

IS THE WORLD FLAT?

COUNTRY LEVEL AND FIRM LEVEL DETERMINANTS OF LAW COMPLIANCE

ALBERTO CHONG*

INTER-AMERICAN DEVELOPMENT BANK

MARK GRADSTEIN**

BEN GURION UNIVERSITY

Abstract

This research revisits the effects of a country's institutional framework on individual firms' behavior, in particular focusing on their propensity to comply with legal rules. We purport at explaining the variation in compliance with legal rules and employ a rich data set on thousands of firms from dozens of countries to this end. We find that most of the variation emanates from country-wide differences in institutional quality, although some firm characteristics play a role as well. We also find indications that differences across countries are smoothed with income.

JEL Classification Codes: D21, K42, O17, O57

Keywords: Firms, Institutions, Law Compliance, Country differences

* Research Department, Inter-American Development Bank, email: albertoch@iadb.org

** Department of Economics, Ben Gurion University, CEPR, CESifo, IZA, email: grade@bgu.ac.il

1. INTRODUCTION

As forcefully emphasized by De Soto, 1989, 2000, differences across countries in the rule of law and legal enforcement, are important for economic performance. Recent research documents this statistically. Thus, the work on legal origins (see, for example, Djankov et al., 2003, Glaeser and Shleifer, 2002, and La Porta et al., 2008) shows that differences in legal rules across countries matter for investor protection, financial development, and more generally, efficient resource allocation. Acemoglu et al., 2005, find that legal enforcement of contracts trumps the effect of political institutions on financial development, investment and growth. Yet, the parable of the flat world used by Thomas Friedman in his bestseller (2006) suggests that globalization has erased differences across countries making them similar economically and culturally (see Leamer, 2007, for pointed criticism and further literature references). This paper purports, therefore, to empirically tackle the significance of cross country differences, specifically focusing on how the rule of law is actually translated to the legal compliance by business firms.

Our data, further detailed below, seem to be especially well suited to deal with this objective. In particular, they contain proxies for law compliance by thousands of business firms from a wide range of countries, developed, developing, and in transition, that display large institutional variation. While survey based, these data are invaluable as internationally comparable measures of compliance is hard to come by. The data have information on several aspects of law compliance, such as the scope of corruption, bribery, and the extent of informality – by which is meant the propensity of firms to hide output.

The null hypothesis – consistent with the “flat world” paradigm - is that most of the variation in informality is driven by firm level characteristics, whereas the significance of country level characteristics, in particular, a country’s institutional quality should be marginal. The analysis reveals that many of the available firm level characteristics are indeed relevant to explain the variation in informality. For example, firm size matters, and smaller firms appear to be hiding a larger share of output; in contrast, exporting firms, those with foreign ownership, and – in some specifications – older firms, appear to hide less than otherwise. Yet, we find strong evidence that most of the variation is driven by differences across countries in their respective levels of institutional quality, thus rejecting the null hypothesis in favor of what is implied by our theoretical model. Country-level variation is accountable for almost twice as much variation in informality as firm-level variation, and for other measures of illegal behavior even more so. In particular, commonly used measures of country-level institutional strength emerge as the most statistically significant variable in explaining informality and corruption behavior of the firms. Yet, we also find evidence of a convergence club, whereby differences in legal compliance become smaller with country’s income.

This paper is related to recent work that examines the effects of countries’ legal institutions on various outcomes, see the review in La Porta et al., 2008, and, more generally, to work that emphasizes the role of institutional quality in development, see Acemoglu et al., 2006, for a review. Additional important recent efforts in this regard have been directed toward international trade. Thus, Berkowitz et al., 2006, and Rodrik et al., 2004, show that the quality of institutions is an important determinant of trade flows; and the latter paper also draws growth implications from this inference. Examining yet another aspect, Doidge et al.,

2007, argue that country-wide variation in institutional quality is responsible for the bulk of variation in corporate governance across business firms. The data they use cover mostly developed economies, and the extent of countries covered is smaller than here. While the focus in Doidge et al., 2007, is clearly very much different from the one examined here, our results are complementary to theirs. The richness of our data that include a variety of countries ensures that the results have wide applicability. In work that is more specifically related to the current endeavor, Dabla-Norris et al., 2008, and Friedman et al., 2000, find that institutional quality is an important determinant of informality; this work does not, however, distinguish between firm-level and country-level characteristics. Finally, Fisman and Miguel, 2006, examining an aspect of illegal behavior of international diplomats stationed in New York City – violations of car parking regulations - find that it is correlated with their respective countries' corruption indicators. While the authors do not distinguish between individual and county-level characteristics, and their sample can hardly be considered as representative, the flavor of their results is consistent with ours. This is especially gratifying as their evidence, being based on objective data, should be viewed as complementary to this paper's findings.

