Accounting Transparency, Tax Pressure and Access to Finance

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9 November 2010

Abstract

In choosing accounting transparency, firms must trade off the benefits from access to more abundant and cheaper capital against the cost of a greater tax burden. The paper studies this trade-off in a model with distortionary taxes and endogenous rationing of external finance, and tests its predictions using two data sets: the Worldscope database and the World Bank Enterprise Survey. The main predictions of the model are borne out by the evidence from both data sets. First, investment and access to finance are positively correlated with accounting transparency and negatively with tax pressure, controlling for firm-level characteristics, sector and country effects. Second, transparency is negatively correlated with tax pressure, particularly in sectors where firms are less dependent on external finance. Finally, financial development enhances the positive effect of transparency on investment, and encourages greater transparency by firms that are more dependent on external finance.

JEL Classification: G31, G32, G38, H25, H26, M40.

Keywords: Accounting Transparency, Tax Pressure, Investment, Access to Finance.

Acknowledgements: Paper prepared for the conference "Corporate Governance and Performance: Causation?", 12-13 November 2010, held at the Yale School of Management. We thank Ulf Axelson, Daniel Beneish, Patrick Bolton, Robert Jennings, Ailsa Röell, and participants to a seminar at Indiana University. This research has been sponsored by a grant from the Millstein Center at the Yale School of Management and the Italian Ministry for University and Research (MIUR).

At the end of 1936, the Dutch beer-producing company Amstel Bier N.V. was flush with cash: its bumper earnings had allowed it to pay down its bonds completely and to accumulate more cash than needed for its investments. On 4th December 1936, the company held an extraordinary shareholders' meeting to decide whether its shares should be turned from bearer to registered status. When one attending shareholder asked the reason for this proposal, the chairman answered: "This is done to be *freed from the obligation to publish the balance sheet*, now that this has become possible due to the complete repayment of the company's bonds. The Board thinks the *advantages of this with regard to the government* and the workers are important."[1] This is because at the time Dutch law allowed firms with no outstanding bonds and registered shares to avoid public disclosure of the accounts. The proposal was approved, and Amstel Bier did not get a stock exchange listing until well after WWII.

This episode highlights three points. (i) Amstel Bier had some latitude in choosing the degree of accounting transparency: by registering its shares and giving up bond issuance, it could avoid publishing its accounts. (ii) The company decided that it could afford a lower level of accounting transparency because it had more cash than needed: if instead it had to appeal to external finance, it would have chosen to retain its initial degree of accounting transparency. (iii) The choice of a lower accounting transparency is motivated by the benefit of lower visibility to the government and employees: by not disclosing the accounts, the company could more easily shield its fat profits from the government's tax collectors and from its employees' wage demands. In this paper, we argue that all three points apply more generally.

First, just like for Amstel Bier, for most firms accounting transparency is largely a matter of choice (Leuz and Wysocki, 2008). Regulation does set minimum disclosure requirements, but leaves firms free to choose from an ample menu of transparency standards. A crucial element in this choice is the degree to which firms wish to access public capital markets: issuance of publicly listed securities typically requires certification

[1] Italics added. We thank Ailsa Röell for bringing this enlightening case to our attention, and for providing the English translation of the Dutch original, contained in *Notuleboek 891-1949, Gemeentearchief Amsterdam Archief 1506 (Amstel Bier) Inventarisnummer 22*. The decision by Amstel followed the introduction in 1928 of a law forcing companies with bearer shares to disclose their annual accounts, which was very contentious because "traditionally many companies had kept this information private within a small inner circle – for example, by allowing only a small number of shareholder delegates to look at the accounts" (de Jong and Röell (2005), p. 472). Indeed, when the law changed in 1970-71, introducing a new form of limited liability "closed company" that required a lower level of financial disclosure, most of the smaller companies converted to this low-disclosure company type.

of accounts by independent auditors, adoption of strict accounting rules, frequent disclosure of company accounts, etc. At the other side of the spectrum, unlisted family firms tend to be more opaque, because they do not need to satisfy the disclosure requirements associated with access to the bond or the stock market. Even apart from the choice between different regulatory standards, firms have a wide degree of discretion over their transparency. For instance, listed firms can increase the quality and quantity of information reported to the public by providing more detailed reports and holding more frequent meetings with financial analysts.

Second, firms that choose greater transparency tend to attract more funding from investors and face a lower cost of capital, as shown by many empirical studies.[2] This not only applies to listed firms, but also to unlisted ones: those that seek loans must disclose reliable accounting information to the banks where they apply for credit; those that instead operate in the unofficial or underground economy, and therefore hide all accounting information to outside parties, have a hard time obtaining loans from formal credit institutions (Straub (2005), Garmaise and Natividad (2010) and Ayyagari, Demirgüç-Kunt and Maksimovic (2010)). This suggests that accounting transparency, access to capital markets and corporate investment should all be positively correlated, especially for financially dependent companies, which are more likely to be finance-constrained due to their large capital requirements. Naturally, this reasoning only applies to firms operating in countries where capital markets are developed enough as to reward their accounting transparency with abundant and cheap external funding. Where instead capital markets are not sophisticated or deep enough to do so, corporate disclosure should be less attractive for firms, other things equal.

Thirdly, as illustrated by the Amstel Bier episode, disclosure does not have only benefits in terms of greater funding capacity: it also has costs in terms of greater visibility to the tax authorities, and therefore of reduced ability to evade or elude taxation (on top of its direct compliance costs). The government can be regarded as a "silent shareholder", in

[2] Cross-country studies demonstrate that non-U.S. firms with better voluntary disclosures attract more funds by U.S. institutional investors (Bradshaw, Bushee, and Miller, 2004) and mutual funds (Aggarwal, Klapper and Wysocki, 2005). Moreover, Khurana, Pereira, and Martin (2005) and Francis, Khurana and Pereira (2005) find that more comprehensive disclosure is associated with a reduction in the cost of capital, and allows firms to obtain more external financing. Daske, Hail, Leuz and Verdi (2008) provide evidence of a reduction in cost of capital for firms converting to IFRS, and Lang, Lins and Maffett (2009) show on cross-country data that transparency reduces the cost of capital (at least partly) by raising stock market liquidity. Also Eleswarapu and Venkataraman (2007) find that accounting standards increases market liquidity, using data for U.S. ADRs from 44 countries. Only Daske (2006) finds no evidence that adoption of International Financial Reporting Standards (IFRS) matters to the cost of capital for European firms.

that even if it holds no control rights in firms, it shares in their cash flow by levying taxes. The fraction of the cash flow it appropriates depends on the corporate tax rate: as a result, a firm facing high tax pressure has a greater inducement to choose low accounting transparency. For instance, its owners may keep two sets of accounts: an official one that understates their profits for tax purposes, and a truthful one for internal book-keeping. Or they may keep the firms private and closely held, so as to reap the tax advantages of the murky boundary between its balance sheet and that of their family (for instance, by using the company cars and jet for their private leisure). But a firm whose official accounts understate its true profits or offer murky data about them cannot expect to raise much funding from outside investors, as explained before.

In short, in choosing their accounting transparency, firms that need credit must trade off the benefits from access to more abundant and cheaper capital against the cost of a greater tax burden. Firms will choose different points along this trade-off depending on their own situation and their country's characteristics: they will choose greater transparency if they are finance-constrained and are located in countries with more developed financial markets; and may be less inclined to choose high transparency if they are subject to great tax pressure. This has implications for their investment and growth: firms that end up choosing lower accounting transparency will be more severely rationed in capital markets, and therefore will be able to undertake less investments and tend to remain smaller. Therefore, taxation may constrain firm investment and growth not only via its direct disincentive to capital accumulation, but also by discouraging firms from being transparent and thereby limiting their capital market access.

To bring out these predictions more clearly and highlight the conditions under which they apply, we start by presenting a model where firms choose their investment level and their degree of accounting transparency in the presence of distortionary taxes and endogenous rationing of external finance (due to an agency problem). We then proceed to test these predictions on two international company-level data sets: the Worldscope database and the World Bank Enterprise Survey (WBES), which provide different measures of transparency, tax pressure, investment and access to credit.

Our main empirical results are as follows. First, as predicted by the model, firm-level investment (in Worldscope) and access to finance (in WBES) are positively correlated with our measures of accounting transparency and negatively with tax pressure, controlling for a variety of firm level characteristics and including sector and country

fixed effects.[3] Second, the degree of firm-level accounting transparency is itself negatively correlated with tax pressure, particularly in sectors where firms are less dependent on external finance – again as predicted by the model. Finally, financial development appears to enhance the positive effect of transparency on investment, and encourages greater transparency by firms that are more dependent on external finance. Also these findings are consistent with the model.

The closest paper to ours is Desai, Dyck and Zingales (2007), which also focus on the relationship between corporate taxes and the extraction of private benefits of control by corporate insiders. As in our setting, also in their setting higher taxes increase the incentives to chose for worse corporate governance – equivalent to lower transparency in our setting. But a major difference is that we highlight that this reduction in transparency comes at the cost of lower access to external finance and investment. Also, in their model firms do not need to borrow on the capital market. This link with investment and access to finance is instead emphasized by the empirical work of Mironov (2010), who finds that Russian firms that evade taxes tend to grow less and face restricted access to capital markets, in the form of higher interest rate on their debt. Our work also contributes to a vast and growing literature on the determinants and the effects of accounting transparency, extensively surveyed in Leuz and Wysocki (2008). In particular, the empirical study by Leuz, Nanda and Wysocki (2003) shows that the level of investor protection is an important determinant of international differences in the degree of accounting transparency chosen by firms. Our paper adds to this research by showing that corporate taxes are of paramount importance in the choice of accounting transparency, and that this choice has substantial consequences for firm's access to finance and growth.

The rest of the paper is as follows. Section 1 presents the model. Section 2 maps its results into testable hypotheses and lays out our empirical strategy. Section 3 presents the estimates obtained using the Worldscope database, while Section 4 reports those obtained with the WBES data. Section 5 concludes.

[3] One could argue that transparency *vis-à-vis* investors does not need to translate in the same degree of transparency with respect to tax authorities. For instance, a firm may disclose to a bank information about its revenues and costs that would not disclose to the government. We do not analyze this possibility theoretically, but empirically we use the tax-book conformity index of Hung (2001) and Ashbaugh and LaFond (2004) to capture cross-country differences along this dimension and to test if the relation between accounting transparency and investment is weaker in countries with lower tax-book conformity.

1. The model

We consider an entrepreneur who at time $t=1$ can invest an amount I in a new project that at $t=2$ will generate a cash flow $R(I)$, with $R'>0$, $R'(0)>1$ and $R''<0$. The firm already has assets in place that will yield a certain cash flow $A\geq 0$ at $t=2$. Therefore if the investment is undertaken, at $t=2$ the firm's total cash flow will be $A+R(I)$, which the government taxes at rate τ. A key assumption of the model is that the taxes levied on the profits reported by the firm distort its investment decisions. We model the distortion by assuming that only a fraction γ of the investment cost I is tax deductible,[4] so that taxable profits are $A+R(I)-\gamma I$, and after-tax profits are $A+R(I)-I-\tau\left(A+R(I)-\gamma I\right)$ $=(1-\tau)\left(A+R(I)\right)-(1-\tau\gamma)I$.

To fix ideas, consider first the effect of taxes if investment is chosen by an entrepreneur who can finance its cost I entirely from his own wealth, so that capital market imperfections are immaterial. If $\gamma=1$, his after tax profits would be $(1-\tau)[A+R(I)-I]$ and taxes would be not distortionary: as the cost I is entirely deductible, investment would be set at the first-best level I^* dictated by the first-order condition $R'(I^*)=1$. Instead, for any value of $\gamma\in[0,1]$ investment is determined by the condition $R'(I)=(1-\tau\gamma)/(1-\tau)>1$ and therefore is reduced below its first-best level, because only a fraction $\gamma<1$ of the investment costs are deductible (for instance, because tax depreciation allowances fall short of true economic depreciation).[5] By the same token, an increase in taxes would lower investment.

Consider now an entrepreneur who has no cash, and must borrow outside funds I if he wishes to invest at t=1, committing to repay D at t=2.[6] However, the availability of funds by creditors is limited by an agency problem: the entrepreneur cannot pledge the whole after-tax profits of the firm to investors, since at $t=2$ he can grab part of the cash

[4] The assumption that only a fraction of the costs are tax deductible is a shortcut that we use to obtain the result that taxes have a distortionary effect on the investment.

[5] If $\gamma<1$, then $\partial I/\partial\tau=-(1-\gamma)/(1-\tau)^2<0$. If $\gamma>1$, instead, we have overinvestment, because the government effectively subsidizes the company, by allowing it to deduct more than 100% of its costs. In that case, $\partial I/\partial\tau>0$.

[6] For simplicity we focus on a debt contract , but our results do not depend on this assumption.

flow as private benefits of control. Private benefits extraction is efficient (that is, does not entail a deadweight loss). If the entrepreneur diverts a fraction ϕ of the cash flow $A+R(I)$ as private benefits, security benefits are $(1-\phi)(A+R(I))$ and the profit reported in the firm's accounts is $(A+R(I))(1-\phi)-I$. Therefore, the after-tax profits that the firm can pledge to external investors are $\big(A+R(I)\big)(1-\phi)-\tau\big(A+R(I)-\gamma I\big)$ $=(1-\tau)(1-\phi)\big(A+R(I)\big)+\tau\gamma I$, which shows that both corporate taxation (τ) and the extraction of private benefits (ϕ) reduce the repayment that outside investors can expect to receive from the firm.

Transparency affects the entrepreneur's ability to appropriate cash flow as private benefits. When the entrepreneur releases very detailed information about its balance sheet, dubious transactions will be more easily observable both by financiers and tax authorities, and he may be sanctioned for diverting resources away from the State or from investors. As a result, he will have lower incentive to extract private benefits. We formalize the idea of transparency by assuming that, before investing, the entrepreneur can voluntarily impose an upper bound on ϕ. Specifically, we assume that at the pre-investment stage $t=0$, the entrepreneur can commit to divert no more than a fraction $\overline{\phi}$ of private benefits from the firm's cash flow. A crucial assumption is that the level of transparency chosen by the entrepreneur is the same for investors and for tax authorities. More transparency implies a greater pledgeable *and* taxable income. Transparency benefits the entrepreneur by increasing his ability to borrow, but it also hurts him by implying that more of his profits will be taxed. This trade-off in the choice of transparency is at the heart of the model's predictions.

