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ABSTRACT

Transparency, Tax Pressure and Access to Finance*

In choosing transparency, firms must trade off the benefits from better access to finance against the cost of a greater tax burden. We study this trade-off in a model with distortionary taxes and endogenous rationing of external finance. The evidence from two different data sets, one formed only by listed firms and another mainly by unlisted firms, bears out the model's predictions: First, investment and access to finance are positively correlated with accounting transparency, especially in firms that depend more on external finance, and are negatively correlated with tax pressure. Second, transparency is negatively correlated with tax pressure, particularly in sectors where firms are less dependent on external finance, and is positively correlated with tax enforcement. Finally, financial development enhances the positive effect of transparency on investment, and encourages transparency by financially dependent firms.

JEL Classification: G31, G32, G38, H25, H26
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Firm transparency is largely a matter of choice: while regulation sets minimum standards, firms are free to exceed them, for instance by adopting strict accounting rules, hiring independent auditors to certify their accounts, or listing their shares on exchanges with demanding disclosure standards. But transparency is a double-edged sword: On one hand, by enhancing investor confidence, it enables companies to attract funding and reduces their cost of capital, as shown by many empirical studies;[1] indeed, firms that operate in the unofficial economy, and therefore have murky accounts, have a hard time obtaining loans.[2] On the other hand, transparency makes firms' operations more visible to tax authorities, and thus reduces their ability to evade or elude taxation. For instance, upon going public Italian companies pay 2% more taxes as a fraction of their operating income than in the pre-listing year, a likely reflection of the tighter disclosure associated with a public listing (Pagano, Panetta and Zingales, 1998). Also in the U.S. tax avoidance is a prime corporate concern, to the point that Treasury officials describe it as "the most serious compliance issue threatening the American tax system today" (Desai and Dharmapala, 2009, p. 1).

In this paper, we show that the tradeoff between the funding benefits and the tax costs of accounting transparency varies considerably across companies and across countries, depending on the corporate tax rate, on the degree of tax enforcement and on a company's need for external finance. Faced with a high corporate tax rate, companies may be inclined to choose low transparency, thus forgoing the funding benefits of transparency in exchange for more opportunities to reduce their tax burden. Their choice will also depend on the strictness of tax enforcement: if the penalties associated with tax avoidance are steep and hard to escape, companies will want to increase their accounting transparency. Another crucial element is whether the legal system requires companies to produce the same accounting information to both tax authorities and investors ("tax-book

[1] Cross-country studies find 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) show that more comprehensive disclosure is associated with a lower cost of capital and greater external financing. Daske, Hail, Leuz and Verdi (2008) document a reduction in cost of capital for firms converting to International Financial Reporting Standards (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. Only Daske (2006) finds no evidence that adoption of IFRS matters to the cost of capital for European firms.

[2] See Straub (2005), Garmaise and Natividad (2010) and Ayyagari, Demirgüç-Kunt and Maksimovic (2010).

conformity"): absent this requirement, more transparency vis-à-vis investors need not imply a greater tax burden, so that the tradeoff disappears (or at least is mitigated).

Dependence on external finance is another determinant of how each company weighs the costs and benefits of transparency: a company that envisages heavy reliance on external funding – for instance because it is capital-intensive or has strong growth prospects – will opt for high transparency to reassure investors; conversely, a company flush with cash, and thus free of financial concerns, will prefer low transparency.

The latter situation is well illustrated by an early episode concerning the Dutch company Amstel Bier. In 1936, the company's bumper earnings had allowed it to pay down its bonds completely and accumulate more cash than needed for its investments. 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."[3] 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 go public until well after WWII.

This episode highlights three points. (i) The company had some latitude in choosing its accounting transparency: by registering its shares and giving up bond issuance, it could avoid publishing its accounts. (ii) It opted for lower transparency because it had more cash than needed: if instead it had to appeal to external financiers, it might have done otherwise. (iii) The choice of lower transparency was 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 tax collectors (and from its employees' wage demands). This paper argues that all three points apply more generally.

[3] 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 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 lower financial disclosure, most small companies converted to this low-disclosure company type.

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). The model shows that, in choosing their transparency, firms trade off the benefits from access to more abundant capital against the cost of a greater tax burden. This tradeoff generates not only the testable predictions about firm transparency described above, but also predictions for firm investment and access to finance: firms that choose 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. Hence, 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.

We then test these predictions about transparency and investment on two international company-level data sets: the Worldscope database and the World Bank Enterprise Survey (WBES), which allow us to devise different measures of transparency, tax pressure, investment and financial market access. The WBES data refer to both private and listed firms, and thus features more variation in transparency than Worldscope, which only contains listed companies. But Worldscope has more detailed financial data, which enable us to compute accounting-based measures of transparency widely used in the literature.

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 all measures of transparency, especially in firms that depend more on external finance, and is negatively correlated with tax pressure, controlling for a variety of firm-level characteristics and including sector and country fixed effects.[4] Second, firm-level transparency is itself negatively correlated with tax pressure and positively correlated with measures of tax enforcement; moreover, the negative effect of taxes on transparency is weaker in industries where firms depend more on external finance. Third, these results are much stronger in countries that prescribe "tax-book conformity". Finally, financial

[4] 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.

development enhances the positive effect of transparency on investment, and encourages greater transparency by firms that depend more on external finance. All of these findings are consistent with the model.

Our paper is related to Desai, Dyck and Zingales (2007), who focus on the relationship between corporate taxes and corporate governance. In their setting, higher taxes increase the incentives to choose worse corporate governance, in the sense of greater extraction of private benefits of control by company insiders; conversely, stricter tax enforcement reduces such incentives and therefore benefits corporate governance. They test these predictions on data for Russian companies around the increase in tax enforcement following Mr. Putin's 2000 election, and find that better enforcement is associated with higher stock prices and lower voting premia, as well as better governance in the companies concerned. Our work differs from theirs not just because it focuses on transparency rather than governance, but more importantly because it recognizes that firms choose transparency and investment jointly, while Desai et al. (2007) take investment as given in their model and accordingly do not analyze the effects on investment at the empirical level.[5] In contrast, we take into account that transparency facilitates access to external funding and thus enables firms to increase investment, especially if they depend heavily on external finance. Another distinctive implication of our analysis is that the links between taxes, transparency and investment hinge on "tax-book conformity": if this is relaxed, the effects of corporate tax on transparency and investment should weaken, which again is consistent with our cross-country evidence.

The effect of tax avoidance on investment and financial access is also highlighted 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 results point to the likely reason behind this correlation: firms that evade taxes have murkier accounts, which makes investors wary of funding them.

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

[5] Precisely because we treat both investment and transparency as endogenous variables, we find that in principle an increase in tax pressure has an ambiguous effect on transparency, while it has a positive effect on corporate governance in the analysis by Dyck and Zingales.

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.

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 taxes levied on reported profits distort the firm's investment decisions. We model the distortion by assuming that only a fraction γ of the investment cost I is tax deductible,[6] 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). By the same token, an increase in taxes would lower investment.

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

Consider now an entrepreneur who has no cash, so that to invest an amount I at $t=1$, he must raise an equal amount of outside funds. Moreover, assume that at $t=2$ the entrepreneur can appropriate a fraction ϕ of the cash flow $A+R(I)$ as private benefits of control. In this case, the cash flow verifiable by investors and tax authorities is $(1-\phi)(A+R(I))$ and the pre-tax profit reported in the firm's accounts is $(A+R(I))(1-\phi)-I$. This amount is the basis to determine the company's tax liability $\tau\left[(1-\phi)\left(A+R(I)\right)-\gamma I\right]$. This implies that the extraction of private benefits $\phi\left(A+R(I)\right)$ from the company is tantamount to tax evasion.

However, the firm can be sanctioned for this behavior: in case the entrepreneur underreports the firm's cash flow and therefore its pre-tax profits by setting $\phi>0$, the firm is charged an expected penalty equal to a fraction $p\in[0,1)$ of the unpaid taxes $\phi\tau\left(A+R(I)\right)$. The fraction *p* can therefore be taken as a measure of the stringency of tax enforcement.[7] The tax penalty, being senior to payment to investors, reduces the net income $\Pi(I)$ that the company can pledge to pay out to them for a given amount of funding *I*:

$$\begin{aligned}\Pi(I) &\equiv \underbrace{(1-\phi)\left(A+R(I)\right)}_{\text{reported cash flow}}-\underbrace{\tau\left[(1-\phi)\left(A+R(I)\right)-\gamma I\right]}_{\text{tax liabilities on reported profits}}-\underbrace{p\tau\phi\left(A+R(I)\right)}_{\text{expected penalty for tax evasion}} \\ &=\left[(1-\phi)(1-\tau)-p\tau\phi\right]\left(A+R(I)\right)+\tau\gamma I.\end{aligned} \tag{1}$$

Limited liability protects investors against pledgeable income $\Pi(I)$ becoming negative. Hence we shall assume that *p* is small enough that expression (1) is positive, so that the entrepreneur can borrow resources and invest: a sufficient – but not necessary – condition to this effect is that $p<(1-\phi)(1-\tau)/\phi\tau$.

We formalize the choice of transparency by assuming that, at $t=0$, before investing, the entrepreneur can voluntarily impose an upper bound $\bar{\phi}$ on the private benefits that he extracts, ϕ, for instance by adopting stringent accounting standards, hiring a reputable auditor, listing the company on an exchange with tough disclosure standards, etc. The higher $\bar{\phi}$, the higher the firm opacity and the greater the scope to extract private benefits.

[7] The parameter *p* may be taken to capture both the probability detecting tax evasion and the severity of the penalty inflicted upon tax evaders, once these are detected.

Notice that our setting presupposes "tax-book conformity": the firm cannot legally report different earnings to tax authorities and investors. This assumption has an important implication: by increasing the firm's opacity $\bar{\phi}$, an entrepreneur hides the firm's income away from both the tax authority and outside investors, and raises his private benefits at the expense of both. But this implies that the tax savings obtained via greater opacity will also reduce the cash flow that the firm can pledge to external investors. Conversely, increasing the company's transparency $1-\bar{\phi}$ raises its tax bill but increases the cash flow that can be shown to elicit funding from investors. This trade-off in the choice of transparency is at the heart of the model's predictions.

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

- at $t=0$, the entrepreneur commits to a transparency level $1-\bar{\phi} \geq 0$;
- at $t=1$, the entrepreneur raises outside funding and invests *I*;
- at $t=2$, cash flow $A+R(I)$ is realized; the entrepreneur diverts a fraction $\phi \leq \bar{\phi}$ of it as private benefits of control, the firm pays a fraction τ of its reported profits $(1-\phi)\left(A+R(I)\right)-\gamma I$ as taxes, and upon being audited by tax authorities also pays a penalty $p\tau\phi\left(A+R(I)\right)$. Investors receive the residual income $\Pi\ (I)$.

In solving the model, we assume that investors are perfectly competitive, there is no discounting, and entrepreneur and investors are risk-neutral. The entrepreneur is protected by limited liability and has no collateral to pledge beside reported cash flow from the assets in place. As usual, the entrepreneur's optimal strategy is found by backward induction: we start with the decision about private benefits extraction at $t=2$, then turn to the investment choice at $t=1$ (for a given transparency level), and finally solve for the choice of transparency at $t=0$ as a function of the tax rate τ and the enforcement probability *p*.

1.1 Extraction of private benefits

At $t=2$, the entrepreneur diverts the fraction ϕ of the firm's cash flow that maximizes his payoff U_2, namely he solves:

$$\max_{\phi\in[0,\bar{\phi}]} U_2 = \max\left(\Pi\ (I)-D,0\right)+\phi(A+R(I)), \qquad (2)$$

where $\Pi(I)$ is defined by (1). Expression (2) is increasing in the degree of opaqueness ϕ:

$$\frac{\partial U_2}{\partial \phi} = \left\{1-\left[1-\tau(1-p)\right]\right\}(A+R(I)) > 0\,, \tag{3}$$

since $p<1$ by assumption. Intuitively, the entrepreneur will hide as much cash flow as possible, given the level of transparency to which he has committed, i.e. will choose $\phi = \bar{\phi}$.[8] In other words, since profits are taxed, while private benefits are not, once he has borrowed and invested, the entrepreneur will want to extract private benefits as much as possible. This result depends also on the assumption that private benefits extraction by the entrepreneur is not associated to a deadweight loss. Interestingly, better tax enforcement reduces the incentive to appropriate private benefits from the firm (expression (3) is decreasing in *p*), as in Desai et al. (2007), but only perfect tax enforcement ($p=1$) would eliminate it.

