153)	(0.0665)	(0.173)	(0.0640)	(0.264)
CxT					1.738						-3.796		10.08
					(1.653)						(2.685)		(9.790)
CxF							8.869**				11.23*		16.92*
							(4.304)				(6.108)		(9.070)
TxF									-0.440**		-0.200		0.131
									(0.201)		(0.197)		(0.325)
CxTxF												2.619	-16.21
												(1.829)	(12.27)
N	969	969	969	969	969	969	969	969	969	969	969	969	969
F	144.0	461.4	365.0	97.15	18.18	71.16	5.175	276.2	32.47	64.77	1.303	11.11	2.273

Standard errors in parentheses. F statistic for weak identification: Cragg-Donald or Kleibergen-Paap.
All regressions include a constant, controls for age
initial sales, foreign ownership and trade
and clustering at the location-sector level
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 21: Effects on firms' growth: Second stage estimates, continent dummy

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Corruption	-0.481			-0.392	2.555***	-0.452	-1.817*			-0.365	2.067	1.538*	-4.039
	(0.300)			(0.299)	(0.889)	(0.299)	(0.994)			(0.299)	(1.507)	(0.837)	(5.646)
Declaration		0.0575*		0.0478	0.150***			0.0559*	0.349***	0.0470	0.392***	0.118***	0.291*
		(0.0318)		(0.0321)	(0.0429)			(0.0323)	(0.113)	(0.0327)	(0.119)	(0.0422)	(0.151)
Int. Finance			-0.0751**			-0.0661*	-0.0976**	-0.0732*	0.260**	-0.0663*	0.190	-0.0256	0.0910
			(0.0371)			(0.0369)	(0.0439)	(0.0374)	(0.122)	(0.0372)	(0.125)	(0.0448)	(0.170)
CxT					-4.411***						-4.423***		5.296
					(1.232)						(1.201)		(8.151)
CxF							2.249				0.926		10.09
							(1.449)				(1.801)		(8.818)
TxF									-0.447***		-0.368**		-0.222
									(0.159)		(0.160)		(0.217)
CxTxF												-4.780**	-14.98
												(2.232)	(12.92)
N	6816	6816	6816	6816	6816	6816	6816	6816	6816	6816	6816	6816	6816
F	142.0	3104.5	1844.6	65.59	22.16	93.86	9.079	944.9	111.4	52.07	6.330	6.937	0.763

Standard errors in parentheses. F statistic for weak identification: Cragg-Donald or Kleibergen-Paap.
All regressions include a constant, controls for age
initial sales, foreign ownership and trade
and clustering at the location-sector level
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 22: Effects on firms' growth: Second stage estimates, Subsaharan Africa

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Corruption	0.522			0.439	1.417*	0.521	0.793			0.439	1.852	1.241*	-0.610
	(0.324)			(0.315)	(0.769)	(0.327)	(1.916)			(0.317)	(1.837)	(0.729)	(4.107)
Declaration		-0.0474*		-0.0376	0.0120			-0.0476*	0.0284	-0.0376	0.0908	0.00451	0.0447
		(0.0260)		(0.0253)	(0.0467)			(0.0258)	(0.0893)	(0.0249)	(0.0982)	(0.0442)	(0.140)
Int. Finance			0.0194			0.00104	0.00816	0.0142	0.0868	-0.000143	0.0805	0.0199	0.0182
			(0.0488)			(0.0510)	(0.0611)	(0.0485)	(0.0937)	(0.0505)	(0.0940)	(0.0530)	(0.130)
CxT					-1.729						-1.769		1.121
					(1.174)						(1.206)		(6.060)
CxF							-0.363				-0.518		3.180
							(2.409)				(2.391)		(5.712)
TxF									-0.111		-0.108		-0.0398
									(0.132)		(0.131)		(0.187)
CxTxF												-1.841	-4.685
												(1.379)	(8.435)
N	2570	2570	2570	2570	2570	2570	2570	2570	2570	2570	2570	2570	2570
F	264.2	2490.9	1163.4	128.3	43.48	134.2	13.54	601.3	108.4	85.39	5.337	20.74	1.564