We assume that the capital market is perfectly competitive and standardize the interest rate to zero. Each player's payoff is simply his final wealth. The entrepreneur is protected by limited liability and has no collateral to pledge beside the cash flow from the assets in place.

To summarize the previous assumptions, the model's time line is as follows:

- at $t=0$, the entrepreneur commits to a transparency level $1-\overline{\phi}>0$;
- at $t=1$, the entrepreneur borrows and invests *I* and commits to repay debt *D*;

- at $t=2$, cash flow $A+R(I)$ is realized, the entrepreneur diverts a fraction $\phi \le \bar{\phi}$ of it, pays taxes $\tau[A+R(I)-\gamma I]$ and repays debt D to investors.

As usual, the model is solved backwards: we start with the entrepreneur's decision about private benefits extraction at $t=2$, then turn to his investment choice at $t=1$ (for a given transparency level), and finally solve for his choice of transparency at $t=0$. As we shall see, investment and transparency differ depending on whether the firm is finance-constrained or not, and so do their response to parameters such as the tax rate.

1.1 Extraction of private benefits

At $t=2$, the entrepreneur decides to divert a fraction ϕ of the firm's cash flow. In this decision, he maximizes his payoff

$$\max_{\phi} \left\{(1-\phi)\big(A+R(I)\big)-\tau[(1-\phi)\big(A+R(I)\big)-\gamma I]-D,0\right\}+\phi(A+R(I)), \qquad (1)$$

under the only constraint that $\phi \le \bar{\phi}$: that is, he is subject to the degree of transparency $1-\bar{\phi}$ to which he has committed at $t=0$. The term inside the curly brackets in expression (1) is the entrepreneur's security benefit net of taxes and debt repayment, while the final term is the value of private benefits.

The objective function is increasing in ϕ, its derivative being equal to the firm's tax payment $\tau[A+R(I)-\gamma I]$. So the entrepreneur will set $\phi=\bar{\phi}$. The intuition is simple: profits are taxed, while private benefits are not. As a result, once he has borrowed and invested, the entrepreneur will want to extract as much private benefits as possible.

1.2 Investment and financing decision

At stage $t=1$, the entrepreneur chooses the investment size *I*. This choice may be constrained by the amount of external finance he can raise. In determining this amount, creditors must take into account that not all of the firm's cash flow will be available to repay them, because a fraction $\bar{\phi}$ of it will be appropriated by the entrepreneur and a fraction τ of the accounting profit will go to the government in the form of taxes.

Formally, the entrepreneur chooses investment *I* so as to maximize

$$U = \max\left\{(1-\bar{\phi})\big(A+R(I)\big)-\tau[(1-\bar{\phi})\big(A+R(I)\big)-\gamma I]-D,0\right\}+\bar{\phi}(A+R(I)) \qquad (2)$$

subject to the investors' participation constraint

$$D \geq I \qquad (3)$$

and the feasibility constraint

$$D \leq (1-\bar{\phi})\big(A+R(I)\big)-\tau[(1-\bar{\phi})\big(A+R(I)\big)-\gamma I], \qquad (4)$$

which states that debt repayment cannot exceed the verifiable cash flow net of taxes on profits. Note that this constraint assumes that the government has priority over investors.

Given our assumption of perfect competition in the capital market, the investors' participation constraint (3) is always binding: $D = I$. Replacing this equality in (2) and considering the feasibility constraint,[7] the entrepreneur's problem can be rewritten as

$$\max_{I} U = \Big(1-\tau(1-\bar{\phi})\Big)\big(A+R(I)\big)-(1-\tau\gamma)I \qquad (5)$$

subject to the financing constraint

$$(1-\bar{\phi})(1-\tau)\big(A+R(I)\big)-(1-\tau\gamma)I \geq 0. \qquad (6)$$

Suppose that the firm is finance-constrained, so that constraint (6) is binding. Then the constrained investment $\tilde{I}$ is determined by

$$(1-\bar{\phi})(1-\tau)\Big(A+R(\tilde{I})\Big) = (1-\tau\gamma)\tilde{I}. \qquad (7)$$

In this case, transparency allows the firm to *invest more* by relaxing the financing constraint, as can be seen from equation (7).[8] So, though transparency increases the tax burden on the firm, since its taxable income is $(1-\bar{\phi})\Big(A+R(\tilde{I})\Big)$, it also expands its access to finance and thus raises its level of investment.

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[7] In the default state, the security benefits are zero, so that the entrepreneur's reduces to his private benefits $\bar{\phi}\big(A+R(I)\big)$, which is maximized by choosing investment *I* as large as possible. But since in this parameter region the firm defaults with certainty, it obtains no funding from financiers, so that in equilibrium *I* is zero.

[8] By implicit differentiation of (7) one obtains

$$\frac{\partial \tilde{I}}{\partial(1-\bar{\phi})} = -\frac{(1-\tau)\Big(A+R(\tilde{I})\Big)}{(1-\bar{\phi})(1-\tau)R'(\tilde{I})-(1-\tau\gamma)} > 0,$$

because the numerator is positive and the denominator is negative, being the derivative of the financing constraint (6) with respect to *I* at the point where it is binding, and thus decreasing in *I*.

Instead, higher taxes depress investment, for a given level of transparency (but we shall see below that the same applies when transparency is endogenous). The intuition is simple: taxes reduce the resources that the firm can pledge to external financiers, and thus tighten the financing constraint.[9] By the same token, a larger cash flow *A* from assets in place relaxes the financing constraint and increases investment.[10]

The results obtained so far can be summarized as follows:

Proposition 1 (Effects of transparency and taxes on investment) *In a financially constrained firm, investment is increasing in the degree of transparency and in the cash flow from existing assets, and decreasing in the corporate tax rate.*

The effects of transparency and taxes on investment would be quite different if the firm were unconstrained, so that the financing constraint (6) can be disregarded in the choice of investment. Then, the first-order condition yields the following implicit expression for the unconstrained investment $\hat{I}$:

$$R'(\hat{I}) = \frac{1-\tau\gamma}{1-\tau(1-\bar{\phi})}. \qquad (8)$$

This expression shows that, in contrast to the case of a finance-constrained firm, in the unconstrained case a higher transparency $1-\bar{\phi}$ leads the entrepreneur to choose a lower level of investment $\hat{I}$. The reason is that in this case greater transparency just implies a heavier tax burden (more taxed security benefits and less untaxed private benefits), while any benefits in terms of enhanced access to finance are irrelevant by assumption.[11]

Condition (8) shows that generally taxes ($\tau > 0$) distort investment away from the first best, with the exception of the special case where $\gamma = 1-\bar{\phi}$, where the first-best level

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[9] Implicit differentiation of (7) with respect to τ yields

$$\frac{\partial \tilde{I}}{\partial \tau} = \frac{(1-\bar{\phi})\left(A + R(\tilde{I})\right) - \gamma\tilde{I}}{(1-\bar{\phi})(1-\tau)R'(\tilde{I}) - (1-\tau\gamma)} < 0 \ ,$$

where the numerator is positive (since by (7) it equals $(1-\gamma)\tilde{I}/(1-\tau)$) and the denominator is negative (by the argument in the previous footnote).

[10] Implicit differentiation of (7) with respect to *A* yields

$$\frac{\partial \tilde{I}}{\partial A} = -\frac{(1-\bar{\phi})(1-\tau)}{(1-\bar{\phi})(1-\tau)R'(\tilde{I}) - (1-\tau\gamma)} > 0 \ ,$$

since the denominator is negative.

[11] Differentiating (5) yields $\partial\hat{I}/\partial(1-\bar{\phi}) = \tau / \left\{ R''(\hat{I})[1-\tau(1-\bar{\phi})]^2 \right\}$, which is negative because $R''(\cdot) < 0$.

is restored: in that case, the firm can deduct from its taxable profits a fraction γ equal to the fraction of cash flow $1-\bar{\phi}$ reported in the company's accounts, so that taxes are entirely forgone on fraction of profits paid out to investors. Instead, if $\gamma<1-\bar{\phi}$, there is under-investment, and an increase in the tax rate τ depresses investment; conversely, if $\gamma>1-\bar{\phi}$ there is over-investment, and a tax increase further encourages it.[12] The reason is that a higher τ has two opposite effects on desired investment: it depresses it by cutting into the fraction $1-\bar{\phi}$ of the revenues reported in the company's accounts; but it also raises the value of the tax-deductible fraction γ of the investment costs. With $\gamma<1-\bar{\phi}$, the first effect dominates; with $\gamma>1-\bar{\phi}$, instead, the second does, as at the margin the government subsidizes investment and a higher τ increases this subsidy.

Throughout this section the degree of transparency has been treated as a parameter. However, the hallmark of our analysis is that transparency $1-\bar{\phi}$ is chosen by the entrepreneur himself, via an initial commitment. This is what we turn to next.

1.3 Choice of transparency by the firm

To build up intuition about how the entrepreneur chooses the degree of transparency $1-\bar{\phi}$ at stage $t=0$, suppose initially that the firm is unconstrained and consider a decrease in its transparency. Based on the analysis of Section 1.1, the lower degree of transparency $1-\bar{\phi}$ will raise the entrepreneur's desired investment $\hat{I}$, by shifting up the payoff function (5), while at the same time reducing his ability to borrow, by shifting down the financing constraint (7) and thus reducing the investment $\tilde{I}$ that he would be able to undertake is constrained. Hence, at one point we shall reach a threshold level of transparency $1-\bar{\phi}^*$, such that the two are just equal: $\hat{I}=\tilde{I}$. If transparency drops below that level (i.e. $1-\bar{\phi}<1-\bar{\phi}^*$), investment is dictated by the binding financial constraint (7). This will certainly occur for zero transparency ($1-\bar{\phi}=0$), where the financing

[12] Differentiating (5) yields $\partial\hat{I}/\partial\tau=-[\gamma-(1-\bar{\phi})]/\left\{R''(\hat{I})[1-\tau(1-\bar{\phi})]^2\right\}$. Since $R''(\cdot)<0$, this expression has the same sign as $\gamma-(1-\bar{\phi})$.

constraint is never satisfied. Hence, credit rationing occurs for transparency in the range $1-\phi \in [0,\ 1-\bar{\phi}^*)$.

Now, suppose that the transparency $1-\bar{\phi}$ chosen by the entrepreneur remains above the threshold level $1-\bar{\phi}^*$. Then, the financing constraint is not binding and of investment is given by the first-order condition (7). By the envelope theorem, in this region the entrepreneur's payoff U is unambiguously decreasing in transparency $1-\bar{\phi}$: as long as he is not financially constrained, the entrepreneur simply tries to minimize his taxes and therefore goes for the minimal level of transparency $1-\bar{\phi}^*$. Hence, he will lower transparency to the point where the firm enters the constrained region. This implies that, whenever the entrepreneur wishes to have a positive level of investment, the financing constraint will be binding.

Now let us turn to the case where the financing constraint is binding, and consider how the entrepreneur's payoff respond to a change in transparency $1-\bar{\phi}$. Recall that in Section 1.2 a constrained firm can borrow and invest *more* by increasing its transparency. However, for a *given* level of investment greater transparency lowers the entrepreneur's payoff U in expression (5), because it raises his exposure to tax pressure. This creates a trade-off in the choice of transparency, in contrast with what we have seen in the unconstrained case. Formally, the trade-off can be seen by totally differentiating U with respect to $1-\bar{\phi}$ and writing the first-order condition for transparency:

$$\frac{dU}{d(1-\bar{\phi})} = \left[\left(1-\tau(1-\bar{\phi})\right)R'(I)-(1-\tau\gamma)\right]\cdot\frac{\partial\tilde{I}}{\partial(1-\bar{\phi})}-\tau(A+R(I))=0. \qquad (9)$$

The first term is the benefit that transparency confers on the entrepreneur by relaxing the financing constraint and allowing greater investment, the second its cost due to the larger implied tax burden. Upon substituting for $d\tilde{I}/d(1-\bar{\phi})$ from Section 1.2, condition (9) yields the constrained investment $\tilde{I}$ associated with the optimal choice of transparency:

$$R'(\tilde{I}) = \frac{1-\tau\gamma}{1-\tau}. \qquad (10)$$

This shows that when the financing constraint is binding, there is always underinvestment, as $(1-\tau\gamma)/(1-\tau)>1$. Moreover, differentiating in (10) shows that an

increase in taxes unambiguously reduces the investment of constrained firms, even when their degree transparency is chosen optimally.

How do taxes affect the optimal level of transparency in the constrained regime? This question can be addressed by differentiating the (binding) financing constraint (7) and using the optimality condition (10) in the resulting expression:

$$\frac{\partial(1-\bar{\phi})}{\partial\tau}=\frac{\bar{\phi}(1-\tau\gamma)\dfrac{d\tilde{I}}{d\tau}+\dfrac{1-\gamma}{1-\tau}\tilde{I}}{(1-\tau)(A+R(I))}. \qquad (11)$$

Since investment $\tilde{I}$ is decreasing in taxes τ, the first term at the numerator is negative. The increase in taxes forces the entrepreneur to reduce investment. As the financing constraint is binding, lower investment is equivalent to greater pledgeable income, and this allows the entrepreneur to be less transparent. The second term is positive: higher taxes reduce the fraction of income that can be pledged to outside investors and, to compensate for the implied drop in external funding, greater transparency is called for. The total effect is ambiguous, but it is more likely to be negative if investment is very sensitive to taxes.