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, a fraction τ of the reported profit will go to the government in the form of taxes, and a fraction $p\tau\bar{\phi}$ of the cash flow is expected to be taken by the government as penalty for tax evasion. Formally, the entrepreneur maximizes his expected payoff U:

$$\max_I U_1 = \max\left(\Pi\ (I;\bar{\phi}) - D, 0\right) + \phi(A+R(I))\,, \tag{4}$$

subject to the investors' participation constraint

$$D \geq I \tag{5}$$

and to the feasibility constraint

[8] Given our assumption that the entrepreneur can extract private benefits without a deadweight loss, he will extract as much as possible, $\phi = \bar{\phi}$. In other words, the degree of opacity and the extent of private benefits extraction coincide. This is a peculiar feature of our model. More generally, the degree of opacity will affect the entrepreneur's decision on private benefits extraction.

$$D \leq \Pi\,(I;\bar{\phi})\,. \tag{6}$$

Constraint (6) states that the repayment promised to investors cannot exceed the cash flow that they will actually receive, after deducting private benefits, taxes and penalties for tax evasion.

Given our assumption of perfect competition in the capital market, the investors' participation constraint (5) is always binding: $D = I$. Imposing this equality, using the definition of $\Pi\,(I;\bar{\phi})$, and assuming that condition (6) holds with strict inequality, the entrepreneur's problem can be rewritten as

$$\max_{I}\ U_1 = \left[1-\tau + p(1-p)\tau\bar{\phi}\right]\left(A + R(I)\right) - (1-\tau\gamma)I \tag{7}$$

subject to the financing constraint resulting from (5) and (6):

$$\left[(1-\tau) - (1-\tau(1-p))\bar{\phi}\right]\left(A + R(I)\right) \geq (1-\tau\gamma)I. \tag{8}$$

If the firm is finance-constrained, so that (8) is binding, then the constrained investment level $\tilde{I}$ is determined by

$$\left[(1-\tau) - (1-\tau(1-p))\bar{\phi}\right]\left(A + R(\tilde{I})\right) = (1-\tau\gamma)\tilde{I}. \tag{9}$$

From this expression, one can establish how the investment of a finance-constrained firm responds to changes in opaqueness $\bar{\phi}$ (and hence transparency $1-\bar{\phi}$) and other parameters:

Proposition 1 (Effect 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 and in the severity of tax enforcement.*

Intuitively, higher transparency allows the firm to *invest more* because it relaxes its financing constraint, in spite of the fact that it also increases the firm's tax burden. Instead, higher taxes and their enforcement depress investment, for a given level of transparency: intuitively, tax pressure reduces the resources that the firm can pledge to external financiers, and thus tighten the financing constraint. By the same token, a larger cash flow A from assets in place relaxes the financing constraint and increases investment; this also implies that, if the firm starts out with some initial debt, its

magnitude has the opposite effect on investment, namely it tightens the financing constraint and depresses investment.

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. Then the first-order condition yields the following implicit expression for the unconstrained investment $\hat{I}$:

$$R'(\hat{I}) = \frac{1-\tau\gamma}{1-\tau\left(1-\bar{\phi}(1-p)\right)}, \tag{10}$$

which shows that, in contrast to the case of a finance-constrained firm, in the unconstrained case more opaqueness (a larger $\bar{\phi}$) leads the entrepreneur to choose a higher level of investment $\hat{I}$. The reason is that in this case lower transparency just implies a reduced tax burden, while any costs in terms of enhanced access to finance are irrelevant by assumption.

Investment is determined by the first-order condition (10) only if the firm's transparency $1-\bar{\phi}$ is large enough as to make the financing constraint (8) slack (recall that transparency weakens this constraint, as shown in the previous section). But in this case, by applying the envelope theorem to the payoff function (7), the entrepreneur's payoff U turns out to be unambiguously decreasing in transparency $1-\bar{\phi}$: as long as he is not financially constrained, the entrepreneur simply tries to minimize taxes and therefore will want to reduce the level of transparency. Indeed he will want to reduce it all the way down 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. Hence, in equilibrium the firm will invariably be finance-constrained.

Which level of transparency $1-\bar{\phi}$ the entrepreneur will choose when the financing constraint is binding? Recall that, based on the results of 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 (7), 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 $\bar{\phi}$ and writing the first-order condition for transparency:[9]

$$\frac{dU}{d\bar{\phi}} = \tau(1-p)(A+R(I)) + \left\{\left[(1-\tau)+\tau(1-p)\bar{\phi}\right]R'(\tilde{I}) - (1-\tau\gamma)\right\}\frac{\partial \tilde{I}}{\partial \bar{\phi}} = 0\,. \qquad (11)$$

The first term is the benefit that transparency confers on the entrepreneur by relaxing the financing constraint and allowing greater investment; the second is its cost due to the larger implied tax burden (note that $\partial \tilde{I} / \partial \bar{\phi} < 0$). In Appendix A we show that the constrained investment $\tilde{I}$ associated with the optimal choice of transparency (implicitly determined by (11)) is given by the following condition:

$$R'(\tilde{I}) = \frac{1-\tau\gamma}{1-\tau}. \qquad (12)$$

Since $(1-\tau\gamma)/(1-\tau) > 1$, financially constrained firms always feature underinvestment. Moreover, differentiating condition (12) shows that an increase in taxes unambiguously reduces the investment of constrained firms, even when their transparency is chosen optimally.

Equation (11) determines implicitly the optimal degree of transparency that the entrepreneur will choose initially, taking into account its effects on the firm's tax liabilities as well as on its access to external finance. It can then be used to determine how the optimal level of transparency in the constrained regime responds to changes in the corporate tax rate τ, the degree of tax enforcement *p*, and the firm's initial cash position *A*. In Appendix A we show the following:

Proposition 2 (Effects of taxes and cash flow on transparency) *The transparency chosen by the entrepreneur is (i) decreasing in the corporate tax rate if the negative effect*

[9] We assume that the entrepreneur can commit to any level of $\bar{\phi}$ he wishes to implement. In practice factors such as the quality of accounting standards and of financial analysts may constrain the entrepreneur's ability to set the desired level of transparency.

of taxes on investment is sufficiently large; (ii) increasing in the severity of tax enforcement; and (iii) decreasing in the cash flow from existing assets.

Hence in general tax pressure has an ambiguous effect on firm transparency, its sign depending on the response of investment to taxes: whether higher corporate taxes induce greater or lower firm transparency is an empirical issue. The reason why the theory is ambiguous on this point is simple. Tax pressure reduces both the investment that an entrepreneur *wishes* to fund and the investment that he *can* fund, and these two effects have opposite implications for his choice of transparency. Insofar as higher taxes reduce the *desired* investment, the firm needs less pledgeable income, and this allows the entrepreneur to be *less* transparent. But higher taxes also curtail the income that can be pledged to outside investors and thereby may compress the *fundable* investment below its desired level: if so, the firm will react to higher taxes by becoming *more* transparent.

The first effect dominates if investment is very sensitive to taxes. For instance, this negative effect always dominates in the special case where the firm's revenue is given by the power function $R(I) = I^{\alpha} / \alpha$ (with $0 < \alpha < 1$) and there is no penalty for eluding taxes ($p = 0$). As shown in the Appendix A, in this special case the optimal transparency is

$$1 - \bar{\phi} = \frac{1}{\frac{1}{\alpha} + A\left(\frac{1-\tau\gamma}{1-\tau}\right)^{\frac{\alpha}{1-\alpha}}}, \tag{13}$$

whose derivative with respect to τ is negative, and is larger in absolute value the greater are assets in place *A*: firms react to higher taxes by lowering transparency, all the more so if they are cash-rich and thus free of external financing concerns. By the same token, the negative effect of corporate taxes on transparency should be mitigated for companies that depend heavily on external funding.

The second result in Proposition 2, which refers to the effect of tax enforcement *p* on transparency, is more straightforward than that concerning taxes. A greater penalty for tax evasion unambiguously raises transparency, because it cuts into the firm's pledgeable income but leaves its desired level of investment unaffected, at the level determined by (12): hence the entrepreneur must increase transparency to offset the drop in income.

Finally, Proposition 2 states that a larger cash flow *A* from its assets base lowers the firm's optimal degree of transparency – a result apparent also from expression (13) for the example with isoelastic revenue. Here the intuition goes again back to the episode of Amstel Bier quoted in the introduction: from Proposition 1, we know that a larger cash flow from existing assets expands a firm's borrowing, for a *given* degree of transparency; but since the increased cash flow leaves its desired investment unaffected, the firm will want to reduce its transparency, and replace external funds with internal cash flow.

So far the entrepreneur has been assumed to want a positive level of investment *I*. But he may decide to forgo it entirely and be content with the firm's assets in place. Then, he would want transparency to be zero ($1-\bar{\phi}=0$), so as to minimize taxes, and his payoff would be equal to *A*. Thus, to check whether – and when – the entrepreneur actually wants to invest, borrow and choose a positive degree of transparency, we must compare the payoff $U(\tilde{I})$ associated with the optimal investment $\tilde{I}$ with the payoff $U(0)=A$ resulting from zero transparency, no borrowing and no investment. Using equations (6) and (7), the difference between the payoffs associated with these two choices is

$$\Delta U \equiv U(\tilde{I})-U(0)=\frac{\bar{\phi}(1-\tau\gamma)}{(1-\tau)(1-\bar{\phi})-\tau p\bar{\phi}}\tilde{I}-A.$$

It is easy to show that this expression is decreasing in the cash flow *A* from initial assets:[10] hence only relatively cash-poor firms will invest, borrow and choose transparency $1-\bar{\phi}>0$. Conversely, firms that are so cash-rich that $\Delta U<0$ will refrain from borrowing, and opt for complete opaqueness. Of course, in practice in most countries the government mandates a positive level of disclosure, so that such firms will choose the lowest transparency level and raise some external funds.

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

[10] To see this, notice that that the fraction in the expression for ΔU is increasing in $\bar{\phi}$ and recall that (i) $\bar{\phi}$ is decreasing in *A* by Proposition 2 and (ii) $\tilde{I}$ is independent of *A* by expression (12). This implies that first term in the expression for ΔU is decreasing in *A*. The same obviously applies to the second term of the expression.

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,[11] so that choosing a high level of transparency may not actually pay off in terms of more abundant funding.

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 π that the firm is matched with financiers capable of evaluating its accounts. With complementary probability $1-\pi$, the firm does not encounter them, and reverts to financial autarky: 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.

Thus at stage $t=0$, before learning whether he will have the opportunity to borrow or not, the entrepreneurs' objective is

$$U=\left[1-\tau+\tau(1-p)\bar{\phi}\right]\left(A+\pi R(I)\right)-(1-\tau\gamma)\pi I, \qquad (14)$$

so that the first-order condition for transparency now becomes

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

Compared with condition (11) derived above, all the terms in the optimality condition (15) are multiplied by π except for *A* in the first term. This implies that, compared to condition (11), condition (15) assigns a relatively larger weight to the tax burden arising from an increase in transparency (the first term) then to the implied benefit in terms of greater access to credit (the second term). Therefore, the effect of a lower degree of financial development (a lower π) is formally identically to that of an increase in *A* analyzed at the end of the previous section: namely, it lowers the transparency of financially constrained firms.