Standard errors in parentheses. F statistic for weak identification: Cragg-Donald or Kleibergen-Paap.
All regressions include a constant, controls for age
initial sales, foreign ownership and trade
and clustering at the location-sector level
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 23: Effects on firms' growth: Second stage estimates, Latin America

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Corruption	-1.334***			-0.883**	-3.046	-1.323***	3.127			-0.888**	3.849	0.918	6.636
	(0.436)			(0.436)	(4.016)	(0.436)	(4.662)			(0.436)	(5.413)	(3.486)	(11.72)
Declaration		0.271***		0.245***	0.219***			0.262***	0.194	0.237***	0.158	0.231***	0.0977
		(0.0728)		(0.0734)	(0.0806)			(0.0752)	(0.313)	(0.0760)	(0.336)	(0.0794)	(0.332)
Int. Finance			-0.139***			-0.134**	-0.0754	-0.138**	-0.228	-0.135**	-0.163	-0.102	-0.216
			(0.0510)			(0.0536)	(0.0770)	(0.0548)	(0.422)	(0.0565)	(0.443)	(0.0882)	(0.449)
CxT					3.008						-2.478		-5.370
					(5.553)						(5.674)		(15.71)
CxF							-8.912				-6.093		-12.39
							(9.574)				(6.070)		(19.53)
TxF									0.113		0.0876		0.153
									(0.512)		(0.539)		(0.544)
CxTxF												-5.180	6.745
												(10.51)	(26.63)
N	4387	4387	4387	4387	4387	4387	4387	4387	4387	4387	4387	4387	4387
F	60.98	793.3	902.9	34.98	1.526	31.35	0.417	456.0	14.41	23.51	0.377	0.250	0.532

Standard errors in parentheses. F statistic for weak identification: Cragg-Donald or Kleibergen-Paap.
All regressions include a constant, controls for age
initial sales, foreign ownership and trade
and clustering at the location-sector level
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 24: Effects on firms' growth: Second stage estimates, by size: small

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Corruption	0.340			0.300	1.567	0.412	-2.631			0.357	0.474	0.964	-6.507
	(0.344)			(0.350)	(1.005)	(0.345)	(2.188)			(0.352)	(2.023)	(0.917)	(10.28)
Declaration		-0.0198		-0.0123	0.0433			-0.0267	0.282*	-0.0193	0.349**	0.00651	0.229
		(0.0328)		(0.0331)	(0.0512)			(0.0334)	(0.147)	(0.0338)	(0.175)	(0.0477)	(0.240)
Int. Finance			-0.0330			-0.0461	-0.122*	-0.0416	0.259*	-0.0506	0.199	-0.0350	0.102
			(0.0505)			(0.0510)	(0.0732)	(0.0507)	(0.148)	(0.0510)	(0.152)	(0.0571)	(0.221)
CxT					-1.921						-2.651		8.587
					(1.466)						(1.754)		(14.20)
CxF							4.107				2.155		12.26
							(2.759)				(2.418)		(14.51)
TxF									-0.440**		-0.425**		-0.267
									(0.204)		(0.211)		(0.289)
CxTxF												-1.258	-16.42
												(1.748)	(20.50)
N	2452	2452	2452	2452	2452	2452	2452	2452	2452	2452	2452	2452	2452
F	122.3	1733.2	723.4	56.26	14.45	66.46	4.667	355.2	38.61	39.48	3.066	11.89	0.506

Standard errors in parentheses. F statistic for weak identification: Cragg-Donald or Kleibergen-Paap.
All regressions include a constant, controls for age
initial sales, foreign ownership and trade
and clustering at the location-sector level
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 25: Effects on firms' growth: Second stage estimates, by size: medium