The negative effect always dominates in the special case where $R(I)$ is the power function $R(I)=I^{\alpha}/\alpha$, (with $0<\alpha<1$). In this case, the firm's constrained investment is

$$\tilde{I}=\left(\frac{1-\tau}{1-\tau\gamma}\right)^{\frac{1}{1-\alpha}}.$$

This, together with the financing constraint, yields the optimal transparency level

$$1-\bar{\phi}=\frac{1}{\dfrac{1}{\alpha}+A\left(\dfrac{1-\tau\gamma}{1-\tau}\right)^{\frac{\alpha}{1-\alpha}}}.$$

The derivative of this expression with respect to τ is negative, and is larger in absolute value the greater are assets in place A.[13]

Also a larger cash flow A from its assets base lowers the firm's optimal transparency:

[13] The derivative is

$$\frac{\partial(1-\bar{\phi})}{\partial\tau}=-\left(\frac{1-\bar{\phi}}{1-\tau}\right)^{2}A\frac{\alpha}{1-\alpha}\left(\frac{1-\tau\gamma}{1-\tau}\right)^{\frac{1-2\alpha}{1-\alpha}}(1-\gamma)<0.$$

$$\frac{\partial(1-\bar{\phi})}{\partial A} = -\frac{1-\bar{\phi}}{A+R(\tilde{I})} < 0. \qquad (12)$$

The intuition is immediate, and goes back to the episode of Amstel Bier quoted at the start of this paper: an increase in the cash flow from its existing assets expands the firm's borrowing capacity for a given level of transparency, and therefore allows it to maintain the same ability to borrow and invest even if it lowers its degree of transparency.

These results are summarized in the following

Proposition 2 (Effects of taxes and cash flow on transparency) *(i) The effect of a higher corporate tax rate on the optimal transparency is negative if the effect of taxes on investment is sufficiently large, and is always negative for constant-elasticity revenue functions; (ii) the effect of a larger cash flow from existing assets on the optimal transparency is negative.*

Finally, note that so far the entrepreneur has been assumed to want a positive level of investment *I*. Alternatively, he may decide to forgo entirely the investment and remain only with the assets already in place. In this case, the optimal level of transparency is zero ($1-\bar{\phi}=0$), as the entrepreneur will simply want to minimize taxes, and his payoff is equal to *A*. The final decision of the entrepreneur will be then to compare the payoff $U(\tilde{I})$ associated with the optimal (positive) level of investment $\tilde{I}$ with the payoff $U(0)=A$ resulting from zero transparency and no investment. Using equations (5) and (7), the difference between the payoffs associated with these two choices is

$$\Delta U \equiv U(\tilde{I}) - U(0) = \left(\frac{1}{1-\bar{\phi}} - 1\right)\frac{1-\tau\gamma}{1-\tau}\tilde{I} - A, \qquad (13)$$

which is invariant to changes in *A*: hence the entrepreneur will always opt for investing either $\tilde{I}$ (with transparency $1-\bar{\phi}$) or zero (with no transparency), irrespective of the cash flow from the firm's existing asset base. If revenue is a power function, ΔU is positive, implying that the entrepreneur will always opt for investment $\tilde{I}$ and transparency $1-\bar{\phi}$. [14]

[14] To show that expression (13) does not vary with *A*, note that

$$\frac{\partial \Delta U}{\partial A} = -\frac{1}{(1-\phi)^2}\frac{\partial(1-\phi)}{\partial A}\frac{1-\tau}{1-\tau\gamma}\tilde{I} - 1,$$

It is worth noting that most governments mandate a positive level of disclosure, unlike implicitly assumed so far. So, even an entrepreneur choosing the lowest transparency level will be able to raise some external funds and invest a positive amount. This will tilt the balance further in favor of choosing the transparency $1-\overline{\phi}$, since even when settling for the lowest transparency mandated by the law the entrepreneur must pay some taxes.

1.4 Financial development and the choice of transparency

So far, we have assumed that the only friction in capital markets arises from a firm-level agency problem – the extraction of private benefits of control – that can be controlled by the firm-level decision about the degree of transparency: once an entrepreneur agrees to bear the tax burden associated with high transparency, financiers will deliver abundant external funding. However, in practice this may not always be the case. Financial analysts may be not sufficiently skilled to correctly interpret the information disclosed by the firm; and banks may not be willing or equipped to screen the value of the firm's project,[15] so that choosing a high level of transparency may not actually pay much in terms of more abundant funding. Otherwise said, more developed financial markets may induce entrepreneurs to opt for greater transparency. Here we show that this prediction applies to finance-constrained firms only.

To capture the relationship between financial development and firm-level transparency choices, let us capture the degree of financial development by assuming that at $t=1$ there is an exogenous probability p that the firm is matched with financiers capable of evaluating its accounts. With complementary probability $1-p$, the firm does not encounter them, and reverts to financial autarchy: it cannot undertake the additional investment ($I=0$), so its cash flow is limited to the amount A generated by its assets in place. Clearly, the investment decisions derived in Section 1.2 still apply in the event in which the firm is matched with external financiers.

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which upon substituting from (12) and (7) can be seen to be zero. This is immediate if the firm's revenue is the power function $R(I)=I^{\alpha}/\alpha$, where

$$\Delta U=\frac{1-\alpha}{\alpha}\left(\frac{1-\tau}{1-\tau\gamma}\right)^{\frac{\alpha}{1-\alpha}}.$$

[15] Especially if faced with the easy alternative of requiring collateral (Manove, Padilla and Pagano, 2001).

When we turn to stage $t=0$. The entrepreneurs' objective is now a modified version of equation (5):

$$U=\left(1-\tau(1-\bar{\phi})\right)\left(A+pR(I)\right)-(1-\tau\gamma)pI, \qquad (14)$$

so that the first-order condition for transparency now becomes

$$p\left[\left(1-\tau(1-\bar{\phi})\right)R'(I)-(1-\tau\gamma)\right]\cdot\frac{d\tilde{I}}{d(1-\bar{\phi})}-\tau\left(A+pR(I)\right)=0. \qquad (15)$$

Compared with condition (9) derived above, all terms in the optimality condition (15) are multiplied by *p* except for *A* in the last term. This implies that the only new element in the trade-off is that now the incremental tax burden arising from an increase in transparency (the second term) is now more costly relative to the associated benefit in terms of greater access to credit (the first term). This can also be seen by dividing all terms of expression (15) by *p*: then, the expression becomes identical to (9) except for the fact that the cash flow *A* of the assets in place is now divided by *p*, which makes that term larger than in (9) since $p<1$. Therefore, the effect of a lower degree of financial development *p* is formally identically to that of an increase in *A* analyzed at the end of the previous section, i.e. it lowers the transparency of financially constrained firms.

Intuitively, expression (15) tells us that opting for greater transparency implies more taxes on the cash flow *A* generated by assets in place *irrespective* of whether the firm actually manages to secure the extra funding *I*. Instead, both the tax burden associated with the new investment *I* and the benefit from transparency in terms of extra funding only materialize if the firm happens to be matched with capable financiers, both of which occur only with probability *p*. Since $p<1$, this explains why the overall tax cost of greater transparency becomes larger than the benefit of securing more funding, and the more so the smaller is *p* and the larger is *A*: the lower *p* and the larger *A*, the less inclined will be a constrained entrepreneur to go for lower transparency. Indeed, if *A* were equal to zero (i.e., the firm had no assets in place), expression (15) would reduce to (9), and the choice of transparency would be the same as in Section 1.3.

Therefore, not only firms should opt for lower transparency if they operate in countries with less developed financial markets, but among those firms transparency should be lower for companies that have already accumulated a relatively large capital base than for smaller, upstart companies. This suggests that in these countries companies

should reduce transparency as they grow, which in turn implies that at least on this account their ability to fund further growth via external finance should decrease during their life cycle. Thus the model predicts an endogenous, transparency-related slowdown in the growth of firms, which may explain why in countries with low financial development and high tax pressure, such as Italy or India, firms may not expand beyond a threshold size: they may choose to do so because expanding would require becoming more transparent, and implied payoff in terms of extra expected funding does not compensate the extra tax burden.

This discussion can be summarized as follows:

Proposition 3 (Effects of financial development on transparency) *A higher degree of financial development increases the degree of transparency, the more so for firms that have fewer assets in place.*

2. Empirical strategy

As illustrated in Section 1, the model yields two sets of predictions, one concerning investment and external funding, and the other transparency. In what follows, we summarize these predictions and describe the empirical strategy. To test the model, we will use two distinct firm-level data sets, which differ in country and firm coverage: one drawn from Worldscope, which refers to listed companies located in 38 countries, including all OECD countries, in the period from 1990 to 2008; and another drawn from the World Bank-IFC Enterprise Surveys (WBES), which is a collection of cross-sectional firm surveys conducted between 2005 and 2009 in 90 countries, mostly emerging or developing countries.

While Worldscope has detailed balance sheet data, WBES contains mostly self-reported, qualitative information, but has greater country coverage and international variation in tax rates and other institutional variables. The two data sets also complement each other by offering the possibility of constructing different measures of firm-level accounting transparency. Of course, the empirical strategy will have to be adapted to suit the different characteristics of these two data sets.

2.1 Investment and external finance

The relationships between investment, transparency and taxes will be estimated via variants of the following regression:

$$I_{ics} = \delta_c + \delta_s + \alpha_1 \tau_{ics} + \alpha_2 T_{ics} + \alpha_3 T_{ics} \times DEP_s + \alpha_4 T_{ics} \times FD_c + \gamma X_{ics} + \varepsilon_{ics}, \quad (16)$$

where I_{ics} is the ratio between Capital Expenditure and Total Assets of firm *i* in country *c* and sector *s*, T_{ics} is an empirical proxy for its accounting transparency, τ_{ics} is a measure of its tax burden, X_{ics} is a set of firm-specific characteristics, DEP_s is a sector-level measure of financial dependence, FD_c is a country-level measure of financial development, and δ_c and δ_s are country- and sector-level fixed effects, respectively. Among the firm-level characteristics X_{ics}, it is important for the firm's total assets, since the model predicts that cash flow from the firm's assets in place mitigate the financing constraint and therefore are associated with greater investment.

According to Proposition 1 in the previous section, for constrained firms investment should be negatively correlated with the firm's tax burden ($\alpha_1 < 0$) and positively correlated with transparency ($\alpha_2 > 0$). Since for a constrained firm investment is driven by the availability of external finance, in some specifications we replace investment with proxies of firms' ability to access credit markets (e.g., whether they perceive access to credit not to hinder growth or whether they are not discouraged from applying for credit). Note that, while WBES has firm-level information on the perceived tax burden, in Worldscope this information is unavailable, so that corporate tax pressure can be measured only at the country level. Thus in our regressions using Worldscope data, the coefficient α_1 is not identified because the effect of taxes is absorbed by country effects.

In Worldscope, we can also use a measure of financial dependence (DEP_s) as in Rajan and Zingales (1998). Financially dependent firms are more likely to be constrained, because they have lower cash flow from assets in place relative to their investment opportunities. The model predicts that for such firms investment and access to finance should have a stronger correlation with transparency; in contrast, transparency should be immaterial for the investment of firms with large cash flow. Thus the coefficient of the interaction between financial dependence and transparency should be positive ($\alpha_3 > 0$).

Finally, recall that in the variant of the model proposed in Section 1.4, transparency is more effective in relaxing financing constraints in countries with developed capital markets, where firms are more likely to be matched with financial intermediaries capable of interpreting their accounting data. Hence, we expect the coefficient of the interaction between transparency and measures of financial development FD_c to be positive ($\alpha_4 > 0$).

2.2 Transparency

The second set of predictions of the model refers to transparency, which we model empirically via the following specification:

$$T_{ics} = \delta_c + \delta_s + \beta_1 \tau_{ics} + \beta_2 \tau_{ics} \times DEP_s + \beta_3 FD_c \times DEP_s + \theta X_{ics} + \eta_{ics}. \qquad (17)$$

According to Proposition 2, the effect of taxes on transparency is in general ambiguous. However, it is predicted to be negative ($\beta_1 < 0$) if revenues are a power function of investment or if the negative effect of taxes on investment is sufficiently strong. The same proposition also suggests that measures of cash flow from existing assets, as measured by total assets (and possibly other variables in X_{ics}), should be negatively correlated with transparency. Furthermore, in the power function case, the model predicts that the effect of taxes on transparency should be larger in absolute value for entrepreneurs with larger cash flows, and therefore should be smaller for more financially dependent firms ($\beta_2 > 0$). In other words, financial dependence should dampen the negative effect of taxes on transparency.

Finally, by Proposition 3, we expect financial development to be associated with higher transparency, and this effect should be stronger for firms with low cash flow. Since the effect of financial development FD_c is absorbed by the country effects δ_c, it is not identified. However, assuming that firms with low cash flow are mainly those in more financially dependent sectors, we can still test the prediction that the coefficient of the interaction term $FD_c \times DEP_s$ is positive ($\beta_3 > 0$).

3. Evidence from Worldscope data

The first sample that we use is obtained by merging firm-level accounting and financial data from Worldscope (for non-U.S. firms) and Compustat (for U.S. firms) with data on corporate effective taxation from Djankov et al. (2009) and on financial development from Djankov et al. (2006). Other information on statutory and effective corporate taxes is drawn from the IMD World Competitiveness Yearbook.

3.1. Data description

To test the model's empirical predictions on the relation between tax pressure, transparency and investment, we bring together two types of data: (i) firm-level data for five different measures of accounting transparency, capital expenditures, sales, total assets, leverage and market-to-book ratios, and (ii) measures of country-level corporate effective tax rates and financial development.

The financial and accounting data are obtained from the Worldscope database which provides historical data from the financial reports of publicly listed firms in several countries. We collect data for firms incorporated and listed in 37 countries over the period 1990-2008. We apply two screens to the data: first, we remove financial institutions and banks; second, we include firms only if income and balance sheet data are available for at least 6 consecutive years, thus allowing us to compute all five measures of earnings management. This leaves us with 12,783 firms and 124,822 firm-year observations.

The country-level data on corporate tax rates are drawn from two different sources: (a) Djankov et al. (2009) that provide cross-country data as of 2003, and (b) the IMD World Competitiveness Yearbook which provide cross-country data over the period 1997-2008. Both sources give data both on the statutory tax rate, defined as the rate for the highest bracket of all taxes on corporate income, and Djankov et al. (2009) also report data on the effective tax rates, which are closer to the actual tax rates faced by companies, since they take into account provisions of the tax code about depreciation provisions and exemptions.[16] We measure financial development as the ratio of stock market

[16] The effective corporate tax rates are assembled jointly by the World Bank, PricewaterhouseCoopers, and Harvard University, and come from a calculation of *all* relevant taxes applicable to *the same* standardized firm operating in each country.

capitalization to GDP as reported in Djankov et al. (2006), and use the data on industry-level financial dependence reported by Rajan and Zingales (1998).