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

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 π. Hence the lower π and the larger *A*, the less inclined will firms be to choose transparency. Therefore, not only firms should opt for lower transparency if they operate in countries with less developed financial markets, but among those transparency should be lowest for companies that have already accumulated a relatively large capital.

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 related 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 has listed companies incorporated in 37 countries in 1990-2009; 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. The WBES dataset contains mostly privately held firms in emerging or developing countries.

While Worldscope has detailed income statement and balance sheet data, WBES contains mostly self-reported, qualitative information, but with much greater country coverage and international variation in tax rates and other institutional characteristics. The choice of transparency is quite different for the firms in these two samples: in WBES there is a wider range of possible degrees of transparency across firms and countries, since not all of them meet the standards set by stock exchange listing requirements, in

contrast to the Worldscope firms. However, the greater detail of Worldscope data allows us to compute accounting-based measures of transparency that are widely used in the literature (Leuz and Wysocki (2008)). Hence, the two data sets complement each other. Clearly, we shall adapt the empirical strategy to suit the different characteristics of these two data sets.

We start our analysis by estimating OLS regressions of the relation between investment, transparency and taxes (the investment equation), and between transparency and tax pressure (the transparency equation). Since transparency is chosen by firms, as highlighted by our model, OLS estimation of the investment equation may suffer from endogeneity bias: to address this issue, we also carry out instrumental variables (IV) estimation. Finally, to check the robustness of our findings, we experiment with various changes in specification and variable definitions.

2.1 Investment and external finance

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

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

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-level and sector-level fixed effects, respectively. Among the firm-level characteristics X_{ics}, it is important to include 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).

In Worldscope, we 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 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 ($\alpha_4 > 0$). We use the ratio of stock market capitalization to GDP to capture financial development.

It is important to note that we use variants of specification (16) depending on the dataset. In Worldscope, tax pressure is measured at the country level, so that in the corresponding regressions the coefficient α_1 will not be identified in specifications that include country fixed effects δ_c, because these absorb the tax variable. We use alternative specifications without country effects to estimate the coefficient α_1. In contrast, the WBES data provide firm-level information on the perceived tax burden, so that we can estimate α_1. When using WBES data we cannot construct the financial dependence variable, because the sector classification differs greatly from that in Rajan and Zingales (1998). However, regressions based on WBES data allow us to check the robustness of the results using a full set of country and sector fixed effects, including their interactions.

2.2 Transparency

The second set of predictions of the model refers to transparency, which we model empirically via the following specification (or variants depending on the dataset):

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

where μ_c and μ_s are country-level and sector-level fixed effects, respectively. 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 the negative effect of taxes on investment is sufficiently strong. That same proposition also predicts that the effect of tax enforcement on transparency is positive: to test this prediction, in some specifications we replace the fixed country effect μ_c with a country-level tax enforcement variable.

Proposition 2 also suggests that cash flow from assets in place should be negatively correlated with transparency. Furthermore, as suggested by the example with isoelastic revenue in equation (13), the effect of taxes on transparency should be smaller for firms that are more financially dependent: in other words, financial dependence might be expected to dampen the negative effect of taxes on transparency ($\beta_2 > 0$).

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 flows. Since the effect of financial development FD_c is absorbed by the country effects μ_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 ($\beta_3 > 0$).

As in the estimation of the investment regression in (16), we need to use variants of the specification in (17) to accommodate the structure of the two datasets. When using Worldscope data, we cannot estimate the coefficient β_1 when we use country fixed effects because these will absorb the tax variable. In WBES, instead, tax pressure is measured at the firm level, so β_1 will be estimated directly. Since in that dataset there is no reliable indicator of financial dependence for many countries, we dot include the two interaction terms in equation (17); rather, we use country and sector fixed effects, as well as their interaction.

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 other sector-level and country-level data. We obtain country-level 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. From the same source, we also obtain a measure of tax enforcement at the country level. Finally, we use sector-level data on financial dependence from Rajan and Zingales (1998).

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 measures of transparency, capital expenditures, sales, total assets, leverage and market-to-book ratios, (ii) sector-level financial dependence, and (iii) measures of country-level corporate effective tax rates, tax enforcement 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 1990-2009. 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 168,962 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 1998-2008. 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.[12]

To measure the degree of tax enforcement, we use data from the IMD World Competitiveness Yearbook. IMD reports opinions of entrepreneurs and country experts on the following statement: "Tax evasion does not hamper business activity". The responses range from 1 (tax evasion hampers activity) to 10 (tax evasion does not hamper activity). We take the country average values of the responses in 1997-2009 to capture tax enforcement at the country-level, assuming that tax enforcement is less effective in countries where tax evasion is perceived as an obstacle to economic activity.

We measure financial development as the ratio of stock market capitalization to GDP as reported in Djankov et al. (2006), and rely on the data on reported by Rajan and Zingales (1998) to gauge industry-level financial dependence.

3.2. Measures of transparency

In the regressions using Worldscope data we rely on five different firm-level earnings-based measures of accounting transparency and a single qualitative indicator of transparency.

3.2.1 Earnings-based measures of transparency

As highlighted by the literature,[13] 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 misstate the firm's true economic performance. Earnings smoothing measures (that we term *ES* indicators) gauge the extent to which management dampens fluctuations in reported earnings relative to true earnings, thus increasing accounting opacity. Another measure of accounting opacity is earnings discretion (the *ED* indicators), namely the latitude that management has in reporting – and thereby misstating – earnings, based on the extent and use of accounting accruals. On

[12] 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.

[13] 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).

balance, given the non-linearities in corporate taxation (i.e. no taxes are paid when losses are incurred), earnings smoothing measures may be closer to the spirit of the model.[14] But we also use an earnings discretion measure to check the robustness of the results.

We first compute various earnings management measures at the firm level, and then we proceed to disentangle other measures into their "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. In keeping with the models' assumption, we want to capture exclusively management's intentional errors to reduce transparency. There are two different ways to achieve this objective. First, we can use the total amount of smoothing (or discretion) at the firm level and then control for variables that capture environmental uncertainty and industry affiliation. Second, we can use the *abnormal* component of earnings smoothing and earnings discretion without the use of any control variables. Both measures have been widely used in the accounting literature and we will use both approaches.

The two *ES* indicators refer to management's ability to smooth reported earnings. The first earnings smoothing measure 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 $\Delta CA_{it} - \Delta Cash_{it} - \Delta CL_{it} + \Delta STD_{it} + \Delta TP_{it} - Dep_{it}$, where ΔCA_{it} is the change in total assets, $\Delta Cash_{it}$ the change in cash and cash equivalent items, ΔCL_{it} the change in total current liabilities, ΔSTD_{it} the change in short-term debt, ΔTP_{it} the change in income taxes payable, and Dep_{it} the depreciation and amortization expense of firm *i* in year *t.* Thus, our first measure is the time-series average of the ratio described above for each firm in the sample. We denote this measure as ES1. The interpretation of ES1 is that larger values correspond naturally to greater transparency. When we use ES1 in our

[14]We thank Christian Leuz for making this suggestion.

transparency regressions we will expand the specification to include various firm-level characteristics to control for the firm's "normal" level of transparency.

The second earnings management measure is based on an approach aimed at disentangling normal from abnormal accruals using a modified Jones (1991) approach as proposed by Francis et al. (2004). We use industry-specific and year-specific parameter estimates to measure firm-specific normal accruals predicted by the Francis et al. (2004) model and then proceed to compute (absolute level of) abnormal accruals by subtracting normal accruals from actual accruals. This measure of abnormal earnings management is increasing in the firm's accounting opacity; since the model's predictions refer to transparency, we take the negative of this measure, which we denote by ES2.

The literature also suggests another measure of earnings smoothing 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.[15] Also in this case, we use the total level of smoothing (ES3) at the firm level by computing the correlation measure just described at the firm level. Yet another measure that we use is a modified version of ES2 described above where we use firm-specific and year-specific parameter estimates to measure firm-specific (absolute level of) abnormal accruals. We call this measure as ES4. Finally, following Leuz et al. (2003), we also measure transparency based on firm-level earnings discretion, defined as (the negative of) the absolute value of total accruals divided by the absolute value of cash flow from operations (ED). While we use all five measures of accounting transparency in our regression analysis, for the sake of brevity in the paper we only show results using ES1 and ES2, and report further results obtained using ES3, ES4 and ED in Appendix B.

3.2.2 Qualitative measure of transparency

Measures based on earnings management may provide an incomplete gauge of firm transparency. For example, analyst following is commonly regarded as a mechanism that makes firms more transparent even from an accounting point of view: Yu (2008) finds that firms with higher analyst coverage exhibit a lower level of accrual-based earnings management. Likewise, the literature on cross-listings shows that the listing decision,

[15] 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).

especially when the NYSE is chosen as the cross-listing market, is associated with higher quality and more transparent information production because of the listing requirements.

Consistent with this strand of literature, we construct a qualitative measure of transparency based on several firm-level characteristics: analyst coverage, type of accounting standards, identity of the auditor, cross-listing on the NYSE, separate (and voluntary) reporting of R&D expenses and staff costs. Notice that firms reporting R&D and staff costs disclose such information *voluntarily*. Existing studies (Botosan, 1997; Botosan and Frist, 1998) show that this decision correlates with the overall degree of disclosure, especially when there is no analyst coverage.

In particular, we define a binary 0-1 variable for each firm characteristic and year as follows: (a) analyst coverage equals 1 if the firm has at least one analyst covering it, (b) accounting standard equals 1 if the firm uses IFRS or US GAAP, (c) auditor equals 1 if the firm contracts the service of one of the Big 5 auditors, (d) cross-listing equals 1 if the firm is cross-listed on the NYSE, (e) R&D expenses equals 1 if the firm reports R&D expenses, and (f) staff costs equals 1 if the firm reports staff costs. Then we build a qualitative transparency index taking the sum of these binary variables at the firm level for each year and average across all the years of our sample period.[16] We use the qualitative index in our regressions as an alternative to the earnings-based measures of transparency described in Section 3.2.1.[17]

3.2.3 Book-tax conformity

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: 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 require "tax-book conformity", that is, a high degree of

[16] Since not all firms carry our R&D, we use a second transparency index excluding reporting of R&D expenditures. Results using this index are qualitatively similar to the ones reported in the paper and not reported for brevity.

[17] Since one of the variables in the qualitative index is the cross-listing in the U.S. we cannot compute the index value for U.S. firms. We use a third transparency index, excluding cross-listing in the U.S. and thus we are able to find values for U.S. firms. Results using this index are qualitatively similar to the ones reported in the paper and not reported for brevity.

alignment between tax and financial reporting.[18] 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 transparency.

We use the tax-book conformity index of Hung (2001) and Ashbaugh and LaFond (2004) to capture cross-country differences along this dimension and test if the relation between 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 a 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 (both the 1st year and the 5th year 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 column 2 with columns 3 and 4, there are large differences between effective tax rates (both 1st year and 5th year) and statutory tax rates. For example, while Japan and the U.S. have very high statutory rates, the 1st year effective tax rates are only 28.66% and 18.19% respectively. 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.

[Insert Table 1 here]

Column 5 shows the country-level measures of tax enforcement, with larger values signifying a lower level of (perceived) tax evasion which we interpret as measuring a higher level of tax enforcement. Tax enforcement values vary considerably across countries, ranging from 1.82 (Argentina, with the lowest value of tax enforcement) to 7.50 (Singapore, with the highest value of tax enforcement). Column 6 shows the country-level stock capitalization as percent of GDP which we use as the measure of

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

financial development in our specifications. Columns 7 and 8 present country averages of our two earnings-based transparency indicators (ES1 and ES2) and column 9 the country averages of the qualitative transparency index. The cross-country differences in accounting transparency are broadly consistent with Leuz et al. (2003). Countries with large stock markets (such as Australia, Canada, the U.K. and U.S.) have consistently high transparency according to all measures (whether accounting-based or non-accounting based), 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.