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Corruption	-0.0679			0.128	2.696***	-0.0384	-0.596			0.142	3.296*	1.983**	2.735
	(0.313)			(0.345)	(0.984)	(0.326)	(1.214)			(0.353)	(1.938)	(0.877)	(4.478)
Declaration		0.0517		0.0584	0.140***			0.0497	0.343**	0.0565	0.383**	0.107**	0.415**
		(0.0363)		(0.0402)	(0.0488)			(0.0368)	(0.147)	(0.0402)	(0.154)	(0.0471)	(0.199)
Int. Finance			-0.0292			-0.0273	-0.0407	-0.0144	0.344**	-0.0193	0.263	0.0121	0.317
			(0.0481)			(0.0509)	(0.0590)	(0.0496)	(0.171)	(0.0514)	(0.174)	(0.0581)	(0.230)
CxT					-4.130***						-4.484***		-2.850
					(1.552)						(1.574)		(6.682)
CxF							0.932				-0.450		0.271
							(1.826)				(2.257)		(6.260)
TxF									-0.465**		-0.375*		-0.434
									(0.223)		(0.223)		(0.292)
CxTxF												-4.759**	-2.228
												(2.063)	(9.042)
N	2854	2854	2854	2854	2854	2854	2854	2854	2854	2854	2854	2854	2854
F	49.43	980.5	595.2	17.36	7.049	40.52	4.246	274.4	31.78	13.33	2.816	5.661	0.827

Standard errors in parentheses. F statistic for weak identification: Cragg-Donald or Kleibergen-Paap.
All regressions include a constant, controls for age
initial sales, foreign ownership and trade
and clustering at the location-sector level
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 26: Effects on firms' growth: Second stage estimates, by size: large

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Corruption	-0.559			-0.398	72.80	-0.700	-1.938			-0.559	-90.85	2.266	3.745
	(0.608)			(0.624)	(384.1)	(0.622)	(4.405)			(0.635)	(1317.9)	(1.588)	(9.730)
Declaration		0.107		0.0895	1.199			0.0999	0.442*	0.0762	0.588	0.0977	0.409
		(0.0812)		(0.0824)	(5.656)			(0.0824)	(0.262)	(0.0839)	(3.380)	(0.0883)	(0.276)
Int. Finance			-0.184**			-0.173**	-0.202	-0.175*	0.275	-0.168*	-6.030	-0.0593	0.302
			(0.0894)			(0.0868)	(0.142)	(0.0900)	(0.310)	(0.0878)	(85.88)	(0.112)	(0.523)
CxT					-111.8						-76.93		-2.881
					(586.4)						(921.6)		(8.146)
CxF							2.460				287.2		-5.975
							(8.621)				(3897.3)		(22.31)
TxF									-0.576		3.773		-0.545
									(0.383)		(59.86)		(0.517)
CxTxF												-9.529*	3.536
												(5.101)	(14.23)
N	1099	1099	1099	1099	1099	1099	1099	1099	1099	1099	1099	1099	1099
F	21.06	264.4	166.7	12.02	0.0121	66.16	0.116	84.35	12.52	43.89	0.000904	2.743	0.214

Standard errors in parentheses. F statistic for weak identification: Cragg-Donald or Kleibergen-Paap.
All regressions include a constant, controls for age
initial sales, foreign ownership and trade
and clustering at the location-sector level
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 27: Effects on firms' growth: Second stage estimates, by size: very large

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Corruption	-2.239***			-2.178***	19.41**	-2.338***	-2.651**			-2.272***	11.35	-3.135***	12.59
	(0.585)			(0.558)	(8.599)	(0.620)	(1.331)			(0.588)	(19.67)	(0.791)	(23.37)
Declaration		0.222		0.189	0.423**			0.214	0.394	0.177	0.0772	0.234	0.148
		(0.195)		(0.181)	(0.189)			(0.193)	(0.968)	(0.176)	(0.897)	(0.176)	(0.691)
Int. Finance			-0.0965			-0.123	-0.107	-0.0836	0.187	-0.112	-0.523	-0.0444	-0.152
			(0.177)			(0.190)	(0.185)	(0.183)	(1.446)	(0.193)	(1.290)	(0.200)	(0.942)
CxT					-22.42***						-14.56		-15.82
					(8.673)						(19.42)		(23.39)
CxF							2.190				2.094		-19.25
							(8.025)				(7.893)		(43.26)
TxF									-0.302		0.465		0.110
									(1.600)		(1.370)		(1.039)
CxTxF												7.184*	25.53
												(4.242)	(44.56)
N	411	411	411	411	411	411	411	411	411	411	411	411	411
F	2.751	62.03	81.76	3.536	1.304	25.33	0.533	41.34	1.239	17.03	0.280	1.097	0.584