3.2. Measures of Accounting Transparency

In our estimates, we rely on five different firm-level measures of accounting transparency. As highlighted by the literature,[17] the degree of accounting transparency of a firm is inversely related to the degree of earnings smoothing and discretion: both measures should capture the extent to which insiders may misstate the firm's true economic performance. Earnings smoothing measures the extent to which management dampens fluctuations in reported earnings relative to true earnings, and thereby increases accounting opacity. However, earnings smoothing does not per se imply a systematic overstatement of earnings. A measure of accounting opacity that is more directly tied to our model is the discretion that management has in reporting – and thereby misstate – earnings, based on the extent and use of accounting accruals.

After computing each measure at the firm level, we proceed to separate each measure into "normal" and "abnormal" components, thus obtaining the firm-level *excessive* earnings smoothing and earnings discretion. As shown in the accounting literature (for instance Francis et al., 2005), the informativeness of reported earnings is influenced by various factors, such as environmental uncertainty and industry affiliation, as well as by intentional estimation mistakes arising from insiders' incentives to reduce transparency. We capture management's intentional errors to reduce transparency by the *abnormal* component of earnings smoothing (which we term ES indicators) and earnings discretion (the ED indicators).

The ES indicators refer to management's ability to smooth reported earnings by making use of accruals. The first measure, ES1, is computed as the ratio of the firm-level standard deviation of operating earnings (scaled by assets) and the firm-level standard deviation of cash flows from operations (also scaled by assets). As in Leuz et al. (2003), the cash flow from operations is computed by subtracting the accrual component from firm's earnings. Consistent with Dechow, Sloan and Sweeney (1995), we compute the accrual component of earnings as $\Delta CA_{jt} - \Delta Cash_{jt} - \Delta CL_{jt} + \Delta STD_{jt} + \Delta TP_{jt} - Dep_{jt}$,

[17] See, for example, Jones (1991), Dechow, Sloan and Sweeney (1995), Healy and Wahlen (1999), Dechow and Skinner (2000), Francis, LaFond, Olsson and Schipper (2005), and Leuz, Nanda and Wysocki (2003).

where ΔCA_{jt} is the change in total assets, $\Delta Cash_{jt}$ the change in cash and cash equivalent items, ΔCL_{jt} the change in total current liabilities, ΔSTD_{jt} the change in short-term debt, ΔTP_{jt} the change in income taxes payable, and Dep_{jt} the depreciation and amortization expense of firm j in year *t*.

The second measure of earnings smoothing, ES2, is based on the contemporaneous correlation between accounting accruals and operating cash flows. Insiders can try to hide shocks to the firm's cash flows by increasing such correlation. Although Dechow (1994) shows that a negative correlation between accruals and cash flows may result from the accrual accounting itself, larger correlations have been found to be related to smoothing of earnings unrelated to true firm's performance (Skinner and Myers, 1999).

We also rely on three measures of earnings discretion. The first of these, ED1, is the absolute value of firm's total accruals divided by the absolute value of cash flow from operations (to control for size and performance). The second measure, ED2, is aimed at disentangling normal accruals from abnormal accruals using the approach proposed by Jones (1991), as modified by Francis et al. (2005). We estimate the following regression for each of 36 ISIC industries within each country with at least 10 firms in year *t*:

$$\frac{TA_{jt}}{Assets_{jt-1}} = \varphi_1 \frac{1}{Assets_{jt-1}} + \varphi_2 \frac{\Delta Rev_{jt}}{Assets_{jt-1}} + \varphi_3 \frac{PPE_{jt}}{Assets_{jt-1}} + \varepsilon_{jt}, \qquad (18)$$

where Total Accruals (TA_{jt}) are calculated as explained above, $Assets_{jt-1}$ are total asset of firm *j* at the end of year *t-1*, ΔRev_{jt} is the change in revenues between year $t-1$ and year *t*, and PPE_{jt} is the property, plant and equipment of firm *j* in year *t*. Abnormal accruals ED2 are then measured as the absolute values of the difference between actual firm-level accruals (scaled by assets) and their estimated values, that is, the absolute value of the estimated errors of regression (18), $\left|\hat{\varepsilon}_{jt}\right|$. Clearly, the larger the value of ED2, the lower is the firm's transparency. We only include countries for which we can consistently generate such a measure for at least 18 ISIC industrial groups.

The third earnings discretion measure, ED3, uses the methodology proposed by Dechow and Dichev (2002). For each country, year and ISIC industry groups with at least 10 firms, we estimate the following regression:

$$TCA_{jt} = \gamma_0 + \gamma_1 CFO_{jt-1} + \gamma_2 CFO_{jt} + \gamma_3 CFO_{jt+1} + \nu_{jt}, \qquad (19)$$

where Total Current Accruals (TCA_{jt}) are defined as $\Delta CA_{jt} - \Delta Cash_{jt} - \Delta CL_{jt} + \Delta STD_{jt}$ and CFO_{jt} are the cash flows from operations in year *t*. We define ED3 as the absolute value of firm's *j* residual for year *t*, $\left|\overline{\nu}_{jt}\right|$: the higher ED3, the lower the firm's transparency. Also in this case, we only include countries for which we can consistently generate the indicator for at least 18 ISIC industrial groups.

Recall that our empirical methodology requires identifying the abnormal portion of earnings smoothing and earnings management due to managers' discretion, rather than the normal portion arising from environmental uncertainty or industry affiliation. While ED2 and ED3 capture precisely this part of opaqueness, all other measures explained above provide the *level* of opaqueness. To extract the abnormal amount of accounting opaqueness as measured by ES1, ES2 and ED1, we regress each of these measures for firm *j* and year *t* on firm's characteristics that should capture the normal level of opaqueness: log of the firm's total assets, total debt (scaled by total assets), book-to-market ratio, operating cycle, average sales growth in the previous three years, PPE divided by assets, average cash flows divided by assets, firm, industry and time fixed effects. We then compute the absolute value of the residuals for each firm *j* and year *t* for each of the three measures (ES1, ES2 and ED1) and use the time-series average of such residuals as a measure of accounting opacity for each firm *j*.

Importantly, note that all of the earnings smoothing and earnings discretion measures defined so far are designed to be increasing in the firm's opacity. However, for consistency with the model's predictions, we want measures of accounting transparency. Hence, we will take the *negative* of each of the measures defined above, so that in what follows *larger* values (values closer to 0) of ES1, ES2, ED1, ED2 and ED3 will correspond to *greater transparency*.

Recall that a key assumption in our model is that the degree of accounting transparency chosen by firms affects both their tax liabilities and their debt capacity: that is, firms are assumed to produce a single set of accounting data for both tax authorities and financial markets. So an important issue for our empirical tests is whether this assumption actually holds in the data. In fact, not all countries do require "tax-book

conformity", that is, a high degree of alignment between tax and financial reporting.[18] In countries where such conformity is not required, the tax-avoidance payoff from lower accounting transparency should be low or non-existent, and therefore taxes should have low or no impact on the choice of financial transparency. We will use the tax-book conformity index of Hung (2001) and Ashbaugh and LaFond (2004) to capture cross-country differences along this dimension and to test if the relation between accounting transparency and investment is weaker in countries with lower tax-book conformity.

3.3. Descriptive Statistics

Table 1 reports the number of firms for each of the 37 countries in our sample. As expected, there is significant variation in the number of firms in each country, with the U.S., Japan, the United Kingdom, Germany, France and Australia being the countries with the larger number of firms. Table 1 also provides information on corporate statutory tax rates and corporate effective tax rates. The U.S. has the highest statutory tax rate (at 45.20%), followed by Japan (at 42.05%), while Chile and Hong Kong have the lowest rates (at around 17%). Comparing columns 2 and 3, there are large differences between effective tax rates and statutory tax rates. For example, while the U.S. has one of the highest statutory rates, the effective tax rate is only 18.19%. There are also considerable cross-country differences in effective tax rates: these are highest in Israel, Japan and New Zealand (above 25%), followed by Germany, Italy, Netherlands, Malaysia, Philippines, Peru and Thailand (22-24%), and are lowest in Hong Kong, Ireland, Mexico and Sweden.

Columns 5 to 9 present country averages of our five accounting transparency indicators. The cross-country differences are broadly consistent with Leuz et al. (2003), even though we use excessive opaqueness while Leuz et al. (2003) use the *levels* of opaqueness. Countries with large stock markets (such as Australia, Canada, the U.K. and U.S.) have consistently high transparency according to all measures, while countries characterized by insiders' control and weak legal enforcement (such as Argentina, Brazil, Greece, India, Italy, and Spain) tend to have lower transparency according to all measures.[19]

[18] See Alford et al. (1993), Ali and Hwang (2000), and Kasanen et al. (1996), and Ashbaugh and LaFond (2004).

[19] It should be noted that for ED2 and ED3 we only obtain values for 18 out of the 37 countries. This is because, as explained before, to calculate such measures we require that (a) each industry contains at least

Table 2 shows the correlation between the measures of transparency, statutory corporate tax rates, effective corporate tax rates, and financial development (stock market capitalization). All transparency measures are highly and significantly correlated among themselves, but the correlation is highest between the two earnings smoothing measures (ES1 and ES2) and among the earnings management measures (ED1, ED2 and ED3). This is encouraging, since it implies that there is significant information overlap between the different transparency measures and that the particular indicator used will not affect our main results.

As predicted by our model, the correlation between all measures of information transparency and corporate tax rates (especially effective ones) is negative, even though the correlation lacks statistical significance. Also in keeping with the model's predictions, all measures of transparency are positively and significantly correlated with our proxy for financial development, i.e. the GDP ratio of stock market capitalization. Of course, these cross-country two-way correlations are purely suggestive, and it is still to be seen whether they survive in econometric tests based on firm-level data, which is the topic of the next section.

3.4. Regression Results

We start with regressions that test the impact of corporate taxes, financial dependence, and financial development on firms' investment policies. We then move to regressions where the dependent variable is the firm's accounting transparency. In both cases we include firm-level variables (the log of initial assets in U.S. dollars, initial book-to-market ratio, and initial leverage, where "initial" refers to the first year for which data are available), and control for sector and country effects.

The investment regressions are shown in Table 3. Consistent with the model's prediction we find that transparency is positively correlated with investment for all five transparency measures ($\alpha_2 > 0$). The ES1, ES2 and ES3 coefficients are statistically different from zero at the 5 percent level, while the ED1 and ED2 are significant at the 10 percent level (columns 4 and 5).

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10 firms in any given year to calculate the normal level of firm-level accruals, and (b) that for each country we can calculate such measures for at least 18 industrial groups (i.e. half of the ISIC industrial groups).

We also find that the coefficient of the interaction term between transparency and financial dependence is positive ($\alpha_3 > 0$), and that transparency has also an incremental positive impact for firms in countries with high financial development ($\alpha_4 > 0$). So, transparency appears to relax financing constraints by more for firms that are more dependent on external finance and that are located in countries where financial intermediaries are more sophisticated. Also these findings are in line with model's predictions summarized in Section 2.

To gauge the economic significance of these results, we focus on a firm in the industry with average financial dependence (0.31) and in a country with average financial development (61 percent), and consider a one-standard-deviation increase in transparency. The resulting total impact on investment is an increase of 0.012 of the ratio of capital expenditures to assets. As the average ratio is 0.064, the impact of the increase in transparency is to raise firm's investment by over 20 percentage points.

In Table 4, the most striking result is shown in the first row: as predicted by the model, the effect of taxes on transparency is stronger for firms in industrial sectors that are more dependent on external finance ($\beta_2 > 0$). The relevant coefficient is significant at the 5 percent level for three of the five transparency measures (ES1, ES2 and ED1), and at the 10 percent level for the remaining two (ED2 and ED3). The impact also carries economic significance: fixing corporate taxes at their average level (19%) and focusing on the industry with average financial dependence (0.31), a one-standard-deviation increase in financial dependence is associated with an increase in ES1 of slightly less than 0.011. Since the average value of ES1 is -0.065, this amounts to an increase in transparency of more than 16 percentage points of the mean level. Similar magnitudes are found when using ES2 and ED1 and slightly lower magnitudes are found using ED2 and ED3.

Recalling that the baseline effect of taxes on transparency should be negative according to the model, this evidence shows that their interaction with financial dependence attenuates the effect of taxes on transparency. Clearly, in this regression we cannot identify the direct impact of corporate taxes on transparency since it is absorbed by the country fixed effects. A potential solution is to drop country fixed effects and include as a separate variable country-level corporate taxes but such a specification presents significant limitations because using corporate taxes in this way will absorb all

other country-level characteristics. While keeping these limitations in mind, we estimate such a regression and find a negative and statistically significant (at the 10 percent confidence level) impact of corporate taxes on firm's transparency, precisely as predicted by the model. We do not tabulate these further results for brevity.

Another interesting result emerging from Table 4 concerns the effect of financial development on transparency: firms that are more dependent on external finance tend to choose higher transparency if they are located in countries with deeper stock markets ($\beta_3 > 0$). Also this effect is statistically significant (at the 5 percent confidence level with ES1, ES2 and ED1, and at the 10 percent level with other transparency measures) and economically significant: in a country with average ratio of stock market capitalization to GDP, a one-standard-deviation increase in financial dependence is associated with a 0.006 increase in ES1 – almost 9 percentage points of its mean value.

Next, we test whether these results are affected by international differences in the degree of tax-book conformity. As noted above, the predictions of our model should apply only (or mainly) in countries with high tax-book conformity, and not (or less strongly) in countries where entrepreneurs don't have to produce the same data to tax authorities and investors. To test this prediction, we split the sample based on the tax-book conformity index of Hung (2001) and Ashbaugh and LaFond (2004), and repeat the investment and transparency regressions separately for the two sub-samples. The results for the two sub-samples are shown in Table 5 for the investment regressions and in Table 6 for the transparency regressions. In both cases, Panel A reports the estimates for countries without tax-book conformity and Panel B for countries with tax-book conformity. The number of firm observations is reduced for these tests because the tax-book conformity index is only available for 27 countries.[20]

As expected, we find that the statistical and economic significance of the relevant coefficients are much stronger for firms where tax-book conformity exists. For instance, focusing on the estimates reported in column 1 in the investment regression of Table 5, we see that the estimated coefficient of transparency (ES1) is 0.12 for countries without tax-book conformity and 0.17 for those with tax-book conformity; similar differences are present also for the coefficients of the interacted variables. Likewise, in the transparency

[20] In additions to the countries found in Hung (2001) and Ashbaugh and LaFond (2004), we also found information for tax-book conformity for Argentina, Austria, Chile, Greece, New Zealand, and Portugal, drawing it from *Corporate Taxes: A Worldwide Summary* by of PricewaterhouseCoopers.

regressions of Table 6, the estimated coefficient of the interaction between taxes and financial dependence in column 1 is 0.0018 for the countries without tax-book conformity and 0.0027 for those with tax-book conformity. These results confirm that the entrepreneurs' incentives to produce opaque information is larger in countries where the same set of rules are used to produce the information used for financial and tax reporting.