The correlation between the measures of transparency, statutory corporate tax rates, effective corporate tax rates, and financial development (stock market capitalization), exhibit expected patterns (the correlation matrix is reported in Appendix B). First, all earnings-based measures of transparency are highly and significantly correlated among themselves. This is encouraging, since it implies that there is significant information overlap between the different transparency measures and that the particular indicator used is not likely to affect our results. We also find that the qualitative transparency index is highly correlated with all accounting transparency indicators.

As predicted by our model, the correlation between all measures of transparency and corporate tax rates (especially effective ones) is negative. Also in keeping with the model's predictions, all measures of transparency are positively and significantly correlated with financial development. 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, to which we turn in 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 turn to regressions where the dependent variable is firm's transparency.

We use two different specifications for both the investment and transparency regressions. First, consistent with Leuz, Nanda and Wysocki (2003) we control for each country's investor protection, measured by the (revised) anti-director rights index of La Porta et al. (1998). This specification allows us to estimate the impact of corporate taxes

on investment and transparency, together with the effect of tax enforcement on transparency. In this specification we also include industry fixed effects, but not country fixed effects. (We check the robustness of the results replacing anti-director rights index by log of per-capita GNP.) To control for country-level variables other than investor protection, we use a second specification with sector and country fixed effects. Of course, in this specification the effects of taxes and investor protection are absorbed by the country fixed effects.

The other control variables included in each specification depend on the transparency measure used. When we use the abnormal level of earnings smoothing (ES2) and the transparency index, we use three firm-level control variables: 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.[19]

In the specifications using the level of earnings smoothing (ES2) we must use a broader set of firm-level controls for the transparency specification to capture environmental uncertainty which might have a direct impact on the level of earnings management. In particular, in the transparency regression we use log of initial firm's total assets, initial leverage, initial book-to-market ratio, initial operating cycle, initial leverage, initial PPE divided by assets, and initial average cash flows divided by total assets.[20] In the investment regression we control for log of initial assets in U.S. dollars, initial book-to-market ratio, and initial leverage.

[Insert Table 2 here]

The first set of investment regressions are shown in Table 2. The dependent variable is the mean of the ratio of Capital Expenditure to Total Assets in the previous year calculated over the period 1990-2009. Standard errors are corrected for clustering at the country and sector level. In accordance with the model's prediction, we find that investment is positively correlated with all three transparency measures ($\alpha_2 > 0$). The

[19] We use the initial value of each of these variables, instead of the sample average, to minimize endogeneity concerns.

[20] We check the robustness of these results by using sales growth as an additional control variable and a longer sample period. In these robustness checks, the initial level of each variable refers to their respective (average) value in the first five years for which data are available. We first measure the control variables over the first four years and then estimate the transparency specification over the remaining years of the sample period for each firm. The results are qualitatively similar to those we report in the paper.

coefficients of ES1, ES2 and of the qualitative transparency index are statistically different from zero at the 5 percent level for most of the specifications.

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

The main results summarized above remain broadly consistent across the two different specifications we use. In columns 1, 3 and 5 we omit country fixed effects and can estimate the coefficient of investor protection and effective corporate taxes. The coefficient of taxes is negative, while that of investor protection is positive, although in some specifications they are statistically significant only at the 10% confidence level. We obtain slightly weaker results when we replace investor protection with the log of per capita GNP. In columns 2, 4 and 6 we control also for country effects and find very consistent results for each of the transparency measures.[21]

To gauge the economic significance of the results, we use the specification with country fixed effects and 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. In the case of ES1, the total impact on investment is an increase of 0.014 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 21 percent. It should be emphasized that similar results apply also when using different measures of transparency (accounting or non-accounting based), controlling for firm-level variables that have been found by the literature to influence firm investments, and for country and sector effects.

We next turn to the transparency regression in Table 3. The dependent variables are measures of firm-level transparency calculated over the period 1990-2009 for all firms for which we have at least 6 years of data.

[21] It should be noted that the results summarized above do not change when we use the other four measures of transparency, i.e. ES3, ES4, and ED. These results are reported in Appendix B.

[Insert Table 3 here]

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 operating in industrial sectors that are more dependent on external finance ($\beta_2 > 0$). The coefficient is significant at least at the 5 percent level for two of the three transparency measures (ES2, and the qualitative transparency indicator), and at the 10 percent level for ES1 (when using country fixed effects). The impact is also sizable: 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 0.09. Since the average value of ES1 is 0.470, this amounts to an increase in transparency of almost 19 percentage points of the mean level. We find similar effects using the qualitative transparency indicator and slightly lower effects using ES2.

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, we cannot identify the direct impact of corporate taxes on transparency when we use country fixed effects (columns 2, 4 and 6). However, we can estimate the tax coefficient when we omit the country fixed effects (columns 1, 3 and 5), and find a negative relationship between corporate taxes and transparency, as predicted by the model.

Another interesting result in Table 3 concerns the effect of financial development on transparency: firms that depend more 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 different from zero (at the 5 percent level when we use country fixed effects) and economically significant. In a country with average ratio of stock market capitalization to GDP, a 1-standard-deviation increase in financial dependence is associated with a 0.041 increase in ES1 – almost 9 percentage points of its mean value.[22]

Finally, in the specifications of columns 1, 3 and 5 (omitting country effects) we can also estimate the coefficient of tax enforcement. We find positive values, as predicted by the model (significant at the 5 percent level in columns 1 and 3, and at the 10 percent

[22] Again, the results summarized above do not change when we use the other four measures of transparency, i.e. ES3, ES4, and ED. These results are shown in Appendix B.

level in column 6).[23] This result is important for two reasons. First, it shows that the other coefficients are unaffected when we control tax enforcement, which in our model has a separate impact from that of corporate taxes. Second, we generalize the results obtained by Desai et al. (2007) for Russia using a sample with 37 countries with widely different institutions and tax regimes.

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 are not required 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 estimate the investment and transparency regressions separately for the two sub-samples. The results for the two sub-samples are shown in Table 4 for the investment regressions and in Table 5 for the transparency regressions. For brevity, we report only regressions with country fixed effects. Results replacing country effects with corporate taxes (for the investment and transparency regressions), tax enforcement (transparency regression) and investor protection are qualitatively similar and not reported for brevity.

[Insert Tables 4 and 5 here]

In both cases, Panel A reports the estimates for countries without tax-book conformity and Panel B those for countries with tax-book conformity. The number of firm observations is lower for these tests because the tax-book conformity index is only available for 27 countries.[24]

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 4, we see that the estimated coefficient of transparency (ES1) is 0.019 for countries without tax-book conformity and 0.032 for those with tax-book conformity; similar differences are present also for the coefficients of the interacted variables. Likewise, in the transparency regressions of Table 5, the estimated coefficient of the interaction between

[23] We also use a different measure of tax enforcement provided by the World Economic Forum. The results using this different measure are qualitatively unchanged.

[24] 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.

taxes and financial dependence in column 1 is 0.0186 for the countries without tax-book conformity and 0.0352 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. IV estimation

In the theoretical model we argue that transparency is a choice made by the firm. Thus, it can be argued that the OLS estimation of the investment equation is potentially problematic. Accordingly, in this section we carry out an IV estimation to check the robustness of our findings to possible endogeneity of transparency.

We instrument transparency using share ownership of the family blockholder (as an ultimate owner, rather than just a direct owner) in each firm.[25] Our identification assumption is that family ownership has a direct impact on transparency and affects investment only via the transparency variable, but not directly. This assumption is in line with existing literature (Anderson et al., 2009, and Chen et al. 2011) showing that family ownership is indeed associated with less transparent firms, especially in smaller firms.

Since in the regressions transparency is also interacted with financial dependence and financial development, we use as instruments family blockholder and its interaction with the same two variables. Since the model is exactly identified we cannot provide a test of the validity of the identification restrictions. However, the instruments help predict transparency. In the first-stage regression the coefficient of family ownership is negative for all transparency measures (–0.0142 for ES1) and statistically different from zero at the 1 percent level. In economic terms, an increase of one standard deviation of the family ownership in a firm decreases transparency as measured by ES1 by 0.72 standard deviations. Furthermore, the F-statistics is 14.27.

[Insert Table 6]

The IV estimates are reported in Table 6. The sign and significance of all coefficients are similar to the OLS estimates of Table 2 but generally larger in size. Most importantly, transparency is positively correlated with firm investment, regardless of the transparency measure used. We continue to find that the coefficient of the interaction term between

[25] The data on family ownership is obtained from various sources and is identical to the data used by Ellul et al. (2010).

transparency and financial dependence is positive, and that transparency also has an incremental positive impact for firms in countries with high financial development. This means that the result that transparency appears to be relaxing 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 is robust to the potential endogeneity of transparency.

3.6. 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. 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 legally arbitrage tax rules across different jurisdictions without a significant impact on transparency.

To address the second concern, we check the robustness of the results obtained from the specification with country fixed effects by 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 exclude countries that 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 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 results become weaker (both statistically and economically) when using the Statutory Tax Rates, but become stronger when using the Effective 5th 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 have significant frictions, more so than those included in the Worldscope dataset. 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.[26] In this paper 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).

[Insert Table 7 here]

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, and similar to the qualitative transparency indicator in Worldscope, WBES allows us to construct an indicator of firms' accounting transparency by combining data on reliance on external

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

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 firm is listed in the stock market; (3) the firm has external quality certification; (4) foreigners own at least 50 percent of the firm; and (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 to measure 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.[27]

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 control for several standard firms' characteristics that may affect their credit worthiness (size, age, and location). Beside these variables, two other explanatory variables are also used in the estimation. The first is a tax pressure dummy

[27] 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.

variable, built using the question on the extent to which tax rates are perceived by the firm management as a major or very severe obstacle obstructing the operation of the establishment. This is a firm-specific indicator of tax pressure, as opposed to the country-level tax rate used for the Worldscope data, and thus it 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 dummy, 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 thus possibly lower investment and growth. Finally, in the extended specifications we control for country fixed effects, sector fixed effects, and their interaction (or country-specific sector dummies).

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-reported indicator of access to finance, and the explanatory variables include a self-reported measure of tax pressure and a firm-level indicator of transparency. Since in the WBES data we cannot merge the financial dependency indicator with the sector classification, and the financial development indicator is only available for a subset of the 90 countries considered, we cannot replicate exactly the interaction terms in equations (16) and (17). However, in our last specification we check the robustness of our results using a full set of interacted sector and country (1,251 dummies).

[Insert Tables 8 and 9 here]

The first column of Table 8 reports the results of a regression of the standardized measure of access to finance on the transparency indicator, the dummy for tax pressure, continental dummies, and 15 sector dummy variables (omitted from the table). The regression is performed by ordinary least squares; ordered probit estimates deliver similar results. Tax pressure affects access to credit in the direction suggested by the model ($\alpha_1 < 0$): the coefficient is negative and highly significant. This implies that firms that perceive tax rates as a major obstacle for growth have an access to finance indicator that is 0.43 standard deviations lower than the group stating that taxes represent no obstacle or a minor obstacle.

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. These results confirm the findings from Worldscope data, but this time documenting the effect of taxes and transparency on access to funding rather than on investment. Overall, the pattern and significance of the transparency and tax variables provide strong support for two of the main model's predictions.

In column 2 of Table 8 we control for other firms' characteristics. The coefficients of transparency and tax pressure are not affected. The dummy for pressure from informal competitors is 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 have easier access to finance. The regression in column 3 shows that the coefficients of interest are smaller in absolute value – but still highly statistically different from zero – when we introduce country-level fixed effects. Finally, column 4 shows that the results are unchanged even if introduce the full interaction of country and sector fixed effects.

Table 9 shows 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 9.8 percentage points. Moreover, firms that perceive taxes to be a major obstacle to growth are about 6 percentage points less likely to apply for credit and not be discouraged from borrowing. The results in column 2 of Table 9 confirm that small firms and those that compete in the informal sector are less likely to face affordable credit terms. The final two regressions

suggest that each of the effect described obtains also if we control for country fixed effects, or for dummies defined at the country-sector level.