The remainder of the presentation is organized as follows. The next section contains a simple analytical model. Section 3 describes the data and the empirical approach, followed by the actual empirical analysis in Section 4. Finally, Section 5 concludes with brief remarks.

2. ANALYTICAL FRAMEWORK

To generate testable predictions, we employ Becker's, 1968, approach to illegal behavior, embedding it in a context that is related to the ensuing empirical analysis. In particular, we focus on firms' propensity to hide their activity so as to avoid costly regulations.¹ Thus, a continuum of firms is posited whose maximal operating profits are π .²

We assume that operating formally or legally is costly. Complying with regulation and licensing is one important element of such costs. Further, these costs are generally not uniform, but differ across sectors and industries; and they may also depend on the firm's idiosyncratic characteristics, whereby some firms may find it easier to operate formally than others.³ Thus, let n_i denote the share of profits that a firm generates in the informal sector, and $1 - n_i$ is the share of profits in the formal sector; c_i denote the cost per unit of such profits associated with operating formally. The share of net profits in the formal sector then are given by $\Pi_i^F = \pi (1 - n_i) - c_i$. The share of profits generated informally, n_i , saves the regulation compliance costs, but is potentially subject to penalty. Thus, we assume that the firms are subject to auditing, which results in uncovering informality with the probability $p(n_i)$ that increases in the share of informal activity, $p' > 0$, $p(0) = 0$, $p(1) \leq 1$. If the firm chooses to operate informally, it avoids the direct cost of regulatory requirements but faces a likelihood of being caught and fined. The probability of being caught when operating informally hinges upon the quality of the legal system and is considered a national public good. In contrast, weak institutional quality implies lax enforcement, either because of incompetence or because of associated bribery and corruption of public officials.⁴ We suppose that, when caught, the firm is fined by the full amount of its profits.⁵ While p can be

more fully endogenized (in fact, the literature on tax evasion and optimal auditing deals precisely with this issue, see Allingham and Sandmo, 1972, for a classical paper), here it is assumed to be exogenously given. These assumptions imply that the expected share of profits in the informal sector is given by $\Pi_i^N = \pi n_i [1-p(n_i)]$. The expected total profits, therefore, can be written as follows:

$$\Pi_i = \Pi_i^F + \Pi_i^N = [\pi - c_i](1 - n_i) + \pi n_i [1-p(n_i)] \quad (1)$$

The firms determine the share of their informal activity. Maximizing (1) with respect to n_i and assuming an internal solution we then obtain the first order condition:

$$-[\pi - c_i] + \pi [1-p(n_i) + n_i (1-p'(n_i))] = c_i + \pi [-p(n_i) + n_i (1-p'(n_i))] = 0 \quad (2)$$

To simplify the comparative statics exercise, suppose that the probability of informality detection in case of auditing is proportional to the extent of informality, $p(n_i) = \gamma n_i$, $\frac{1}{2} < \gamma < 1$. The parameter γ is interpreted as a country specific level of institutional quality. Then (2) is re-written as $c_i + \pi [-\gamma n_i + (1-\gamma)n_i] = 0$, so that

$$n_i = c_i / (2\gamma\pi) \quad (3)$$

The variation of informality across the firms – as captured by the standard deviation, for example, is calculated from (3):

$$\sigma_n = \sigma_c / (2\gamma\pi) \quad (4)$$

Differentiation of (3) and of (4) lead then to the following

Proposition 1. (i) The share of informal activity conducted by a firm increases in the regulatory cost and is inversely related to the institutional quality as captured by the strength of legal monitoring and enforcement. Further, the effect of regulatory costs on informality is reduced in the presence of strong enforcement.

(ii) The variation in informality across the firms is positively related to the variation in regulatory costs they face and is negatively related to institutional strength. More importantly, the higher the level of institutional quality the smaller the effect of increased variability in regulatory costs on the variability in informality.

The implication of these results is that a country's institutional environment is a significant determinant of informality, in addition to industry specific or even firm specific characteristics. Further, the importance of the latter is diminished in the context of a strong institutional setup. Whereas measures of institutional quality across countries have been developed in the literature and will be used in the empirical analysis below, direct information about firm specific costs of compliance is non-existent. In the empirical analysis, we use industry- and firm-level characteristics as proxies for the compliance costs.