3.5. Robustness Checks

We check the robustness of our results to several changes in specification. A major concern is that the results may be influenced by economic or legal heterogeneity across countries that are not completely controlled for by the inclusion of country fixed effects. For example, as argued by Leuz et al. (2003), variation in firm size, industry composition or the presence of multinationals in a particular country may bear an impact on our results: large multinational firms can typically arbitrage differences across tax jurisdictions, strategically transferring resources across subsidiaries located in different countries so as to underreport earnings in high-tax jurisdictions and over-report them in low-tax ones. Our predictions should be far less relevant for these firms.

Second, while we use the ratio of stock market capitalization to GDP as our measure of financial development, this measure is known to be highly correlated with country-level institutional factors such as investor protection and creditor rights. The empirical literature is divided on whether stock market capitalization is really exogenously determined or whether it is an outcome of investor protection rules.

To address the first concern, as in Leuz et al. (2003), we re-estimate our regressions separately for large and medium-small firms. In untabulated results, we find that the results of Tables 3 and 4 are stronger for medium and small companies than for large ones, for both transparency and investment regressions, as one would expect considering that large firms should be in a better position to arbitrage tax rules across jurisdictions.

To address the second concern, we check the robustness of the results replacing stock market capitalization with indicators of investor protection: (a) the Revised Anti-Director Index, (b) the Self-Dealing Index, both drawn from Djankov et al. (2006), and (c) the Creditor Rights Index of Djankov et al. (2007). We find that most results remain unchanged and that the coefficient of the interacted variables that include financial development retains statistical significance at the 5 percent level when we use the

Revised Anti-Director Index and the Self-Dealing Index and at the 10 percent level when we use the Creditor Rights Index. Broadly speaking, in these specifications also the economic significance is similar to that found in Tables 3 and 4.

We also check the robustness of our results excluding countries that for different reasons could be driving the results because they are overrepresented in the sample. We first exclude from our regressions U.S. firms because Compustat data are arguably of different quality than Worldscope data. We also repeat the estimation excluding all countries with the largest amount of companies, i.e. Japan, the U.K. and the U.S. Finally, we exclude firms in South and Central American countries, which suffered high monetary instability in most of our sample period, so that their accounting data may be clouded by inflation. We find that all our main results remain broadly unchanged in these three different specifications.

Finally, we check the robustness of the results to the type of corporate tax rates that we use for our regressions. Recall that we use the Effective 1st Year Corporate Tax Rate from Djankov et al. (2009), which can be criticized because this is the rate that corporations pay in their first year of operations. Thus, such taxation rates are more appropriate for small firms, while our sample contains mostly medium sized and large corporations. We check the robustness of our results using (a) the Statutory Tax Rate, and (b) the Effective 5-Year Corporate Tax Rate. Broadly speaking, we find that the results hold their statistical and economic significance when using these alternative rates and that results become stronger when using Statutory Tax Rates and weaker when using the Effective 5-Year Corporate Tax Rate.

4. Evidence from WBES data

In this section we study the relation between tax pressure, transparency and access to credit using a sample of over 40,000 firms drawn from the World Bank-IFC Enterprise Surveys (WBES). There are three main advantages of using WBES data. First, one can exploit firm-level heterogeneity in a sample that covers many different countries. Second, in emerging and less developed countries informality plays a very relevant role, and capital markets are from perfect. Third, WBES contains many qualitative indicators of transparency, tax pressure, informality and access to credit, which are extremely useful to

study the tradeoffs between transparency, taxes and access to credit. But there are also drawbacks: in contrast to the Worldscope database, the survey provides only few firm-level accounting data, and it is not a panel (at least for most of the countries covered), so that the empirical analysis cannot include controls for unobserved heterogeneity at the firm level.

4.1. Data description

Since 2002, the World Bank has conducted the Enterprise Surveys in over 100 countries with the same (or similar) survey instruments.[21] Here we use data from the most recent years (2005-2009), a total of 96 distinct surveys in 90 different countries: 33 African countries, 13 Asian, 16 Latin American, and 28 European transition economies. In 6 countries the survey is repeated over time (for instance, Bulgaria was surveyed in 2007 and 2009 and Malawi in 2005 and 2009). Most surveys refer to 2006 (30 surveys) or 2009 (50 surveys).

As shown in Table 7, our final sample includes 42,916 firms. For some large countries (such as Brazil, Indonesia, Chile and Turkey) the sample size exceeds 1,000 firms, while for the smallest countries it varies between 100 and 500 firms. Depending on the country, data are collected using simple random or random stratified sampling. Firms are classified according to 15 broad sectors in manufacturing, construction, services and transportation. Table 7 shows that the sample covers mostly small (less than 20 employees) or medium-size firms (between 20 and 100 employees).

WBES contains detailed questions on business perceptions on the most important obstacles to firms' operation and growth (taxes, crime, corruption, etc.), data on ownership structure, information on financing arrangements and availability of finance, and some data on firms' characteristics (size, sector, number of employees, location in major cities or small towns, etc.). The balance sheet data in WBES are not sufficiently detailed to construct sophisticated indicators of accounting transparency similar to those illustrated in Section 3 and constructed from the Worldscope data. However, WBES allows us to construct an indicator of firms' accounting transparency by combining data on reliance on external auditors, quality certification, stock market listing and firm's ownership. In particular, for the WBES data our transparency indicator is defined as the sum of the following five dummy variables: (1) the firm has an external auditor; (2) the

[21] See www.enterpriseseurveys.org for details on sample size and survey instruments.

firm is listed in the stock market; (3) the firm has external quality certification; (4) foreigners own at least 50 percent of the firm; (5) the government owns at least 50 percent of the firm. While the rationale for including the first two variables is self-evident, the reason for including external quality certification is that it signals the presence of effective procedures to verify and disclose information to outsiders, and the rationale for including majority ownership by foreigners and government is that these investors should enforce stricter accounting and disclosure standards, both to monitor the firm's management and to comply with the legal rules to which they are subject.

We use two indicators of access to finance. The first captures the extent to which access to formal credit markets constrain firms' growth: firms are asked how problematic access to financing (as determined by collateral requirements, credit availability, interest rates and other charges) is for the operation and growth of their business. The answers (very severe obstacle, major obstacle, moderate obstacle, minor obstacle, no obstacle) are coded on a scale from 1 to 5, with higher values indicating an improvement in the terms at which credit is available.[22]

The second indicator is instead intended to capture more directly whether firms viewed the terms at which credit is offered to them as affordable or prohibitive. Selecting on the firms that did not apply for credit, we focus on the following question: "What was the main reason why this establishment did not apply for any line of credit or loan in the last fiscal year?" The response is coded as 0 if the answer is that application procedures were complex, interest rates were not favorable, collateral requirements were too high, size of loan and maturity were insufficient, the firm expected its application to be rejected, and 1 otherwise. We will refer to this variable as an indicator of "firms undeterred from borrowing", to distinguish it from the first indicator that is labeled as a measure of "access to finance".

In the regressions, we shall control for several standard firms' characteristics that may affect their credit worthiness (size, age, location) or their need for external funding (being part of a business group, and therefore having access to the group's internal capital market). Beside these, two other sets of explanatory variables are used in the estimation. The first consists of five tax pressure dummy variables, drawn from a question on the extent to which tax rates are perceived as obstructing the operation of the establishment

[22] Our coding is opposite to that used in the original questionnaire. This obviously affects only the sign of our coefficient estimates, not their absolute magnitude or precision.

(no obstacle, minor obstacle, moderate obstacle, major obstacle, very severe obstacle). As we shall see, this firm-specific indicator of tax pressure allows us to estimate the effect of taxes on access to finance and transparency even in regressions that control for country fixed effects. A second group of dummies, with similar coding, captures the pressure that firms perceive from competitors in the informal sector. The rationale for this control is that transparency choices may generate an externality via tax evasion and product market competition: if a firm's competitors choose to be opaque and thereby evade or elude taxes easily, the firm may be forced to imitate them to avoid being outcompeted, even though this implies facing tighter credit constraints and therefore less investment and growth.

Figure 1 plots our indicator of access to finance against the transparency indicator by country. Since the scale of the two variables is rather arbitrary, we standardize them to have mean zero and standard deviation of one. The figure shows that countries with more transparent firms (such as Estonia, Hungary and the Philippines) also feature better access to credit, in line with one of the model's prediction. In contrast, firms in the poorest African countries (Ghana, Zaire) report both low level of transparency and more difficult access to credit. Figure 2 indicates that the same positive association exists between transparency and the fraction of firms that are undeterred from borrowing.

4.2. Regression results

Tables 8 and 9 present estimates of a variant of equation (16), where the dependent variable is a self-report indicator of access to finance, and the explanatory variables include a self-reported measure of tax pressure and a firm-level indicator of transparency. The estimated regression however omits the interactions with financial dependence that are present in equation (16), since this variable cannot be constructed for WBES firms.

The first column of Table 8 reports the results of a regression of the standardized measure of access to finance on the transparency indicator, four dummies for tax pressure, continental dummies and 15 sector dummies (omitted from the table). The regression is performed by ordinary least squares; ordered probit estimates deliver similar results.

Tax pressure affect access to credit in the direction suggested by the model ($\alpha_1 < 0$): the coefficients of the tax dummies are always negative, and their absolute value increases with the intensity of tax pressure. For instance, firms that perceive tax

rates as a minor obstacle for growth feature an access to finance indicator that is 0.26 standard deviations lower than the group that states that "taxes or no obstacle" (the excluded category). Instead, firms that perceive taxes as a major or severe obstacle have much more difficult access to credit (the indicator is, respectively, 0.65 or 0.88 standard deviations lower).

We also find that transparency is positively associated with access to finance ($\alpha_2 > 0$). In terms of economic significance, the coefficient implies that a one standard deviation increase in the transparency indicator is associated with an increase in access to credit of 0.1 standard deviations. Therefore, the pattern and significance of the transparency and tax variables therefore provide strong support for two of the main model's predictions discussed in Section 2.

In column 2 of Table 8 we control for firms' characteristics and pressure from informal competitors. The coefficients of transparency and those of the tax pressure dummies are not affected. The dummies for pressure from informal competitors are negative and statistically different from zero: as expected, competing with informal firms induces firms to imitate them, and therefore have more difficult access to formal credit markets. The effect of other variables is as expected: larger firms, and firms that are part of a group have easier access to finance. The last regression in column 3 shows that the coefficients are generally smaller in absolute value – but still statistically different from zero – when we introduce country-level dummies.

Table 9 show that similar results obtain in regressions where access to credit is measured through our second indicator. Firms that are not deterred from borrowing tend to be more transparent: the coefficient indicates that a one standard deviation increase in transparency raises the probability of facing affordable credit terms by 10 percentage points. Moreover, firms that perceive taxes to be a major or very severe obstacle to growth are about 10 percentage points less likely to apply for credit and not be discouraged from borrowing. The second regression in Table 9 confirms that small firms, those that do not belong to a group, and those that compete in the informal sector are less likely to face affordable credit terms. The final regression suggests that each of the effect described obtains also if we control for country fixed effects.

The final set of results refers to the determinants of firm-level transparency in a variant of specification (17), where again data constraints prevent the inclusion of interactions with financial dependence. The estimated specification includes the tax

pressure variables, plus competition dummies, firm-level characteristics and sector dummies as explanatory variables. As discussed in Section 2, the effect of corporate taxes on the choice of accounting transparency cannot be generally signed in our model, even though under reasonable conditions it can be expected to be negative ($\beta_1 < 0$). In columns 1 and 2 of Table 10 the pattern of coefficients of the tax pressure dummies is consistent with taxes deterring transparency: the coefficients are smaller in size for firms that regard tax rates as no hindrance to their growth, and larger and negative for those that perceive them as a major or a very severe obstacle to growth. The evidence is less clear cut in column 3, because part of the tax effects is absorbed by country dummies.

Consistently with the evidence regarding access to credit, the effect of competition by informal firms has a strong and consistently negative impact on the choice of transparency, confirming that an opacity externality is likely to be at work for the firms included in the WBES data. Given that taxes are negatively correlated with transparency in these regressions, it stands to reason that the reduced tax burden associated with opacity may be one of the channels through which this externality operates.

The coefficients of the other controls included in the regressions of Table 10 indicate that more established firms tend to choose higher transparency standards: this may be the reflection of the fixed compliance costs, which can be better absorbed by larger firms, especially if they belong to a business group, as well as for the need of a long track record for accounting information to be meaningful for financial intermediaries.

5. Concluding Remarks

A growing literature documents the link between the degree of accounting transparency, the cost of capital and the availability of external funds to firms. Also the effect of taxes on the investment decisions of firms has been extensively studied. However, previous research has overlooked the fact that taxes may reduce the degree of transparency chosen by firms, and *via that channel* reduce their access to finance and investment. The contribution of this paper lies precisely in analyzing these linkages between taxes, transparency, access to finance and investment. Relying on a simple model with distortionary taxes and endogenous credit rationing, we show that these linkages generate rich empirical predictions. Then we test these predictions using two international

company-level data sets: the Worldscope database and the World Bank Enterprise Survey (WBES), which provide different measures of transparency, tax pressure, investment and access to credit.

The evidence drawn from both of these data sets largely accords with the model's predictions. First, firm-level investment and access to finance are greater in firms that feature greater accounting transparency and lower in firms that face a heavier tax burden, controlling for a variety of firm characteristics and for sector and country effects. Second, firm that face a higher tax rate tend to opt for lower accounting transparency. Finally, financial development appears to amplify the positive effect of transparency on investment, and encourages firms that are more dependent on external finance to go for greater transparency.