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 and 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 dummy is negative and statistically different from zero, consistent with taxes deterring transparency. The coefficient is still negative and significant in the specifications with country and sector fixed effects (columns 3 and 4).

[Insert Table 10 here]

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. Summary

A growing literature documents the link between the degree of firm transparency, the cost of capital and the availability of external funds. Also the effect of taxes on the investment decisions of firms has been extensively studied. But previous research has overlooked the

fact that taxes may reduce the degree of transparency chosen by firms, and *through 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. Using a simple model with distortionary taxes and endogenous credit rationing, we show that there is a tradeoff between the funding benefits and the tax costs of accounting transparency, and that this tradeoff depends on the level of corporate tax rates, the degree of tax enforcement, the degree of "tax-book conformity", the cash flows from companies' asset base, and the degree of financial development. Hence, analyzing this tradeoff generates rich empirical predictions regarding how each of these variables affects firms' choice of accounting transparency, investment and external funding.

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 based on 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-level transparency correlates negatively with tax pressure and positively with tax enforcement; moreover, the negative effect of taxes on transparency is weaker in industries where firms depend more on external finance. Third, these results are much stronger in countries that prescribe "tax-book conformity". Finally, financial development amplifies the positive effect of transparency on investment, and encourages greater transparency by firms that depend more on external finance.

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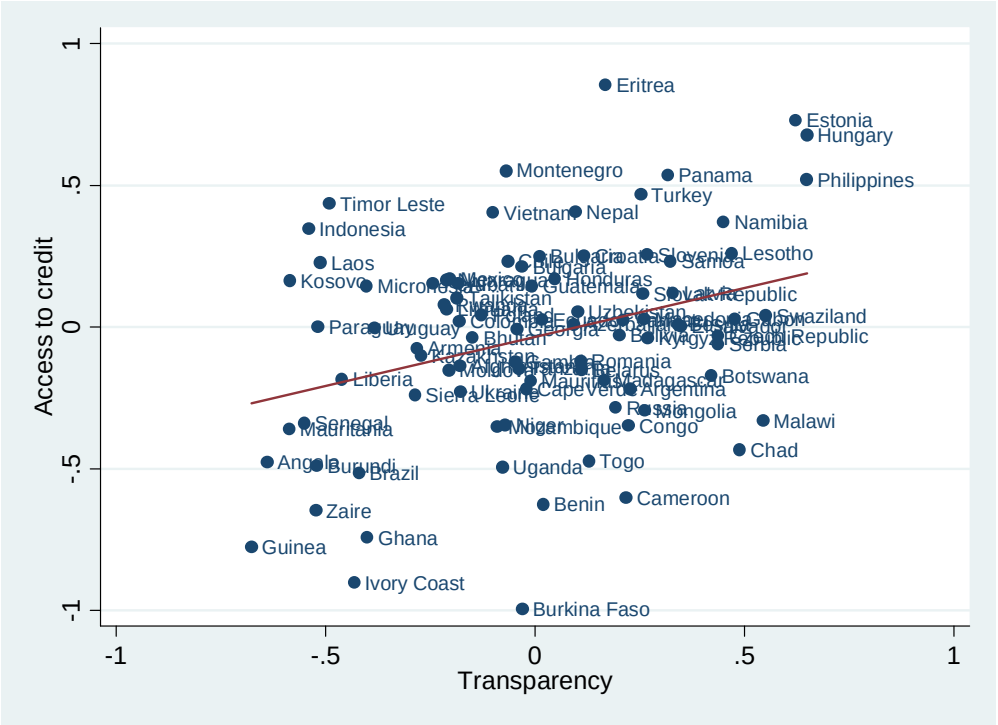

Figure 1. Transparency and Access to Credit. The indicator of firm's transparency is defined as the sum of 5 dummy variables: (1) firm has an external auditor; (2) firm has quality certification; (3) the firm is listed on the stock market; (4) foreigners own at least 50% of the firm; and (5) the government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

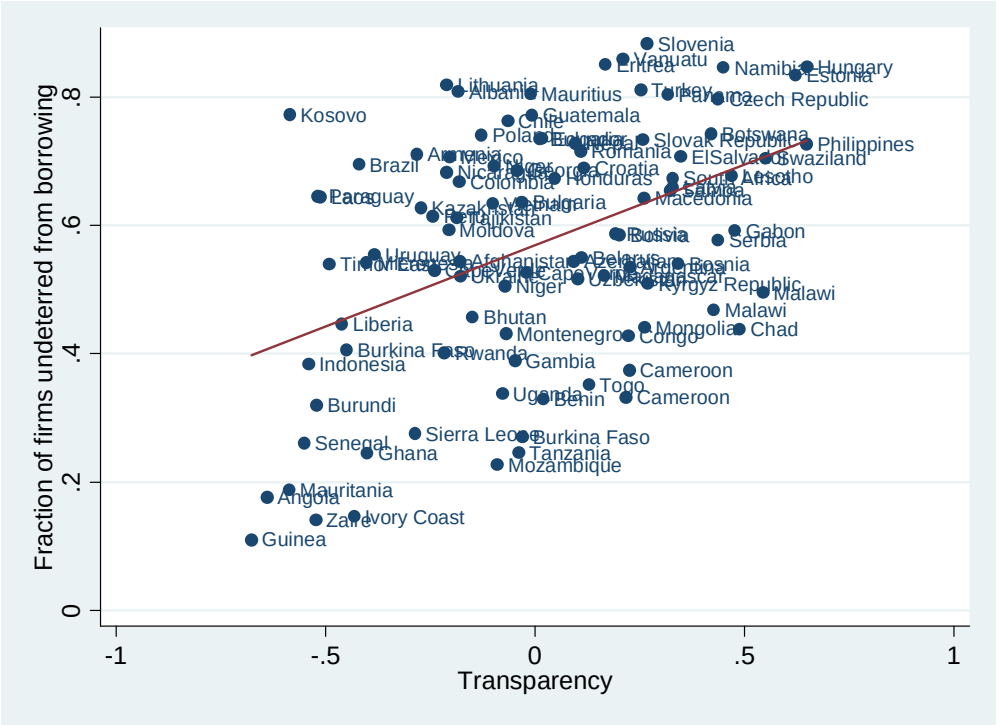

Figure 2. Transparency and Fraction of Firms Undeterred from Borrowing. The indicator of firm's transparency is defined as the sum of 5 dummy variables: (1) firm has an external auditor; (2) firm has quality certification; (3) the firm is listed on the stock market; (4) foreigners own at least 50% of the firm; and (5) the government owns at least 50% of the firm. The variable "firms undeterred from borrowing" is coded from the answers obtained to the following question in the WBES survey and 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, or did not think it would be approved, and 1 otherwise. The variable is then averaged across all firms in a given country.

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 (4) reports the effective 1st year (5th 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 5 reports the measure of tax enforcement from the IMD World Competitiveness Yearbook. The tax enforcement variable reports opinions of entrepreneurs and country experts on the following statement: "Tax evasion does not hamper business activity". The responses are aggregated and ranked on an index that goes from 1 (tax evasion hampers activity) to 10 (tax evasion does not hamper activity). Column 6 reports the stock market capitalization as % of GDP reported in Djankov et al. (2008). Columns 7-8 report the two measures of Earnings Smoothing, ES1 (abnormal earnings smoothing) and ES2 (level of earnings smoothing). Column 9 reports the qualitative transparency index. 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 (5th year) corporate tax rate, tax enforcement, and stock market capitalization as % of GDP, and the firm-level average values for ES1, ES2, and the qualitative transparency index.

	Number of Firms	Statutory Corporate Tax Rate	Effective 1st Year Corporate Tax Rate	Effective 5th Year Corporate Tax Rate	Tax Enforcement	Stock Market Capitalization as % of GDP	Earnings Smoothing Measure ES1	Earnings Smoothing Measure ES2	Qualitative Transparency Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Argentina	49	35.00	23.54	23.80	1.85	34.62	0.2974	-0.0702	1.98
Australia	586	30.00	21.96	23.03	5.82	101.57	0.6876	-0.0291	4.86
Austria	109	34.00	20.86	21.04	5.89	20.55	0.5005	-0.0430	3.15
Belgium	102	33.99	16.71	19.57	3.41	55.11	0.3882	-0.0592	2.50
Brazil	195	34.00	15.49	15.49	2.81	19.85	0.3129	-0.0645	2.08
Canada	426	36.12	21.78	25.93	6.20	90.36	0.5972	-0.0347	3.57
Chile	158	17.00	15.09	15.09	6.98	116.09	0.3894	-0.0532	2.90
Denmark	107	30.00	21.94	24.53	5.76	62.44	0.3957	-0.0534	3.94
Finland	209	29.00	16.30	18.84	6.42	95.89	0.5005	-0.0560	3.15
France	843	35.43	14.06	14.42	4.96	69.80	0.5937	-0.0542	2.53
Germany	962	37.07	23.50	23.60	4.54	40.85	0.5499	-0.0397	4.19
Greece	81	35.00	19.78	19.91	2.84	52.78	0.2974	-0.0689	1.91
Hong Kong	304	17.50	0.00	12.25	7.00	301.94	0.5632	-0.0379	3.62
India	291	36.59	20.28	24.29	2.68	44.32	0.3675	-0.0572	2.36
Indonesia	82	30.00	20.84	21.01	3.19	22.85	0.2891	-0.0762	1.86
Ireland	114	12.50	9.62	9.62	5.27	50.78	0.5644	-0.0484	2.86
Israel	139	35.00	25.72	25.98	4.74	57.58	0.4240	-0.0521	2.47
Italy	272	37.25	23.82	23.82	2.81	37.93	0.5055	-0.0619	2.76
Japan	1,538	42.05	28.66	31.64	5.66	72.51	0.4821	-0.0543	2.46

Malaysia	121	28.00	10.50	16.13	5.50	141.78	0.3923	-0.0549	2.52
Mexico	315	33.00	22.21	22.48	2.32	15.95	0.3113	-0.0708	2.00
Netherlands	115	34.50	25.62	25.62	5.90	117.39	0.6008	-0.0302	3.87
New Zealand	49	33.00	26.44	28.45	7.01	34.49	0.4270	-0.0487	3.62
Norway	209	28.00	18.50	20.33	5.64	43.33	0.4859	-0.0406	4.12
Peru	31	30.00	22.03	23.57	2.00	10.65	0.3273	-0.0634	2.10
Philippines	125	32.00	22.08	22.88	2.38	26.68	0.3015	-0.0708	2.00
Portugal	79	27.50	16.03	16.10	2.84	39.50	0.2983	-0.0691	1.98
Singapore	320	20.00	10.25	13.17	7.50	169.97	0.5816	-0.0352	3.80
South Africa	58	30.00	18.10	22.69	4.05	99.13	0.4146	-0.0463	2.86
South Korea	482	26.73	14.94	18.38	3.88	51.07	0.3461	-0.0605	2.23
Spain	272	35.00	18.52	18.61	4.73	54.65	0.4554	-0.0561	2.41
Sweden	285	28.00	10.47	14.93	4.42	82.67	0.4819	-0.0431	3.10
Switzerland	237	24.10	13.74	16.18	6.79	214.82	0.6279	-0.0383	3.85
Taiwan	148	25.00	17.83	18.01	4.75	136.67	0.4705	-0.0472	2.90
Thailand	190	30.00	22.04	22.26	3.88	81.08	0.4032	-0.0524	2.78
UK	1,560	30.00	18.61	21.44	5.82	129.76	0.5786	-0.0409	3.79
United States	1,620	45.20	18.19	31.99	5.94	120.00	0.6970	-0.0328	-
Total sample	12,783	30.74	18.54	20.73	4.71	78.84	0.4570	-0.05205	2.92