Standard errors in parentheses. F statistic for weak identification: Cragg-Donald or Kleibergen-Paap.
All regressions include a constant, controls for age
initial sales, foreign ownership and trade
and clustering at the location-sector level
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 28: Effects on firms' growth: Second stage estimates, other controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Corruption	-0.371			-0.275	2.695***	-0.339	-1.719*			-0.255	2.087	1.637*	-3.351
	(0.270)			(0.289)	(0.888)	(0.274)	(1.007)			(0.293)	(1.545)	(0.865)	(5.702)
Declaration		0.0443		0.0330	0.136***			0.0397	0.312***	0.0300	0.350***	0.0935**	0.255*
		(0.0297)		(0.0320)	(0.0411)			(0.0301)	(0.116)	(0.0322)	(0.121)	(0.0385)	(0.149)
Int. Finance			-0.0478			-0.0360	-0.0711*	-0.0387	0.265**	-0.0320	0.187	0.0123	0.0962
			(0.0340)			(0.0343)	(0.0424)	(0.0341)	(0.123)	(0.0343)	(0.124)	(0.0438)	(0.166)
CxT					-4.454***						-4.389***		4.271
					(1.255)						(1.224)		(8.237)
CxF							2.227				0.993		9.184
							(1.452)				(1.814)		(8.874)
TxF									-0.411**		-0.325**		-0.190
									(0.162)		(0.160)		(0.213)
CxTxF												-4.706**	-13.38
												(2.307)	(13.08)
N	6936	6936	6936	6936	6936	6936	6936	6936	6936	6936	6936	6936	6936
F	182.3	3187.1	2230.7	71.23	22.21	132.2	9.006	1095.4	116.7	53.02	6.216	6.395	0.768

Standard errors in parentheses. F statistic for weak identification: Cragg-Donald or Kleibergen-Paap.

All regressions include a constant, controls for age, quality of answers and figures, senior time spent dealing with officials, years of experience of top manager initial sales, foreign ownership and trade

and clustering at the location-sector level

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 29: Effects on firms' growth: Second stage estimates, Declared workforce

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Corruption	-0.340			-0.117	3.620***	-0.287	-1.435			-0.0935	2.955	2.321***	5.844
	(0.267)			(0.303)	(0.986)	(0.272)	(0.947)			(0.307)	(2.832)	(0.855)	(6.969)
TaxempPercent		0.0687**		0.0638*	0.190***			0.0617**	0.0920	0.0582*	0.188*	0.136***	0.176
		(0.0296)		(0.0330)	(0.0445)			(0.0294)	(0.0933)	(0.0327)	(0.113)	(0.0404)	(0.158)
Int. Finance			-0.0584*			-0.0480	-0.0782*	-0.0412	0.134	-0.0388	0.133	0.0171	0.207
			(0.0345)			(0.0349)	(0.0421)	(0.0349)	(0.133)	(0.0351)	(0.103)	(0.0456)	(0.254)
CxTemp					-5.536***						-6.523***		-10.97
					(1.396)						(2.401)		(10.76)
CxF							1.865				0.321		-5.397
							(1.388)				(3.476)		(13.47)
TempxFintct									-0.000000804		-0.000000760		-0.00000103
									(0.000000749)		(0.000000672)		(0.00000129)
CxTempxFintct												-6.033***	8.159
												(2.232)	(19.67)
N	6921	6921	6921	6921	6921	6921	6921	6921	6802	6921	6802	6921	6802
adj. R^2	0.042	0.044	0.045	0.044	-0.082	0.043	0.034	0.044	-25.646	0.044	-23.174	-0.157	-42.141
F	191.1	3902.6	2369.1	73.66	21.60	119.6	9.727	1287.0	0.389	51.44	0.229	7.492	0.103

Standard errors in parentheses. F statistic for weak identification: Cragg-Donald or Kleibergen-Paap.
All regressions include a constant, controls for age
initial sales, foreign ownership and trade.
Std err. clustered at location-sector level
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$