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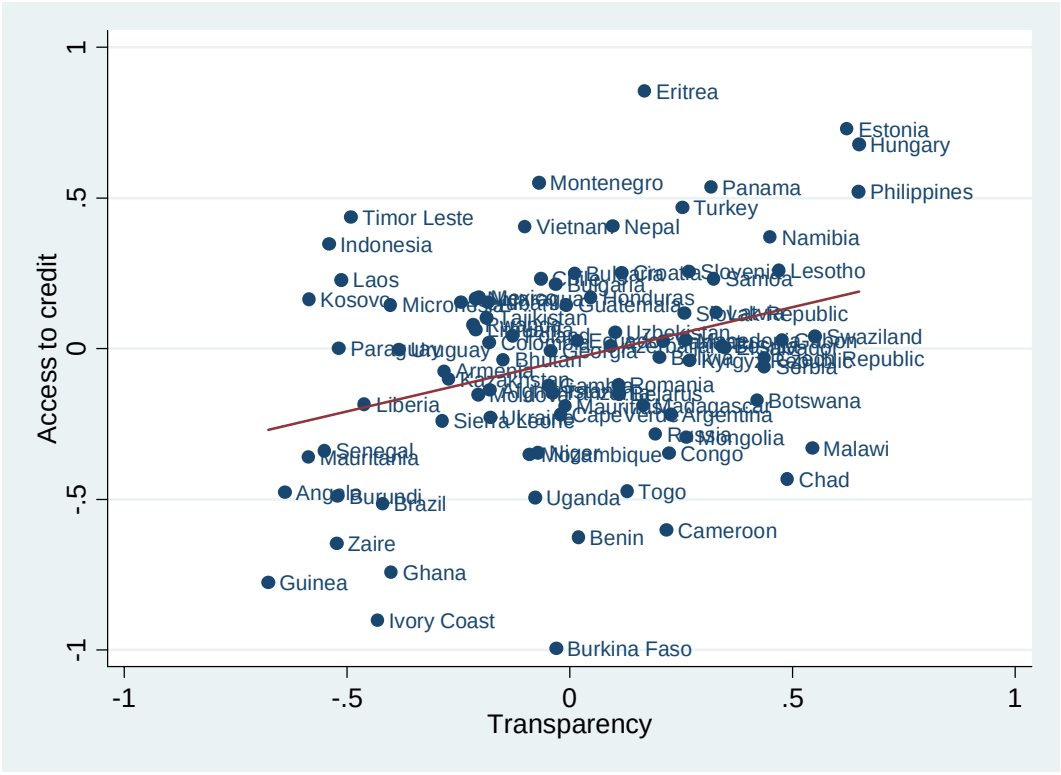

Figure 1. Transparency and Access to Credit. The indicator of firm's transparency is defined as the sum of 5 dummy variables: (1) firm has an external auditor; (2) firm has quality certification; (3) the firm I, listed in the stock market; (4) foreigners own at least 50% of the firm; (5) the government owns at least 50% of the firm. The variable is standardized to have mean zero and standard deviation equal to one.

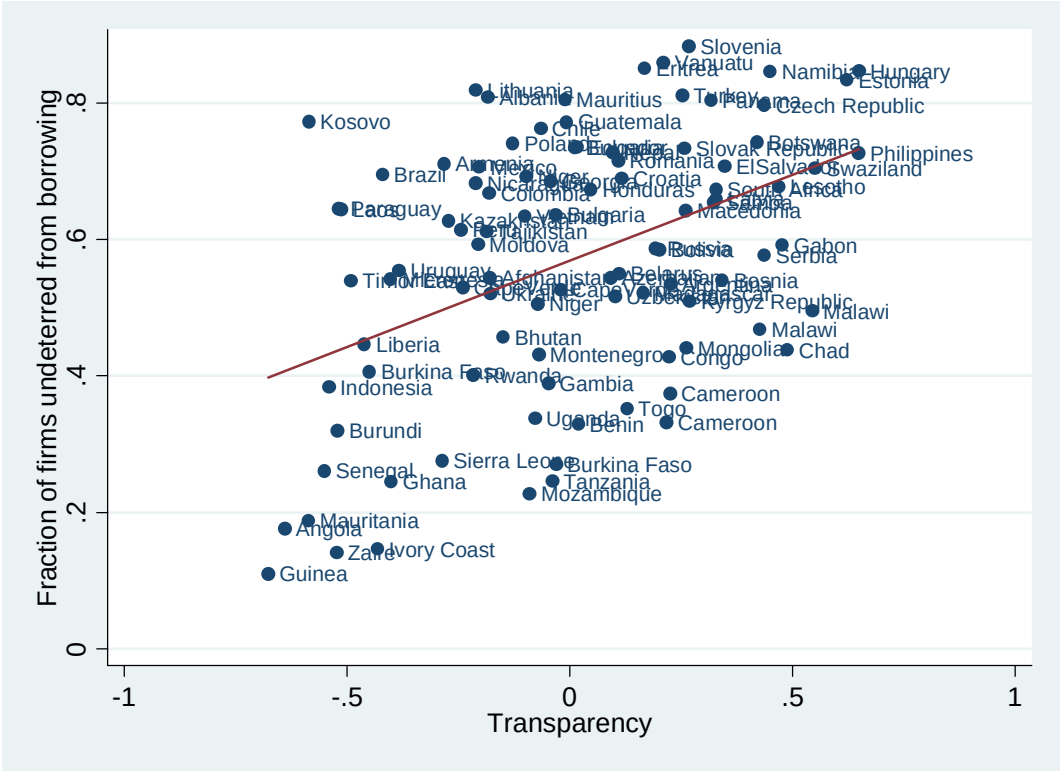

Figure 2. Transparency and Fraction of Firms Undeterred from Borrowing. The indicator of firm's transparency is defined as the sum of 5 dummy variables: (1) firm has an external auditor; (2) firm has quality certification; (3) the firm I, listed in the stock market; (4) foreigners own at least 50% of the firm; (5) the government owns at least 50% of the firm. Firms undeterred from borrowing are those who did not state that they did not apply for credit because the application procedures were complex, interest rates were not favorable, collateral requirements were too high, size of loan and maturity were insufficient, or did not think it would be approved.

Table 1. Descriptive Statistics – Worldscope Data

Column 1 reports the number of publicly listed firms in each country used in our sample. Column 2 reports the statutory tax rate (in %) in each country obtained from Djankov et al. (2009). The statutory corporate tax rate is defined as the rate for the highest bracket of all taxes on corporate income. Column 3 reports the effective 5-year corporate tax rate obtained from Djankov et al. (2009). The effective corporate tax rate takes into account the pre-tax earnings and the actual depreciation charges. Column 4 reports the stock market capitalization as % of GDP reported in Djankov et al. (2008). Columns 5 and 6 report our two measures of Earnings Smoothing, ES1 and ES2. Columns 7, 8 and 9 report our three measures of Earnings Discretion, ED1, ED2 and ED3. The bottom row shows the total number of firms for the entire sample, the country-level average values for the statutory corporate tax rate, effective 1st year corporate tax rate, and stock market capitalization as % of GDP, and the firm-level average values for ES1, ES2, ED1, ED2 and ED3.

	Number of Firms	**Statutory Corporate Tax Rate**	**Effective 1st Year Corporate Tax Rate**	**Stock Market Capitalization as % of GDP**	**Earnings Smoothing Measure ES1**	**Earnings Smoothing Measure ES2**	**Earnings Discretion Measure ED1**	**Earnings Discretion Measure ED2**	**Earnings Discretion Measure ED3**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(8)**
Argentina	49	35.00	23.54	34.62	-0.0692	-0.0711	-0.0618	-	-
Australia	586	30.00	21.96	101.57	-0.0285	-0.0407	-0.0328	-0.0371	-0.0304
Austria	109	34.00	20.86	20.55	-0.0465	-0.0327	-0.0389	-	-
Belgium	102	33.99	16.71	55.11	-0.0584	-0.0433	-0.0479	-	-
Brazil	195	34.00	15.49	19.85	-0.0651	-0.0701	-0.0598	-	-
Canada	426	36.12	21.78	90.36	-0.0361	-0.0432	-0.0425	-0.0474	-0.0488
Chile	158	17.00	15.09	116.09	-0.0537	-0.0595	-0.0490	-	-
Denmark	107	30.00	21.94	62.44	-0.0551	-0.0524	-0.0435	-	-
Finland	209	29.00	16.30	95.89	-0.0555	-0.0593	-0.0492	-0.0416	-0.0428
France	843	35.43	14.06	69.80	-0.0549	-0.0531	-0.0465	-0.0628	-0.0653
Germany	962	37.07	23.50	40.85	-0.0392	-0.0262	-0.0435	-0.0459	-0.0489
Greece	81	35.00	19.78	52.78	-0.0695	-0.0789	-0.0682	-	-
Hong Kong	304	17.50	0.00	301.94	-0.0376	-0.0358	-0.0410	-0.0276	-0.0320
India	291	36.59	20.28	44.32	-0.0587	-0.0601	-0.0443	-0.0465	-0.0486
Indonesia	82	30.00	20.84	22.85	-0.0759	-0.0604	-0.0785	-	-
Ireland	114	12.50	9.62	50.78	-0.0480	-0.0439	-0.0522	-	-
Israel	139	35.00	25.72	57.58	-0.0537	-0.0629	-0.0502	-	-
Italy	272	37.25	23.82	37.93	-0.0622	-0.0680	-0.0598	-0.0527	-0.0628
Japan	1,538	42.05	28.66	72.51	-0.0550	-0.0593	-0.0505	-0.0659	-0.0680

Mexico	121	28.00	10.50	141.78	-0.0541	-0.0532	-0.0543	-0.0685	-0.0675
Malaysia	315	33.00	22.21	15.95	-0.0698	-0.0665	-0.0574	-	-
Netherlands	115	34.50	25.62	117.39	-0.0319	-0.0443	-0.0409	-	-
New Zealand	49	33.00	26.44	34.49	-0.0483	-0.0657	-0.0523	-	-
Norway	209	28.00	18.50	43.33	-0.0397	-0.0554	-0.0488	-0.0551	-0.0560
Peru	31	30.00	22.03	10.65	-0.0640	-0.0698	-0.0594	-	-
Philippines	125	32.00	22.08	26.68	-0.0709	-0.0555	-0.0706	-	-
Portugal	79	27.50	16.03	39.50	-0.0708	-0.0650	-0.0599	-	-
Singapore	320	20.00	10.25	169.97	-0.0355	-0.0383	-0.0328	-0.0426	-0.0440
South Africa	58	30.00	18.10	99.13	-0.0467	-0.0513	-0.0470	-	-
South Korea	482	26.73	14.94	51.07	-0.0611	-0.0625	-0.0588	-0.0791	-0.0829
Spain	272	35.00	18.52	54.65	-0.0571	-0.0596	-0.0445	-0.0455	-0.0475
Sweden	285	28.00	10.47	82.67	-0.0429	-0.0474	-0.0446	-0.0533	-0.0551
Switzerland	237	24.10	13.74	214.82	-0.0344	-0.0463	-0.0407	-0.0467	-0.0476
Taiwan	148	25.00	17.83	136.67	-0.0479	-0.0464	-0.0412	-	-
Thailand	190	30.00	22.04	81.08	-0.0508	-0.0439	-0.0442	-	-
UK	1,560	30.00	18.61	129.76	-0.0406	-0.0315	-0.0303	-0.0420	-0.0405
United States	1,620	45.20	18.19	120.00	-0.0345	-0.0299	-0.0359	-0.0404	-0.0384
Total sample	12,783	30.74	18.54	78.84	-0.0651	-0.0673	-0.0609	-0.0572	-0.0580

Table 2. Correlation Between Accounting Transparency Measures and Country-Level Characteristics – Worldscope Data

The table shows the correlation between the Earnings Smoothing Measures 1 and 2 (ES1 and ES2), the Earnings Discretion 1, 2 and 3 (ED1, ED2 and ED3), the Statutory Corporate Tax Rate drawn from Djankov et al. (2009), the Effective 1st Year Corporate Tax Rate drawn form Djankov et al. (2009), and the Stock Market Capitalization to GDP drawn from Djankov et al. (2006). P-values are shown in parenthesis.