Table 2. Investment Regressions – Worldscope Data

This table presents the estimates of a cross-sectional regression model for 12,783 firms from 37 countries. The dependent variable is the mean ratio of Capital Expenditure to Total Assets in the previous year calculated over the period 1990-2009 for all firms for which we have at least 6 years of data. The independent variables are as follows. Transparency measures the degree of firm-level transparency: in Columns 1 and 2, it is measured as Earnings Smoothing 1 (ES1), in Columns 3 and 4 as Earnings Smoothing 2 (ES2), and in Columns 5 and 6 it is measured by the qualitative transparency index; Transparency × Financial Dependence is the interaction between measures of Transparency and financial dependence drawn from Rajan and Zingales (1998); Transparency × Financial Development is the interaction between measures of Transparency and Stock Market Capitalization as % of GDP drawn from Djankov (2006); Corporate Taxes is the effective 1st year corporate tax rate obtained from Djankov et al. (2009); Initial Assets is the logarithm of each firm's Total Assets in US dollars in the first year for which Worldscope provides accounting data; Initial Market-to-Book is the value of the firm's market-to-book ratio in the first year for which Worldscope provides data; 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; and Investor Protection is the revised anti-director rights index of La Porta et al. (1998). 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)	(6)
Transparency	0.0301***	0.0238**	0.1607**	0.1293**	0.0091***	0.0086*
	(2.89)	(2.50)	(2.52)	(2.38)	(2.90)	(1.93)
Transparency × Financial Dependence	0.0652***	0.0545**	0.4977***	0.4009**	0.0129**	0.0108**
	(3.04)	(2.41)	(3.09)	(2.49)	(2.56)	(2.27)
Transparency × Financial Development	0.0002**	0.0001	0.0014**	0.0009*	0.0001*	0.0001*
	(2.09)	(1.62)	(2.08)	(1.87)	(1.86)	(1.89)
Corporate Taxes	-0.0012*		-0.0011*		-0.012*	-
	(-1.84)	-	(-1.79)	-	(-1.90)	
Initial Assets	-0.0092***	-0.0084***	-0.0075***	-0.0068***	-0.0097***	-0.0086***
	(-5.27)	(-4.41)	(-5.17)	(-4.76)	(-5.10)	(-4.39)
Initial Market-to-Book	0.0117**	0.0122**	0.0097**	0.0102**	0.0086*	0.0094**
	(2.11)	(2.42)	(2.07)	(2.40)	(1.83)	(2.05)
Initial Leverage	-0.0031	-0.0040	-0.0049	-0.0041	-0.0050	-0.0043
	(-1.46)	(-1.52)	(-1.40)	(-1.48)	(-1.42)	(-1.40)
Investor Protection	0.0052**		0.0046**		0.0054*	-
	(2.60)	-	(2.52)	-	(1.93)	
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes
Number of Observations	12,783	12,783	12,783	12,783	12,783	11,163
R^2	0.32	0.42	0.24	0.28	0.36	0.46

Table 3. Transparency Regressions – Worldscope Data

This table presents the estimates of a cross-sectional regression model for 12,783 firms from 37 countries. The dependent variable are measures of firm-level transparency calculated over the period 1990-2009 for all firms for which we have at least 6 years of data. The dependent variable, Transparency, consist of various firm-level measures of transparency: Earnings Smoothing 1 (ES1) in Columns 1 and 2, Earnings Smoothing 2 (ES2) in Columns 3 and 4, and the qualitative transparency index in Columns 5 and 6. The independent variables are as follows: Corporate Taxes is the effective 1st year corporate tax rate obtained from Djankov et al. (2009); Tax Enforcement is obtained from the IMD World Competitiveness Yearbook; Corporate Taxes × Financial Dependence is the interaction between the Corporate Taxes from Djankov et al. (2009) and financial dependence from Rajan and Zingales (1998); Financial Dependence × Financial Development is the interaction between financial dependence from Rajan and Zingales (1998) and Stock Market Capitalization as % of GDP drawn from Djankov (2006); Initial Assets is the logarithm of each firm's Total Assets in US dollars in the first year for which Worldscope provides accounting data; Initial Market-to-Book is the value of the firm's market-to-book ratio in the first year for which Worldscope provides data; Initial Leverage is the firm's leverage (calculated as Total Debt divided by Total Assets) in the first year for which Worldscope provides data; and Investor Protection is the revised anti-director rights index of La Porta et al. (1998). Other controls included in Column 3 are initial operating cycle, initial PPE divided by assets, and initial average cash flows divided by assets. 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)	(6)
Corporate Taxes × Financial Dependence	0.0395***	0.0307*	0.0039***	0.0031**	0.1839**	0.1512**
	(2.71)	(1.92)	(3.02)	(2.47)	(3.04)	(2.59)
Financial Development × Financial Dependence	0.0278**	0.0201*	0.0006**	0.0005*	0.0276**	0.0261**
	(2.44)	(1.87)	(2.23)	(1.77)	(2.50)	(2.16)
Corporate Taxes	-0.0129**		-0.0012**		-0.0702*	
	(-2.10)	-	(-2.37)	-	(-1.89)	-
Tax Enforcement	0.0327**		0.0024**		0.1456*	
	(2.41)	-	(2.29)	-	(1.90)	-
Initial Assets	0.0587**	0.0526**	0.0081**	0.0079**	0.5688**	0.5701**
	(2.51)	(2.25)	(2.54)	(2.08)	(2.19)	(2.11)
Initial Market-to-Book	0.0387**	0.0311**	0.0051*	0.0047*	0.2059*	0.2039*
	(2.25)	(2.19)	(1.83)	(1.77)	(1.79)	(1.91)
Initial Leverage	0.0421	0.0389	0.0029	0.0032	0.3072	0.3118
	(0.98)	(0.85)	(1.01)	(1.12)	(1.05)	(1.12)
Investor Protection	0.0538**		0.0062**		0.2917**	-
	(2.41)	-	(2.28)	-	(2.15)	
Other Controls	Yes	Yes	-	-	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes
Number of Observations	12,783	12,783	12,783	12,783	11,163	11,163
R^2	0.48	0.39	0.39	0.34	0.49	0.52

Table 4. Investment Regressions, Sample Split by Tax-Book Conformity – Worldscope Data

This table presents the estimates of a cross-sectional regression for 12,783 firms 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 ratio of Capital Expenditure to Total Assets in the previous year calculated over 1990-2009 for all firms for which we have at least 6 years of data. The independent variables are as follows. Transparency measures the degree of firm-level transparency: in Columns 1 and 4, it is measured as Earnings Smoothing 1 (ES1), in Columns 2 and 4 as Earnings Smoothing 2 (ES2), and in Columns 3 and 6 it is measured by the qualitative transparency index; Transparency × Financial Dependence is the interaction between measures of Transparency and financial dependence drawn from Rajan and Zingales (1998); Transparency × Financial Development is the interaction between measures of Transparency and Stock Market Capitalization as % of GDP drawn from Djankov (2006); Initial Assets is the logarithm of each firm's Total Assets in US dollars in the first year for which Worldscope provides accounting data; Initial Market-to-Book is the value of the firm's market-to-book 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: No tax-book conformity			**Panel B: Tax-book conformity**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Transparency	0.0192	0.1044*	0.0076	0.0327***	0.1505***	0.0156***
	(1.42)	(1.81)	(1.21)	(2.77)	(3.89)	(2.78)
Transparency × Financial Dependence	0.0415	0.2839	0.0070	0.0703**	0.5202***	0.0176***
	(1.29)	(1.58)	(1.20)	(2.60)	(3.24)	(2.84)
Transparency × Financial Development	0.0001	0.0004	0.0001	0.0003**	0.0012**	0.0001*
	(1.38)	(1.39)	(1.47)	(2.38)	(2.26)	(1.88)
Initial Assets	-0.0087***	-0.0080***	-0.077***	-0.0095***	-0.0074***	-0.0102***
	(-4.15)	(-3.94)	(-3.48)	(-4.51)	(-4.05)	(-5.01)
Initial Market-to-Book	0.0110**	0.0097**	0.0091**	0.0102**	0.0103**	0.0092**
	(2.11)	(2.05)	(2.09)	(2.10)	(2.10)	(2.06)
Initial Leverage	-0.0037	-0.0035	-0.0041	-0.0047	-0.0034	-0.0049
	(-1.50)	(-1.47)	(-1.30)	(-1.34)	(-1.50)	(1.42)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	5,468	5,468	3,848	5,196	5,196	5,196
R^2	0.21	0.29	0.25	0.31	0.35	0.49

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

This table presents the estimates of a cross-sectional regression model for 12,783 firms 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 1990-2009 for all firms for which we have at least 6 years of data. The dependent variable in Columns 1 and 4 is Earnings Smoothing 1 (ES1), in Columns 2 and 5 is Earnings Smoothing 2 (ES2), in Columns 3 and 6 is the qualitative transparency index. The independent variables are as follows: Corporate Taxes × Financial Dependence is the interaction between the Effective 1st Year Corporate Tax Rate drawn from Djankov et al. (2009) and financial dependence drawn from Rajan and Zingales (1998); Financial Dependence × Financial Development is the interaction between financial dependence drawn from Rajan and Zingales (1998) and Stock Market Capitalization as % of GDP drawn from Djankov (2006); Initial Assets is the logarithm of each firm's Total Assets in US dollars in the first year for which Worldscope provides accounting data; Initial Market-to-Book is the value of the firm's market-to-book 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: No tax-book conformity			**Panel B: Tax-book conformity**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Corporate Taxes × Financial Dependence	0.0186*	0.0015	0.0760*	0.0352**	0.0037**	0.1905***
	(1.87)	(1.49)	(1.72)	(2.57)	(2.41)	(2.87)
Financial Development × Financial Dependence	0.0193*	0.0006*	0.0182	0.0345**	0.0008**	0.0341**
	(1.79)	(1.90)	(1.53)	(2.39)	(2.50)	(2.30)
Initial Assets	0.0480**	0.0070*	0.4706**	0.0549**	0.0087**	0.5221**
	(2.14)	(1.91)	(2.41)	(2.38)	(2.14)	(2.49)
Initial Market-to-Book	0.0289**	0.0042**	0.2021**	0.0304**	0.0051**	0.1891*
	(2.30)	(2.04)	(2.05)	(2.02)	(2.11)	(1.91)
Initial Leverage	0.0238	0.0029	0.3022	0.0302	0.0034	0.3440
	(1.27)	(1.39)	(1.47)	(1.47)	(1.51)	(1.26)
Other Controls	Yes	-	Yes	Yes	-	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	5,468	5,468	3,848	5,196	5,196	5,196
R^2	0.38	0.34	0.43	0.49	0.38	0.58

Table 6. Investment Regressions – Second Stage of IV Specification (Worldscope Data)