3. EMPIRICAL STRATEGY

3.1. Data and basic statistics

We employ the World Business Environment Survey (WBES) data available at the World Bank website⁶. The survey was taken as an initiative of the World Bank Group, in

partnership with many other institutions seeking to provide feedback from enterprises on the state of the private sector in client countries; to measure the quality of governance and public services including the extent of corruption; to provide better information on constraints to private sector growth, from the enterprise perspective; to establish the basis for internationally comparable indicators which can track changes in the business environment over time thus allowing both for competitive assessment and impact assessments of market-oriented reforms; stimulate systematic public-private dialogue on business perceptions and the agenda for reform. The field work was done between 1999 and 2000 by private polling of each country firms that met the basic requirements. The survey was targeted to a representative sample of firms filling criteria as sector, size, location, and ownership characteristics⁷. The objective was to gather information on a sizeable number of firms in several countries around the world, which was accomplished for most of the sample.

The sample consists of firm level survey responses of thousands of firms in several dozens countries, among them developed, developing, and in transition. The survey asked each business to rank the constraints or problems impacting on their operations. This process involved an extensive questionnaire undertaken via a face-to-face interview with either the firm managers or firm owners of each company. As a result, the survey reports comparative measurements based on firms' perceptions about the investment climate as shaped by economic policy; governance and corruption; regulation and taxes; infrastructure; public service quality; predictability of economic developments and policies; financial constraints; as well as on firm size, growth and other characteristics.

The survey has information about aspects of firms' environment and modus operandi in regard to law compliance. One major question on which we focus here is related to the

extent of informal activities.⁸ Specifically, the latter can be retrieved from answers to the following question: “Recognizing the difficulties many enterprises face in fully complying with taxes and regulations, what percentage of total sales would you estimate the typical firm in your area of activity keeps “off the books”? The responses are reported as follows: (1) if none at all, (2) if 1-10 percent, (3) if 11-20 percent, (4) if 21-30 percent, (5) if 31-40 percent, (6) if 41-50 percent, and (7) if more than 50 percent. For simplicity, we re-categorize this variable as a dichotomous variable, which takes the value of one whenever the firm reports to have 30 percent or more of their sales off books, and zero otherwise. This variable is our proxy for informality.⁹

INSERT TABLES 1 AND 2 HERE

The survey contains a breakdown of firms by size as measured by the number of employees. Small firms employ 5 to 50 employees, medium sized firms employ between 51 and 500 employees, while large firms employ more than 500 employees. We construct two dummy variables for large and medium, and interpret our results in relation to small sized firms. As other firm level controls, we use indicators of firm ownership (such as the share of foreign or government ownership), if the firm exports, the number of competitors and the firms’ age. We control for industry effects by including dummy variables for manufacturing, services, construction, and agriculture.¹⁰ Additionally, we merge the firm level data obtained through the WBES with country level control variables such as the GDP per capita, its growth rate, the inflation rate, which were taken from the World Development Indicators (WDI, 2007). These variables were used as 5-years averages in order to avoid capturing some

noise due to the natural volatility of macroeconomic variables. We use the ICRG index for the year 1998 – a year before the WBES was conducted. Additionally, we also include the average of the firms’ perception about labor regulation from the WBES. Finally, we take into account the efficiency of the legislative as a proxy for enforcement (Botero et al., 2004). Table 1 has the description of all the variables used, Table 2 provides some basic descriptive statistics, and Table 3 presents a correlation matrix of the main variables of the empirical section.¹¹

INSERT TABLE 3 HERE

We believe that our data offer several advantages with respect to other data employed in related empirical work. One important advantage pertains to the extent of the coverage, as we include thousands of firms from many regions around the world. Furthermore, unlike other available studies, an additional advantage is that the countries in our sample include both industrial and emerging market economies. Not less important, our data contain detailed information based on a homogeneous in-depth survey that was applied rigorously in several aspects, in particular, on issues related with compliance to legal rules, which provides an obvious advantage as it allows the application of useful for robustness tests. In short, the richness in our data allows for a more comprehensive and robust analysis of than presented in previous studies.

3.2. Empirical specification

We apply a simple probit approach with random effects and based on the existing literature as well as the implications of our model above, we consider specific firm-level and country-level characteristics. With respect to the former, we include type of ownership, export status, number of competitors, number of years in operation, size dummies, and sector dummies. Ownership by foreign investors may result in firms being more respectful to domestic legislation as they tend to be better scrutinized; and the same holds true in regard to firms with a high share of government ownership. With respect to firms that rely on exports, the expected sign is less obvious. On the one hand, their dealing in the international marketplace may force firms to become more transparent and thus, allow them fewer opportunities and fewer incentives to behave informally. However, the fact that such firms are more open also gives them more opportunity to behave informally especially when the volume of sales expands rapidly and substantially. With respect to the number of competitors, likewise, on the one hand, competition may provide incentives to firms to behave informally as this would give an edge in terms of cost; however, in a highly competitive world, there may be less opportunities for firms collusion on informality. We also include sector dummies that capture the five available industries in the survey namely, services, agriculture, manufacturing, and construction. Size dummies are also included for both medium and large firms, with small firms constituting the base category. As implied by our theoretical model, we expect that smaller firms are expected to be more inclined to behave informally as such firms may have a higher chance to be off the legal radar screen.