	Earnings Smoothing Measure ES1	**Earnings Smoothing Measure ES2**	**Earnings Discretion Measure ED1**	**Earnings Discretion Measure ED2**	**Earnings Discretion Measure ED3**	**Statutory Corporate Tax Rate**	**Effective 1st Year Corporate Tax Rate**	**Stock Market Capitalization as Percent of GDP**
Earnings Smoothing Measure ES1	1							
Earnings Smoothing Measure ES2	0.7829 (0.00)	1						
Earnings Discretion Measure ED1	0.7219 (0.00)	0.7089 (0.00)	1					
Earnings Discretion Measure ED2	0.5092 (0.01)	0.4696 (0.02)	0.6542 (0.04)	1				
Earnings Discretion Measure ED3	0.5518 (0.01)	0.5328 (0.03)	0.7148 (0.04)	0.8762 (0.02)	1			
Statutory Corporate Tax Rate	-0.1508 (0.40)	-0.1324 (0.49)	-0.0925 (0.62)	-0.1207 (0.57)	-0.1895 (0.28)	1		
Effective 1st Year Corporate Tax Rate	-0.2763 (0.21)	-0.2781 (0.25)	-0.2151 (0.30)	-0.2069 (0.34)	-0.2305 (0.29)	0.7099 (0.00)	1	
Stock Market Capitalization as % of GDP	0.6209 (0.00)	0.4204 (0.00)	0.4529 (0.00)	0.4907 (0.08)	0.49084 (0.04)	-0.4355 (0.01)	-0.5709 (0.00)	1

Table 3. Investment Regressions – Worldscope Data

This table presents the estimates of a cross-sectional regression model for 12,738 firms in Column2 1-3 and 10,351 in Columns 4-5 from 37 countries. The dependent variable is the mean of the ratio of Capital Expenditure to Total Assets in the previous year calculated over the period 1990-2008 for all firms for which we have at least 6 years of data. The independent variables are as follows: Accounting Transparency are measures of firm-level transparency where in Column 1 is measured as Earnings Smoothing 1 (ES1), in Column 2 is measured as Earnings Smoothing 2 (ES2), in Column 3 is measured as Earnings Discretion 1 (ED1), in Column 4 is measured as Earnings Discretion 2 (ED2) and in Column 5 is measured as Earnings Discretion 3 (ED3), Accounting Transparency x Financial Dependence is the interaction between measures of Accounting Transparency interacted with industry-level financial dependence drawn from Rajan and Zingales (1998); Accounting Transparency x Financial Development is the interaction between measures of Accounting Transparency interacted with the country-level Stock Market Capitalization as % of GDP drawn from Djankov (2006); Initial Assets is the value of firm's Total Assets (in US$ and logs) in the first year for which Worldscope provides accounting data; Initial Book-to-Market is the value of the firm's book-to-market ratio in the first year for which Worldscope provides data; and Initial Leverage is the value of the firm's leverage (calculated as Total Debt divided by Total Assets) in the first year for which Worldscope provides data. Standard errors are corrected for clustering at the country and sector level. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Accounting Transparency	0.1291**	0.1228**	0.1381**	0.1025*	0.0988*
	(2.38)	(2.33)	(2.47)	(1.82)	(1.79)
Accounting Transparency × Financial Dependence	0.3512**	0.3452**	0.3625**	0.2875*	0.2728*
	(2.05)	(2.19)	(2.26)	(1.85)	(1.82)
Accounting Transparency × Financial Development	0.0006**	0.0006**	0.0005*	0.0005*	0.0004
	(2.16)	(2.10)	(1.92)	(1.75)	(1.61)
Initial Assets	-0.0081**	0.0075**	-0.0081**	-0.0079**	-0.0074**
	(-2.09)	(2.03)	(-2.11)	(-2.07)	(-1.99)
Initial Book-to-Market	0.0092**	0.0095**	0.0098**	0.0102**	0.0106**
	(2.29)	(2.35)	(2.39)	(2.48)	(2.50)
Initial Leverage	-0.0038	-0.0042	-0.0043	-0.0032	-0.0041
	(-1.42)	(-1.49)	(-1.45)	(-1.31)	(-1.48)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Number of Observations	12,783	12,783	12,783	10,351	10,351
R^2	0.29	0.27	0.25	0.22	0.24

Table 4. Transparency Regressions – Worldscope Data

This table presents the estimates of a cross-sectional regression model for 12,738 firms in Column2 1-3 and 10,351 in Columns 4-5 from 37 countries. The dependent variable are measures of firm-level transparency calculated over the period 1990-2008 for all firms for which we have at least 6 years of data. The dependent variable in Column 1 is Earnings Smoothing 1 (ES1), in Column 2 is Earnings Smoothing 2 (ES2), in Column 3 is Earnings Discretion 1 (ED1), in Column 4 is Earnings Discretion 2 (ED2) and in Column 5 is Earnings Discretion 3 (ED3). The independent variables are as follows: Corporate Taxes x Financial Dependence is the interaction between the Effective 1st Year Corporate Tax Rate drawn from Djankov et al. (2009) interacted with industry-level financial dependence drawn from Rajan and Zingales (1998); Financial Dependence x Financial Development is the interaction between industry-level financial dependence drawn from Rajan and Zingales (1998) interacted with the country-level Stock Market Capitalization as % of GDP drawn from Djankov (2006); Initial Assets is the value of firm's Total Assets (in US$ and logs) in the first year for which Worldscope provides accounting data; Initial Book-to-Market is the value of the firm's book-to-market ratio in the first year for which Worldscope provides data; and Initial Leverage is the value of the firm's leverage (calculated as Total Debt divided by Total Assets) in the first year for which Worldscope provides data. Standard errors are corrected for clustering at the country and sector level. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	(1)	(2)	(3)	(4)	(5)
Corporate Taxes × Financial Dependence	0.0021**	0.0024**	0.0020**	0.0018*	0.0020*
	(2.32)	(2.58)	(2.01)	(1.89)	(1.87)
Financial Development × Financial Dependence (× 1000)	0.3591**	0.3924**	0.4237**	0.2981*	0.3186*
	(1.99)	(2.18)	(2.29)	(1.80)	(1.87)
Initial Assets	0.0084*	0.0091**	0.0081*	0.0072*	0.0078*
	(1.85)	(2.02)	(1.84)	(1.75)	(1.79)
Initial Book-to-Market	0.0050*	0.0047*	0.0047*	0.0042	0.0041
	(1.83)	(1.76)	(1.74)	(1.62)	(1.60)
Initial Leverage	0.0028	0.0030	0.0031	0.0027	0.0028
	(1.02)	(1.11)	(1.14)	(1.04)	(1.05)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Number of Observations	12,783	12,783	12,783	10,351	10,351
R^2	0.29	0.32	0.38	0.25	0.27

Table 5. Investment Regressions, Sample Split by Tax-Book Conformity – Worldscope Data

This table presents the estimates of a cross-sectional regression for 12,738 firms in Columns 1-3 and 10,351 in Columns 4-5 from 37 countries. Panel A presents results for firms in countries that do not have tax-book conformity (Australia, Canada, Denmark, Hong Kong, Ireland, Netherlands, New Zealand, Norway, Singapore, South Africa, United Kingdom, United States) and Panel B for countries with tax-book conformity (Argentina, Austria, Belgium, Chile, Finland, France, Germany, Greece, Italy, Japan, Portugal, Spain, Sweden, Switzerland). The dependent variable is the mean of the ratio of Capital Expenditure to Total Assets in the previous year calculated over 1990-2008 for all firms for which we have at least 6 years of data. The independent variables are: Accounting Transparency are measures of firm-level transparency where in Column 1 is measured as Earnings Smoothing 1 (ES1), in Column 2 is measured as Earnings Smoothing 2 (ES2), in Column 3 is measured as Earnings Discretion 1 (ED1), in Column 4 is measured as Earnings Discretion 2 (ED2) and in Column 5 is measured as Earnings Discretion 3 (ED3), Accounting Transparency x Financial Dependence is the interaction between measures of Accounting Transparency interacted with industry-level financial dependence drawn from Rajan and Zingales (1998); Accounting Transparency x Financial Development is the interaction between measures of Accounting Transparency interacted with the country-level Stock Market Capitalization as % of GDP drawn from Djankov (2006); Initial Assets is the value of firm's Total Assets (in US$ and logs) in the first year for which Worldscope provides accounting data; Initial Book-to-Market is the value of the firm's book-to-market ratio in the first year for which Worldscope provides data; and Initial Leverage is the value of the firm's leverage (calculated as Total Debt divided by Total Assets) in the first year for which Worldscope provides data. Standard errors are corrected for clustering at the country and sector level. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

Panel A. Countries with no tax-book conformity

	(1)	(2)	(3)	(4)	(5)
Accounting Transparency	0.1167**	0.1214*	0.1329*	0.1011*	0.1154*
	(1.98)	(1.91)	(1.85)	(1.79)	(1.81)
Accounting Transparency × Financial Dependence	0.3035*	0.3278*	0.3420*	0.2680*	0.2768*
	(1.68)	(1.85)	(1.95)	(1.71)	(1.74)
Accounting Transparency × Financial Development	0.0005	0.0005	0.0004	0.0004	0.0003
	(1.55)	(1.58)	(1.44)	(1.47)	(1.40)
Initial Assets	-0.0083*	-0.0077*	-0.0087**	-0.0081*	-0.0079*
	(-1.94)	(-1.92)	(-2.07)	(-1.90)	(-1.87)
Initial Book-to-Market	0.0087**	0.0092**	0.0091**	0.0097**	0.0110**
	(2.03)	(2.11)	(2.09)	(2.21)	(2.31)
Initial Leverage	-0.0035	-0.0036	-0.0039	-0.0030	-0.0038
	(-1.44)	(-1.49)	(-1.48)	(-1.37)	(-1.37)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Number of Observations	5,468	5,468	5,468	5,025	5,025
R^2	0.29	0.28	0.24	0.20	0.21

Panel B. Countries with tax-book conformity

	(1)	(2)	(3)	(4)	(5)
Accounting Transparency	0.1715**	0.1682**	0.1833**	0.1427**	0.1517**
	(2.58)	(2.46)	(2.23)	(2.09)	(2.05)
Accounting Transparency × Financial Dependence	0.3783**	0.4208**	0.4387**	0.3428**	0.3419**
	(2.20)	(2.49)	(2.51)	(1.98)	(2.04)
Accounting Transparency × Financial Development	0.0007**	0.0008**	0.0008*	0.0007*	0.0006*
	(1.99)	(2.11)	(1.90)	(1.80)	(1.72)
Initial Assets	-0.0077**	-0.0079**	-0.0077**	-0.0078*	-0.0081**
	(-2.07)	(-2.10)	(-2.06)	(-2.11)	(-2.16)
Initial Book-to-Market	0.0100**	0.0088**	0.0103**	0.0117**	0.0101**
	(2.09)	(2.04)	(2.19)	(2.26)	(2.08)
Initial Leverage	-0.0034	-0.0032	-0.0038	-0.0029	-0.0031
	(-1.51)	(-1.50)	(-1.53)	(-1.42)	(-1.41)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Number of Observations	5,196	5,196	5,196	4,618	4,618
R^2	0.32	0.30	0.26	0.24	0.26

Table 6. Transparency Regressions, Sample Split by Tax-Book Conformity – Worldscope Data

This table presents the estimates of a cross-sectional regression model for 12,738 firms in Column2 1-3 and 10,351 in Columns 4-5 from 37 countries. Panel A presents results for firms in countries that do not have tax-book conformity (Australia, Canada, Denmark, Hong Kong, Ireland, Netherlands, New Zealand, Norway, Singapore, South Africa, United Kingdom, United States) and Panel B presents results for countries with tax-book conformity (Argentina, Austria, Belgium, Chile, Finland, France, Germany, Greece, Italy, Japan, Portugal, Spain, Sweden, Switzerland). The dependent variable are measures of firm-level transparency calculated over the period 1990-2008 for all firms for which we have at least 6 years of data. The dependent variable in Column 1 is Earnings Smoothing 1 (ES1), in Column 2 is Earnings Smoothing 2 (ES2), in Column 3 is Earnings Discretion 1 (ED1), in Column 4 is Earnings Discretion 2 (ED2) and in Column 5 is Earnings Discretion 3 (ED3). The independent variables are as follows: Corporate Taxes x Financial Dependence is the interaction between the Effective 1st Year Corporate Tax Rate drawn from Djankov et al. (2009) interacted with industry-level financial dependence drawn from Rajan and Zingales (1998); Financial Dependence x Financial Development is the interaction between industry-level financial dependence drawn from Rajan and Zingales (1998) interacted with the country-level Stock Market Capitalization as % of GDP drawn from Djankov (2006); Initial Assets is the value of firm's Total Assets (in US$ and logs) in the first year for which Worldscope provides accounting data; Initial Book-to-Market is the value of the firm's book-to-market ratio in the first year for which Worldscope provides data; and Initial Leverage is the value of the firm's leverage (calculated as Total Debt divided by Total Assets) in the first year for which Worldscope provides data. Standard errors are corrected for clustering at the country and sector level. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

Panel A. Countries with no tax-book conformity

	(1)	(2)	(3)	(4)	(5)
Corporate Taxes × Financial Dependence	0.0018**	0.0021**	0.0019*	0.0016*	0.0015*
	(2.08)	(2.21)	(1.92)	(1.78)	(1.72)
Financial Development × Financial Dependence (× 1000)	0.3411*	0.3228**	0.3825*	0.2932*	0.3027*
	(1.91)	(1.97)	(1.92)	(1.74)	(1.75)
Initial Assets	0.0071*	0.0087**	0.0068*	0.0065*	0.0067*
	(1.91)	(2.09)	(1.89)	(1.86)	(1.89)
Initial Book-to-Market	0.0041**	0.0047**	0.0045**	0.0037**	0.0040**
	(2.02)	(2.12)	(2.16)	(2.03)	(2.04)
Initial Leverage	0.0029	0.0028	0.0031	0.0027	0.0026
	(1.40)	(1.48)	(1.45)	(1.37)	(1.39)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Number of Observations	5,468	5,468	5,468	5,025	5,025
R^2	0.34	0.35	0.28	0.29	0.30

Panel B. Countries with tax-book conformity

	(1)	(2)	(3)	(4)	(5)
Corporate Taxes × Financial Dependence	0.0027**	0.0028**	0.0029**	0.0025**	0.0027**
	(2.26)	(2.57)	(2.05)	(2.03)	(1.97)
Financial Development × Financial Dependence (× 1000)	0.3878**	0.4438**	0.4176**	0.3219**	0.2941*
	(2.21)	(2.42)	(2.53)	(2.05)	(1.88)
Initial Assets	0.0085**	0.0096**	0.0089**	0.0082**	0.0085**
	(2.09)	(2.26)	(2.08)	(2.04)	(2.08)
Initial Book-to-Market	0.0061**	0.0052**	0.0055**	0.0050*	0.0051*
	(2.07)	(2.10)	(1.99)	(1.81)	(1.82)
Initial Leverage	0.0034	0.0039	0.0038	0.0035	0.0034
	(1.52)	(1.61)	(1.62)	(1.54)	(1.55)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Number of Observations	5,196	5,196	5,196	4,618	4,618
R^2	0.37	0.40	0.35	0.32	0.26

Table 7. Descriptive Statistics – WBES Data

The Transparency Index is an indicator of firm's transparency and is defined as the sum of 5 dummy variables: (1) firm has an external auditor; (2) firm has quality certification; (3) the firm is listed in the stock market; (4) foreigners own at least 50% of the firm; (5) the government owns at least 50% of the firm. Access to Credit is based on the question: Is access to finance, which includes availability and cost, interest rates, fees and collateral requirements: (1) a very severe obstacle to the current operation of this establishment; (2) major obstacle; (3) moderate obstacle;? (4) minor obstacle; (5) no obstacle. Undeterred from Borrowing is based on the following question asked to all firms who did not apply for credit: What was the main reason why this establishment did not apply for any line of credit or loan in the last fiscal year? The variable is coded 0 if the answer is that application procedures were complex, interest rates were not favorable, collateral requirements were too high, size of loan and maturity were insufficient, did not think it would be approved, and 1 otherwise. Medium firms are firms with more than 20 and less than 100 employees. Large firms are firms with more than 100 employees.