This table presents the estimates of the second stage of the IV specification for 12,783 firms from 37 countries. We instrument for transparency using the ownership held by the family blockholder. We have three potentially endogenous variables in the investment regression: (a) transparency, (b) transparency interacted with financial dependence, and (c) transparency interacted with financial development. The dependent variable is the mean ratio of Capital Expenditure to Total Assets in the previous year calculated over the period 1990-2009 for all firms for which we have at least 6 years of data. Transparency is a firm-level independent variable that consists of alternative measures of earnings smoothing in Columns 1 to 4 (ES1 in Columns 1 and 2, ES2 in Columns 3 and 4), and the qualitative transparency index in Columns 5 and 6; Transparency × Financial Dependence is the interaction between measures of Transparency and financial dependence drawn from Rajan and Zingales (1998); Transparency × Financial Development is the interaction between measures of Transparency and Stock Market Capitalization as percent of GDP drawn from Djankov (2006); Corporate Taxes is the effective 1st year corporate tax rate obtained from Djankov et al. (2009); Initial Assets is the logarithm of each firm's Total Assets in US dollars in the first year for which Worldscope provides accounting data; Initial Market-to-Book is the value of the firm's market-to-book ratio in the first year for which Worldscope provides data; 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; and Investor Protection is the revised anti-director rights index of La Porta et al. (1998). 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)	(6)
Transparency	0.0348***	0.0319***	0.1501**	0.1462**	0.0102***	0.0098**
	(3.09)	(3.10)	(2.57)	(2.40)	(3.61)	(2.25)
Transparency × Financial Dependence	0.0681***	0.0708**	0.5109***	0.4411***	0.0149***	0.0170**
	(2.80)	(2.56)	(3.11)	(2.78)	(3.08)	(2.80)
Transparency × Financial Development	0.0003**	0.0001	0.0015*	0.0007**	0.0001**	0.0002*
	(2.58)	(1.41)	(1.90)	(2.29)	(2.19)	(1.90)
Corporate Taxes	-0.1307*		-0.0907*		-0.1047*	
	(-1.78)	-	(-1.75)	-	(-1.80)	-
Initial Assets	-0.0109***	-0.0098***	-0.0081***	-0.0092***	-0.0097***	-0.0103***
	(-6.57)	(-5.46)	(-6.45)	(-5.37)	(-5.35)	(-5.41)
Initial Market-to-Book	0.0142***	0.0119**	0.0112***	0.0090**	0.0167***	0.0095**
	(3.59)	(2.30)	(3.35)	(2.15)	(3.97)	(2.00)
Initial Leverage	-0.0035	-0.0040	-0.0040	-0.0031	-0.0051	-0.0041
	(-1.49)	(-1.37)	(-1.51)	(-1.28)	(-1.40)	(-1.39)
Investor Protection	0.0048**		0.0051**		0.0053**	
	(2.18)	-	(2.59)	-	(2.29)	-
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes
Number of Observations	12,783	12,783	12,783	12,783	11,163	11,163
F-test	22.10	19.11	18.15	14.27	19.57	18.22

Table 7. Descriptive Statistics – WBES Data

Column 1 reports the number of observations for each country used in the WBES sample. Column 2 reports the Transparency Index which is an indicator of firm's transparency and defined as the sum of 5 dummy variables: (1) firm has an external auditor; (2) firm has quality certification; (3) the firm is listed on the stock market; (4) foreigners own at least 50% of the firm; and (5) the government owns at least 50% of the firm. Column 3 reports Access to Credit which is based on the survey question: "Is access to finance, including 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." Column 4 reports the measure of Undeterred from Borrowing which 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, or did not think it would be approved, and 1 otherwise. Columns 5-7 report the fraction of firms in each country classified as small, medium or large respectively. Medium firms are firms with more than 20 and less than 100 employees. Large firms are firms with more than 100 employees.

	Number of Observations	**Transparency Index**	**Access to Credit**	**Undeterred from Borrowing**	**Small Firms**	**Medium Firms**	**Large Firms**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
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	1,063	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	1,802	0.48	2.66	0.69	0.43	0.37	0.19
Bulgaria	1,303	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	1,017	0.81	3.70	0.76	0.31	0.45	0.25
Colombia	1,000	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 Rep.	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	1,444	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 Observations	Transparency Index	Access to Credit	Undeterred from Borrowing	Small Firms	Medium Firms	Large Firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Kosovo	270	0.32	3.61	0.77	0.73	0.21	0.07
Kyrgyz Rep.	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	1,480	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	1,326	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	1,004	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 Rep.	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	1,152	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	1,053	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	42,916	0.87	3.38	0.58	0.47	0.33	0.18

Table 8. Credit Access Regressions – WBES Data

This table presents the estimates of a cross-sectional regression model for firms from 90 countries. The dependent variable is an indicator of access to credit, based on the following WBES survey 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." The independent variables are as follows: Transparency Index which is an indicator of firm's transparency and defined as the sum of 5 dummy variables: (1) firm has an external auditor; (2) firm has quality certification; (3) the firm is listed on the stock market; (4) foreigners own at least 50% of the firm; and (5) the government owns at least 50% of the firm; Significant Tax Pressure is a dummy variable that takes the value of 1 if the tax pressure is perceived by the firm management responding the survey as a major or very severe obstacle obstructing the operation of the establishment and 0 otherwise; Significant Informal Competition is a dummy variable that takes the value of 1 if the competition from the informal sector in the economy is perceived by the firm management responding the survey as a major or very severe and 0 otherwise; Africa, Asia and Latin America are binary variables that take the value of 1 if a country forms part of the African, Asian or Central and Latin American regions respectively and 0 otherwise; Firm's age is the number of years the firm has operated; Medium firms is a dummy for firms with more than 20 and less than 100 employees; Large firms is a dummy for 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. T-statistics are reported in parenthesis. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	(1)	(2)	(3)	(4)
Transparency Index	0.106***	0.098***	0.068***	0.072***
	(22.69)	(19.02)	(12.12)	(12.03)
Significant Tax Pressure	-0.431***	-0.433***	-0.366***	-0.372***
	(43.51)	(43.39)	(35.34)	(33.60)
Significant Informal Competition	-0.289***	-0.289***	-0.271***	-0.285***
	(28.02)	(27.80)	(26.16)	(25.38)
Africa	-0.413***	-0.408***		
	(31.59)	(30.43)		
Asia	0.153***	0.151***		
	(10.39)	(10.21)		
Latin America	-0.002	-0.011		
	(0.16)	(0.84)		
Firm's Age		0.017***	0.015***	0.021***
		(3.39)	(3.05)	(4.00)
Medium Firm		0.032***	0.040***	0.057***
		(2.88)	(3.70)	(4.80)
Large Firm		0.041***	0.081***	0.088***
		(2.80)	(5.51)	(5.39)
Constant	0.392**	0.028	0.243**	0.159***
	(2.06)	(0.38)	(2.05)	(17.19)
Industry Fixed Effects	Yes	Yes	Yes	Yes
Country Fixed Effects	No	No	Yes	Yes
Industry-Country Fixed Effects	No	No	No	Yes
Number of Observations	40,507	36,208	36,208	31,815
$\mathbf{R^2}$	0.14	0.14	0.19	0.21

Table 9. Regressions for Firms Undeterred from Borrowing – WBES data

Columns 1-3 in this table present the estimates from a probit model for firms from 90 countries. Given the large number of coefficients, the regression in column (4) is estimated by OLS. The dependent variable is an indicator of firms that are undeterred from borrowing. It is coded from the answers obtained to the following question in the WBES survey and 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, or did not think it would be approved, and 1 otherwise. The independent variables are as follows: Transparency Index which is an indicator of firm's transparency and defined as the sum of 5 dummy variables: (1) firm has an external auditor; (2) firm has quality certification; (3) the firm is listed on the stock market; (4) foreigners own at least 50% of the firm; and (5) the government owns at least 50% of the firm; Significant Tax Pressure is a dummy variable that takes the value of 1 if the tax pressure is perceived by the firm management responding the survey as a major or very severe obstacle obstructing the operation of the establishment and 0 otherwise; Significant Informal Competition is a dummy variable that takes the value of 1 if the competition from the informal sector in the economy is perceived by the firm management responding the survey as a major or very severe and 0 otherwise; Africa, Asia and Latin America are binary variables that take the value of 1 if a country forms part of the African, Asian or Central and Latin American regions respectively and 0 otherwise; Firm's age is the number of years the firm has operated; Medium firms is a dummy for firms with more than 20 and less than 100 employees; Large firms is a dummy for 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. T-statistics are reported in parenthesis. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	(1)	(2)	(3)	(4)
Transparency Index	0.098***	0.083***	0.059***	0.047***
	(28.19)	(21.54)	(14.21)	(12.23)
Significant Tax Pressure	-0.059***	-0.062***	-0.064***	-0.059***
	(8.60)	(8.93)	(8.38)	(8.44)
Significant Informal Competition	-0.087***	-0.085***	-0.084***	-0.077***
	(12.16)	(11.86)	(11.07)	(10.89)
Africa	-0.263***	-0.251***		
	(31.03)	(28.80)		
Asia	-0.064***	-0.063***		
	(6.30)	(6.08)		
Latin America	0.062***	0.064***		
	(7.02)	(7.13)		
Firm's Age		-0.000	0.000	0.006*
		(0.14)	(0.08)	(1.85)
Medium Firm		0.073***	0.076***	0.076***
		(9.82)	(9.82)	(10.17)
Large Firm		0.108***	0.121***	0.119***
		(9.92)	(10.74)	(10.80)
Constant				0.591***
				(107.97)
Industry Fixed Effects	Yes	Yes	Yes	Yes
Country Fixed Effects	No	No	Yes	Yes
Industry-Country Fixed Effects	No	No	No	Yes
Number of Observations	26,145	23,236	23,236	20,331
R^2				0.22

Table 10. Transparency Regressions – WBES Data

This table presents the estimates of a cross-sectional regression model for firms from 90 countries. The dependent variable is an indicator of the 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; and (5) the government owns at least 50% of the firm. The independent variables are as follows: Significant Tax Pressure is a dummy variable that takes the value of 1 if the tax pressure is perceived by the firm management responding the survey as a major or very severe obstacle obstructing the operation of the establishment and 0 otherwise; Significant Informal Competition is a dummy variable that takes the value of 1 if the competition from the informal sector in the economy is perceived by the firm management responding the survey as a major or very severe and 0 otherwise; Africa, Asia and Latin America are binary variables that take the value of 1 if a country forms part of the African, Asian or Central and Latin American regions respectively and 0 otherwise; Firm's age is the number of years the firm has operated; Medium firms is a dummy for firms with more than 20 and less than 100 employees; Large firms is a dummy for 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. T-statistics are reported in parenthesis. Asterisks (*, ** and ***) indicate statistical significance (at the 10%, 5% and 1% level, respectively).

	(1)	***(2)***	***(3)***	***(4)***
Significant Tax Pressure	-0.037***	-0.053***	-0.019**	-0.033***
	(3.63)	(5.57)	(2.04)	(3.36)
Significant Informal Competition	-0.107***	-0.070***	-0.047***	-0.054***
	(9.95)	(7.08)	(5.14)	(5.42)
Africa	-0.145***	0.075***		
	(10.75)	(5.86)		
Asia	-0.068***	-0.023		
	(4.42)	(1.62)		
Latin America	-0.079***	-0.012		
	(6.10)	(0.97)		
Firm's Age		0.078***	0.071***	0.069***
		(16.61)	(16.47)	(14.48)
Medium Firm		0.391***	0.381***	0.385***
		(38.07)	(40.76)	(36.66)
Large firm		1.060***	1.051***	1.025***
		(81.50)	(88.29)	(75.46)
Constant	0.403***	-0.239***	0.608***	-0.281***
	(5.19)	(3.34)	(5.72)	(34.57)
Industry Fixed Effects	Yes	Yes	Yes	Yes
Country Fixed Effects	No	No	Yes	Yes
Industry-Country Fixed Effects	No	No	No	Yes
Number of Observations	42,072	41,518	41,518	36,267
R-squared	0.03	0.19	0.34	0.33

Appendix A

Proof of Proposition 1

First of all, notice that $[(1-\tau)-(1-\tau(1-p)\bar{\phi}](1-\mu))R'(\tilde{I})-(1-\tau\gamma)<0$, being the derivative of the financing constraint (8) with respect to *I* at the point where it is binding, and thus being decreasing in *I*. Using this result, implicit differentiation of (9) yields

$$\frac{\partial \tilde{I}}{\partial \bar{\phi}}=\frac{(1-\tau(1-p))\left(A+R(\tilde{I})\right)}{[(1-\tau)-(1-\tau(1-p)\bar{\phi}](1-\mu))R'(\tilde{I})-(1-\tau\gamma)}<0, \qquad \text{(A1)}$$

whose the numerator is positive because $p<1$,

$$\frac{\partial \tilde{I}}{\partial \tau}=\frac{(1-\bar{\phi}(1-p))\left(A+R(\tilde{I})\right)-\gamma\tilde{I}}{[(1-\tau)-(1-\tau(1-p)\bar{\phi}](1-\mu))R'(\tilde{I})-(1-\tau\gamma)}<0, \qquad \text{(A2)}$$

whose the numerator is positive (since by (9) it equals $(1-\gamma)\tilde{I}/(1-\tau)$),

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

and

$$\frac{\partial \tilde{I}}{\partial A}=-\frac{1-\tau(1-(1-p)\bar{\phi})}{[(1-\tau)-(1-\tau(1-p)\bar{\phi}](1-\mu))R'(\tilde{I})-(1-\tau\gamma)}>0.$$

Derivation of equation (12)

Substituting $d\tilde{I}/d\bar{\phi}$ from expression (A1) above into condition (11) for the optimal degree of opaqueness $\bar{\phi}$ yields the following expression:

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

which, upon canceling terms, yields condition (12) for the constrained investment $\tilde{I}$.