	Number of obs.	**Transparency index**	**Access to credit**	**Undeterred from borrowing**	**Small firm**	**Medium Firm**	**Large firm**
Afghanistan	535	0.70	3.19	0.54	0.61	0.26	0.13
Albania	304	0.70	3.59	0.81	0.58	0.35	0.07
Angola	425	0.27	2.71	0.18	0.86	0.12	0.01
Argentina	1063	1.08	3.08	0.53	0.41	0.38	0.21
Armenia	374	0.60	3.27	0.71	0.52	0.32	0.16
Azerbaijan	380	0.95	3.39	0.54	0.45	0.35	0.20
Belarus	273	0.97	3.1 7	0.55	0.35	0.35	0.30
Benin	150	0.89	2.51	0.33	0.55	0.39	0.06
Bhutan	250	0.73	3.33	0.46	0.46	0.41	0.13
Bolivia	613	1.05	3.34	0.59	0.48	0.36	0.16
Bosnia	361	1.19	3.39	0.54	0.39	0.36	0.25
Botswana	342	1.26	3.14	0.74	0.63	0.26	0.11
Brazil	1802	0.48	2.66	0.69	0.43	0.37	0.19
Bulgaria	1303	0.87	3.71	0.72	0.40	0.39	0.21
Burkina Faso	533	0.77	1.99	0.29	0.41	0.21	0.12
Burundi	270	0.38	2.70	0.32	0.83	0.15	0.02
Cameroon	535	1.07	2.54	0.35	0.30	0.24	0.13
Cape Verde	254	0.77	3.07	0.53	0.30	0.22	0.10
Chad	150	1.32	2.78	0.44	0.52	0.37	0.11
Chile	1017	0.81	3.70	0.76	0.31	0.45	0.25
Colombia	1000	0.70	3.41	0.67	0.53	0.36	0.11
Congo	151	1.07	2.89	0.43	0.57	0.34	0.09
Croatia	633	0.98	3.73	0.69	0.38	0.35	0.27
Czech Republic	250	1.27	3.34	0.80	0.34	0.37	0.29
Ecuador	658	0.88	3.41	0.74	0.43	0.36	0.21
El Salvador	693	1.19	3.38	0.71	0.41	0.37	0.22
Eritrea	179	1.02	4.57	0.85	0.58	0.37	0.05
Estonia	273	1.45	4.39	0.83	0.38	0.35	0.27
Gabon	179	1.31	3.42	0.59	0.66	0.25	0.09
Gambia	174	0.82	3.21	0.39	0.70	0.27	0.03
Georgia	373	0.83	3.37	0.69	0.49	0.37	0.14
Ghana	494	0.49	2.34	0.24	0.75	0.19	0.06
Guatemala	522	0.86	3.58	0.77	0.43	0.36	0.20
Guinea	382	0.24	2.30	0.11	0.88	0.09	0.02
Honduras	436	0.91	3.62	0.67	0.49	0.31	0.21
Hungary	291	1.47	4.32	0.85	0.34	0.34	0.32
Indonesia	1444	0.36	3.86	0.38	0.57	0.24	0.19
Ivory Coast	526	0.46	2.12	0.15	0.69	0.23	0.08
Kazakhstan	544	0.61	3.24	0.63	0.29	0.41	0.30

Table 7 – continued

	Number of obs.	Transparency index	Access to credit	Undeterred from borrowing	Small firm	Medium Firm	Large firm
Kosovo	270	0.32	3.61	0.77	0.73	0.21	0.07
Kyrgyz Republic	235	1.12	3.32	0.51	0.44	0.40	0.16
Laos	360	0.39	3.70	0.64	0.47	0.36	0.17
Latvia	271	1.17	3.55	0.66	0.31	0.33	0.35
Lesotho	151	1.30	3.74	0.68	0.48	0.32	0.20
Liberia	150	0.44	3.12	0.45	0.77	0.17	0.06
Lithuania	276	0.67	3.47	0.82	0.40	0.33	0.26
Macedonia	366	1.11	3.42	0.64	0.34	0.41	0.25
Madagascar	445	1.02	3.12	0.52	0.40	0.43	0.17
Malawi	310	1.32	2.92	0.48	0.15	0.17	0.16
Mauritania	237	0.32	2.88	0.19	0.81	0.17	0.02
Mauritius	398	0.86	3.11	0.80	0.55	0.30	0.15
Mexico	1480	0.68	3.62	0.71	0.50	0.30	0.20
Micronesia	68	0.49	3.58	0.54	0.62	0.38	0.00
Moldova	363	0.68	3.17	0.59	0.36	0.38	0.26
Mongolia	362	1.11	2.97	0.44	0.44	0.37	0.19
Montenegro	116	0.80	4.15	0.43	0.51	0.34	0.15
Mozambique	479	0.78	2.89	0.23	0.64	0.30	0.06
Namibia	329	1.29	3.89	0.85	0.72	0.23	0.05
Nepal	368	0.96	3.95	0.73	0.52	0.39	0.08
Nicaragua	478	0.67	3.61	0.68	0.58	0.32	0.10
Niger	275	0.79	2.90	0.57	0.30	0.21	0.04
Panama	604	1.16	4.13	0.80	0.56	0.32	0.12
Paraguay	613	0.38	3.38	0.65	0.53	0.38	0.09
Peru	632	0.64	3.59	0.61	0.43	0.40	0.17
Philippines	1326	1.47	4.10	0.73	0.34	0.41	0.25
Poland	455	0.75	3.44	0.74	0.47	0.29	0.24
Romania	541	0.97	3.21	0.72	0.35	0.34	0.30
Russia	1004	1.05	2.98	0.59	0.26	0.37	0.37
Rwanda	212	0.67	3.49	0.40	0.70	0.24	0.06
Samoa	109	1.17	3.70	0.65	0.58	0.35	0.07
Senegal	506	0.35	2.91	0.26	0.83	0.13	0.04
Serbia	388	1.27	3.29	0.58	0.37	0.32	0.31
Sierra Leone	150	0.60	3.05	0.28	0.70	0.23	0.07
Slovak Republic	275	1.11	3.54	0.73	0.35	0.32	0.33
Slovenia	276	1.12	3.74	0.88	0.38	0.30	0.31
South Africa	937	1.17	4.27	0.67	0.40	0.39	0.21
Swaziland	307	1.38	3.44	0.70	0.73	0.17	0.10
Tajikistan	360	0.69	3.52	0.61	0.50	0.36	0.15
Tanzania	419	0.83	3.18	0.25	0.64	0.27	0.09
Timor East	150	0.41	3.99	0.54	0.61	0.35	0.03
Togo	155	0.99	2.72	0.35	0.61	0.28	0.11
Turkey	1152	1.10	4.03	0.81	0.31	0.38	0.30
Uganda	563	0.79	2.69	0.34	0.68	0.26	0.06
Ukraine	851	0.70	3.06	0.52	0.40	0.35	0.25
Uruguay	621	0.51	3.37	0.55	0.48	0.37	0.15
Uzbekistan	366	0.96	3.45	0.52	0.38	0.37	0.25
Vanuatu	128	1.06	3.41	0.86	0.64	0.35	0.01
Venezuela	500	3.11	3.79	-	0.66	0.24	0.10
Vietnam	1053	0.77	3.94	0.63	0.24	0.40	0.37
Zaire	340	0.38	2.48	0.14	0.77	0.19	0.03
Total sample	42916	0.87	3.38	0.58	0.47	0.33	0.18

Table 8. Credit Access Regressions – WBES Data

The dependent variable is an indicator of access to credit, based on the question: Is access to finance, which includes availability and cost, interest rates, fees and collateral requirements: (1) a very severe obstacle to the current operation of this establishment; (2) major obstacle; (3) moderate obstacle;? (4) minor obstacle; (5) no obstacle. Medium firms are firms with more than 20 and less than 100 employees. Large firms are firms with more than 100 employees. Access to credit, transparency and firm's age are standardized to have mean zero and standard deviation equal to one. Standard errors are reported in parenthesis. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	(1)	(2)	(3)
Transparency	0.117***	0.087***	0.059***
	(0.005)	(0.005)	(0.006)
Tax rate minor obstacle	-0.257***	-0.221***	-0.192***
	(0.015)	(0.015)	(0.015)
Tax rate moderate obstacle	-0.438***	-0.385***	-0.350***
	(0.014)	(0.014)	(0.014)
Tax rate major obstacle	-0.646***	-0.567***	-0.503***
	(0.014)	(0.014)	(0.015)
Tax rate very severe obstacle	-0.877***	-0.765***	-0.686***
	(0.016)	(0.017)	(0.017)
Informal competition minor obstacle		-0.116***	-0.097***
		(0.014)	(0.014)
Informal competition moderate obstacle		-0.227***	-0.202***
		(0.014)	(0.014)
Informal competition major obstacle		-0.316***	-0.288***
		(0.014)	(0.014)
Informal competition very severe obstacle		-0.430***	-0.402***
		(0.015)	(0.015)
Firm's age		0.022***	0.017***
		(0.005)	(0.005)
Medium firm		0.050***	0.042***
		(0.011)	(0.011)
Large firm		0.050***	0.068***
		(0.015)	(0.015)
Part of a group		0.117***	0.104***
		(0.014)	(0.014)
Africa	-0.379***	-0.361***	
	(0.013)	(0.014)	
Asia	0.120***	0.100***	
	(0.015)	(0.015)	
Latin America	-0.020	0.013	
	(0.013)	(0.013)	
Constant	0.289***	0.440**	0.398***
	(0.074)	(0.201)	(0.073)
Observations	40100	38370	38370
R-squared	0.14	0.16	0.22
Sector dummies	YES	YES	YES
Country dummies	NO	NO	YES

Table 9. Regressions for firms undeterred from borrowing – WBES Data

The dependent variable is an indicator of firms that are undeterred from borrowing. The following question is asked to all firms who did not apply for credit: What was the main reason why this establishment did not apply for any line of credit or loan in the last fiscal year? The variable is coded 0 if the answer is that application procedures were complex, interest rates were not favorable, collateral requirements were too high, size of loan and maturity were insufficient, did not think it would be approved, and 1 otherwise. Medium firms are firms with more than 20 and less than 100 employees. Large firms are firms with more than 100 employees. The dependent variable, transparency and firm's age are standardized to have mean zero and standard deviation equal to one. Standard errors are reported in parenthesis. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	(1)	(2)	(3)
Transparency	0.098***	0.077***	0.053***
	(0.003)	(0.004)	(0.004)
Tax rate minor obstacle	-0.025**	-0.023**	-0.037***
	(0.010)	(0.010)	(0.011)
Tax rate moderate obstacle	-0.054***	-0.044***	-0.066***
	(0.009)	(0.010)	(0.011)
Tax rate major obstacle	-0.096***	-0.078***	-0.096***
	(0.009)	(0.010)	(0.011)
Tax rate very severe obstacle	-0.114***	-0.090***	-0.111***
	(0.011)	(0.012)	(0.013)
Informal competition minor obstacle		-0.029***	-0.025**
		(0.010)	(0.010)
Informal competition moderate obstacle		-0.060***	-0.059***
		(0.010)	(0.010)
Informal competition major obstacle		-0.102***	-0.096***
		(0.010)	(0.011)
Informal competition very severe obstacle		-0.118***	-0.122***
		(0.011)	(0.011)
Firm's age		0.002	0.003
		(0.004)	(0.004)
Medium firm		0.066***	0.069***
		(0.008)	(0.008)
Large firm		0.098***	0.110***
		(0.011)	(0.011)
Part of a group		0.053***	0.061***
		(0.010)	(0.011)
Africa	-0.270***	-0.255***	
	(0.008)	(0.009)	
Asia	-0.059***	-0.063***	
	(0.010)	(0.011)	
Latin America	0.051***	0.069***	
	(0.009)	(0.009)	
Observations	25774	24614	24614
Sector dummies	YES	YES	YES
Country dummies	NO	NO	YES

Table 10. Transparency Regressions – WBES Data

The dependent variable is an indicator of firm's transparency and is defined as the sum of 5 dummy variables: (1) firm has an external auditor; (2) firm has quality certification; (3) the firm I, listed in the stock market; (4) foreigners own at least 50% of the firm; (5) the government owns at least 50% of the firm. Medium firms are firms with more than 20 and less than 100 employees. Large firms are firms with more than 100 employees. The dependent variable and firm's age are standardized to have mean zero and standard deviation equal to one. Standard errors are reported in parenthesis. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	(1)	(2)	(3)
Tax rate minor obstacle	0.015	0.000	-0.030**
	(0.016)	(0.015)	(0.013)
Tax rate moderate obstacle	0.030**	0.000	-0.013
	(0.015)	(0.013)	(0.012)
Tax rate major obstacle	-0.009	-0.028**	-0.033**
	(0.015)	(0.013)	(0.013)
Tax rate very severe obstacle	-0.053***	-0.068***	-0.011
	(0.017)	(0.016)	(0.015)
Informal competition minor obstacle	-0.076***	-0.061***	-0.051***
	(0.015)	(0.014)	(0.012)
Informal competition moderate obstacle	-0.124***	-0.083***	-0.045***
	(0.015)	(0.013)	(0.012)
Informal competition major obstacle	-0.161***	-0.100***	-0.070***
	(0.015)	(0.014)	(0.012)
Informal competition very severe obstacle	-0.165***	-0.099***	-0.064***
	(0.016)	(0.014)	(0.013)
Firm's age		0.075***	0.070***
		(0.005)	(0.004)
Medium firm		0.349***	0.345***
		(0.010)	(0.009)
Large firm		0.952***	0.953***
		(0.013)	(0.012)
Part of a group		0.492***	0.436***
		(0.014)	(0.012)
Africa	-0.096***	0.053***	
	(0.014)	(0.013)	
Asia	-0.054***	-0.016	
	(0.016)	(0.015)	
Latin America	-0.059***	-0.028**	
	(0.014)	(0.013)	
Constant	0.287	-0.236***	0.160**
	(0.215)	(0.072)	(0.066)
Observations	40122	39613	39613
R-squared	0.03	0.21	0.36
Sector dummies	YES	YES	YES
Country dummies	NO	NO	YES