Proof of Proposition 2

The effect of the corporate tax rate on the optimal degree of opaqueness $\bar{\phi}$ is found by total differentiation of the (binding) financing constraint (9) with respect to τ and $\bar{\phi}$, while using the optimality condition (12):

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

Using the constraint (9) in the second term of the numerator, the previous expression can be rewritten as:

$$\frac{d\bar{\phi}}{d\tau} = \frac{\frac{1-\tau\gamma}{1-\tau}\bar{\phi}[1-\tau(1-p)](-\frac{\partial\tilde{I}}{\partial\tau}) - \frac{(1-\gamma)(1-\bar{\phi})+p\bar{\phi}}{1-\tau\gamma}(A+R(\tilde{I}))}{[1-\tau(1-p)](A+R(\tilde{I}))}. \qquad \text{(A2)}$$

The first term of the numerator is positive because

$$\frac{\partial\tilde{I}}{\partial\tau} = \frac{1-\gamma}{(1-\tau)^2}R''(\tilde{I}) < 0, \qquad \text{(A3)}$$

while the second term is negative. From (A3), the absolute value of $\partial\tilde{I}/\partial\tau$ is larger the more concave the revenue function evaluated at the constrained investment level (the large is $\left|R''(\tilde{I})\right|$) and the greater the corporate tax rate τ. Hence also the derivative (A2) is negative for sufficiently large values of the large is $\left|R''(\tilde{I})\right|$ and τ.

The effect of an increase in the severity of tax enforcement *p* is found by differentiating the financing constraint (9) with respect to *p* and $\bar{\phi}$, noticing that by condition (12) $\tilde{I}$ is not affected by neither of these parameters. Hence:

$$\frac{\partial\bar{\phi}}{\partial p} = -\frac{\tau}{[1-\tau(1-p)]^2}\frac{(1-\tau)\left(A+R(\tilde{I})\right)-(1-\tau\gamma)\tilde{I}}{\left(A+R(\tilde{I})\right)} < 0,$$

where the numerator of the second fraction must be positive for $\tilde{I}$ to be funded.

Similarly, the effect of an increase in the cash flow *A* from initial assets is found by differentiating the financing constraint (9) with respect to *A* and $\bar{\phi}$, again noticing that by condition (12) $\tilde{I}$ is not affected by any of these parameters. Hence:

$$\frac{\partial \bar{\phi}}{\partial A} = \frac{(1-\tau)(1-\bar{\phi}) - \tau p \bar{\phi}}{[1-\tau(1-p)](A + R(\tilde{I}))} > 0.$$

Derivation of equation (13) and its derivatives with respect to τ and *A*

If $R(I) = I^{\alpha} / \alpha$, from (12) the firm's constrained investment and revenue are respectively

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

If $p = 0$, the financing constraint (9) becomes $(1-\tau)(1-\bar{\phi})\left(A + R(\tilde{I})\right) = (1-\tau\gamma)\tilde{I}$, which upon substituting $\tilde{I}$ and $R(\tilde{I})$ from the previous expressions yields equation (13) in the text:

$$1-\bar{\phi} = \frac{1}{\frac{1}{\alpha} + A\left(\frac{1-\tau\gamma}{1-\tau}\right)^{\frac{\alpha}{1-\alpha}}}. \qquad \text{(A4)}$$

Hence:

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

which clearly implies $\frac{\partial^2(1-\bar{\phi})}{\partial \tau \partial A} > 0.$

From (A4), it is also immediate that $\frac{\partial(1-\bar{\phi})}{\partial A} < 0.$

Appendix B

Table B1. Correlation Between Earnings-based Measures of Transparency and Country-Level Characteristics – Worldscope Data

The table shows the correlation between the Earnings Smoothing Measures 1, 2, 3 and 4 (ES1-ES4), Earnings Discretion (ED), the qualitative transparency index, the Statutory Corporate Tax Rate and the Effective 1st Year Corporate Tax Rate drawn from Djankov et al. (2009), the Tax Enforcement Measure drawn from the IMD World Competitiveness Yearbook, and the Stock Market Capitalization to GDP drawn from Djankov et al. (2006). P-values are shown in parenthesis.

	ES1 Measure	ES2 Measure	ES3 Measure	ES4 Measure	ED Measure	Qualitative Transparency Index	Effective 1st Year Corporate Tax Rate	Tax Enforcement Measure	Stock Market Capitalization as Percent of GDP
ES1 Measure	1								
ES2 Measure	0.7210 (0.00)	1							
ES3 Measure	0.7291 (0.00)	0.7488 (0.00)	1						
ES4 Measure	0.7311 (0.00)	0.7049 (0.00)	0.7518 (0.00)	1					
ED Measure	0.6018 (0.01)	0.6210 (0.00)	0.6514 (0.00)	0.6972 (0.00)	1				
Qualitative Transparency Index	0.5109 (0.02)	0.5244 (0.02)	0.5918 (0.00)	0.6054 (0.00)	0.4819 (0.02)	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)	-0.2922 (0.15)	1		
Tax Enforcement Measure	0.5406 (0.02)	0.6110 (0.01)	0.6215 (0.01)	0.6326 (0.01)	0.5609 (0.02)	0.6847 (0.00)	-0.3492 (0.08)	1	
Stock Market Capitalization as % of GDP	0.5809 (0.00)	0.4604 (0.00)	0.4529 (0.00)	0.4907 (0.08)	0.49084 (0.04)	0.5907 (0.02)	-0.5709 (0.00)	0.6582 (0.00)	1

Table B2. Investment Regressions – Worldscope Data

This table presents the estimates of a cross-sectional regression model for 12,738 firms 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 1990-2009 for all firms for which we have at least 6 years of data. The independent variables are as follows: Transparency are measures of firm-level transparency where in Columns 1 and 2 is measured as Earnings Smoothing 3 (ES3), in Columns 3 and 4 is measured as Earnings Smoothing 4 (ES4), and in Columns 5 and 6 is measured as Earnings Discretion (ED); Transparency × Financial Dependence is the interaction between measures of Transparency interacted with industry-level financial dependence drawn from Rajan and Zingales (1998); Transparency × Financial Development is the interaction between measures of Transparency interacted with the country-level Stock Market Capitalization as % of GDP drawn from Djankov (2006); Corporate Taxes is the effective 1st year corporate tax rate obtained from Djankov et al. (2009); Initial Assets is the logarithm of each firm's Total Assets in US dollars in the first year for which Worldscope provides accounting data; Initial Market-to-Book is the value of the firm's market-to-book ratio in the first year for which Worldscope provides data; 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; and Investor Protection is the revised anti-director rights index of La Porta et al. (1998). 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)	(6)
Transparency	0.0251***	0.0221**	0.2201**	0.1408**	0.2081***	0.1682**
	(2.97)	(2.56)	(2.58)	(2.40)	(3.05)	(2.20)
Transparency × Financial Dependence	0.06970**	0.0598**	0.5160**	0.3811**	0.0138**	0.0119*
	(2.60)	(2.40)	(2.49)	(2.53)	(2.48)	(1.92)
Transparency × Financial Development	0.0004**	0.0003*	0.0032*	0.0035*	0.0001*	0.0001*
	(2.24)	(1.78)	(1.92)	(1.90)	(1.90)	(1.93)
Corporate Taxes	-0.0013*		-0.0012*		-0.012*	-
	(-1.87)	-	(-1.86)	-	(-1.85)	
Initial Assets	-0.0089***	-0.0091***	-0.0080***	-0.0081***	-0.0098***	-0.0091***
	(-5.39)	(-5.53)	(-5.02)	(-5.06)	(-5.43)	(-4.87)
Initial Market-to-Book	0.0106**	0.0105**	0.0090**	0.0094**	0.0105**	0.0102**
	(2.30)	(2.36)	(2.01)	(2.31)	(2.10)	(2.08)
Initial Leverage	-0.0029	-0.0025	-0.0043	-0.0040	-0.0035	-0.0040
	(-1.30)	(-1.22)	(-1.28)	(-1.25)	(-1.21)	(-1.19)
Investor Protection	0.0051**		0.0049**		0.0049**	-
	(2.53)	-	(2.40)	-	(2.38)	
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes
Number of Observations	12,783	12,783	12,783	12,783	12,783	12,783
R^2	0.31	0.34	0.37	0.36	0.22	0.25

Table B3. Transparency Regressions – Worldscope Data

This table presents the estimates of a cross-sectional regression model for 12,738 firms from 37 countries. The dependent variables are measures of firm-level transparency over the period 1990-2009 for all firms for which we have at least 6 years of data. In Columns 1 and 2 the dependent variable is Earnings Smoothing 1 (ES1), in Columns 3 and 4 is Earnings Smoothing 2 (ES2), and in Columns 5 and 6 it is Earnings Discretion (ED). The independent variables are as follows: Corporate Taxes is the effective 1st year corporate tax rate obtained from Djankov et al. (2009); Tax Enforcement is obtained from the IMD World Competitiveness Yearbook; Corporate Taxes × Financial Dependence is the interaction between Corporate Taxes from Djankov et al. (2009) and financial dependence from Rajan and Zingales (1998); Financial Dependence × Financial Development is the interaction between financial dependence from Rajan and Zingales (1998) and Stock Market Capitalization as % of GDP drawn from Djankov (2006); Initial Assets is the logarithm of each firm's Total Assets in US dollars in the first year for which Worldscope provides accounting data; Initial Market-to-Book is the firm's market-to-book ratio in the first year for which Worldscope provides data; Initial Leverage is the firm's leverage (calculated as Total Debt divided by Total Assets) in the first year for which Worldscope provides data; and Investor Protection is the revised anti-director rights index of La Porta et al. (1998). Other controls included in Column 3 are initial operating cycle, initial PPE divided by assets, and initial average cash flows divided by assets. 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)	(6)
Corporate Taxes × Financial Dependence	0.0473***	0.0401**	0.0046**	0.0040**	0.0045**	0.0042**
	(3.22)	(2.32)	(2.61)	(2.38)	(2.40)	(2.32)
Financial Development × Financial Dependence	0.0118**	0.0101**	0.0011**	0.0009**	0.0007**	0.0006**
	(2.31)	(2.07)	(2.29)	(2.30)	(2.35)	(2.06)
Corporate Taxes	-0.0152*		-0.0013**		-0.0024*	
	(-1.89)	-	(-2.16)	-	(-1.88)	-
Tax Enforcement	0.0395**		0.0026*		0.0041*	
	(2.02)	-	(1.90)	-	(1.81)	-
Initial Assets	0.0693**	0.0611**	0.0106***	0.0097***	0.0070**	0.0068**
	(2.49)	(2.29)	(2.91)	(2.75)	(2.26)	(2.24)
Initial Market-to-Book	0.0468**	0.0451**	0.0068**	0.0061*	0.0025**	0.0024*
	(2.19)	(2.08)	(2.15)	(2.01)	(1.98)	(1.83)
Initial Leverage	0.0487	0.0427	0.0034	0.0026	0.0037	0.0035
	(1.08)	(1.01)	(1.12)	(1.02)	(0.97)	(0.95)
Investor Protection	0.0685**		0.0072**		0.0036*	-
	(2.27)	-	(2.14)	-	(1.83)	
Other Controls	Yes	Yes	-	-	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes
Number of Observations	12,783	12,783	12,783	12,783	12,783	12,783
R^2	0.37	0.38	0.41	0.43	0.28	0.29