Among the country level controls, our key variable of interest is the well-known ICRG index, which reflects the institutional quality of the country¹². As described in the model, we would expect a negative association between the institutional quality and the level

of informality. Among the additional country-level controls we include the gross domestic product, which we expect to yield a negative sign with respect to informality, as more developed countries typically behave closer to the institutional set up of the country. Other basic controls included are the rate of growth of the economy, the rate of inflation, a labor regulation variable, and an institutional monitoring variable. The exact definitions are provided in Table 1.

In order to assess the extent to which we account for country and firm level variation, we perform analysis of the variance by computing a goodness of fit measure resembling the calculation of an R-squared statistic for each level of analysis. We compute the goodness of fit measure for the within and between variations, by calculating the squared correlation coefficients between the observed and predicted probabilities of our dependent variable on each level of analysis. This allows us to decompose the overall variance explained by the model to the one explained by the firm level characteristics, independent of the country, and the one explained by the country specific characteristics. Also, all our regressions apply a random effects approach which gives a robust inference, as well as robust standard errors clustered at the country level (Wooldridge, 2006).

4. RESULTS

Table 4 reports our findings using a random effects probit methodology¹³. The first column in Table 4 reports results when using firm-specific variables only. Notice that foreign ownership, state ownership, being an exporter, and firm size all of them tend to be statistically significant at conventional levels and are linked with a reduction in informality,

defined as sales off books. Also, we find that informality increases in the number of competitors a firm has. The Chi-squared test of joint significance of our firm variables, allows us to reject the null hypothesis that all firm level variables are jointly equal to zero. Analogously, column 2 in Table 4 includes country level variables, only. In this case, both effectiveness of the legislative and the ICRG index yield statistically significant coefficients at conventional levels. As expected, the institutional variable yields a negative sign that is statistically significant at conventional levels, which is consistent with the theoretical model. Furthermore, the Chi-squared test of joint significance for country level variables rejects the null hypothesis that these variables are not significant.

The third column on Table 4 includes both firm-level and country-level variables. The results are very similar to the ones above. In particular, our variable of interest, institutional quality, is negative and statistically significant, too. As before, firm size also yields the expected sign at a corresponding conventional statistical significance. The predictive power of the firm-level variables, as measured by the within R-squared (0.16), is well exceeded by the corresponding between countries R-squared (0.26). While our results show that several firm level characteristics are indeed relevant to explain the variation in informality, we find strong evidence that most of the variation appears to be driven by institutional differences across countries, thus rejecting the null hypothesis in favor of what is implied by our theoretical model namely, that a poor legal environment creates incentives for firms to operate informally.

In columns 4 and 5 in Table 4, we include an interaction term between gross domestic product and our institutional variable. This interactive term turns out to be positive and statistically significant at conventional levels, which is consistent with the idea that in the

group of high-income countries, nation-wide institutions matter relatively less than in low-income countries. Along these lines, notice that the sign of the interaction between gross domestic product and our institutional proxy is positive and statistically significant at conventional levels.

INSERT TABLE 4

Sample correction

The sampling methodology of the data from the World Bank Economic Survey does not take into account the economic size of each country, which may obviously bias our findings. To correct for this potential problem, we take a random draw of observations out of the full number of firms surveyed. This random draw was done based on size of the economies of the countries in the sample, as measured by their respective gross domestic products at the time of the survey. In particular, we use the country with the highest gross domestic product value in our sample, the United States, as the benchmark, and then proceed to draw a number of random observations from each other country in our sample taking into account the ratio of corresponding gross domestic products between the United States and the chosen country. Thus, we end up with a random draw of firms around the world that better reflects the relative size of the countries¹⁴. With this random sample, we replicate the specifications estimated for the first five columns of Table 4. The corresponding results of using random samples are shown in the last five columns in the same table. Our findings do not change, and the same variables – both at a firm level and at a country level – are statistically significant; in addition, firm’s age now appears mildly negatively correlated with informality.

As before, a country's institutional quality is significantly negatively correlated with informality, and the coefficient of an interaction term between the ICRG institutional index and the gross domestic product yields a positive and statistically significant sign. The predictive power of country-level variables, the within R-squared of 0.27 in the fully specified regression, is almost twice as much as the corresponding firm-level R-squared (0.15).

Endogeneity

Informality may cause erosion in the institutional quality of the country, for example, via an increase in income inequality (Chong and Gradstein, 2007). Similarly, the average country-level firm perception variable about labor regulations may also be endogenous to informality. In particular, past institutional quality may affect current perceptions of the environment by the respondents in the data (Chong and Gradstein, 2008).

To deal with these potential endogeneity issues we employ instrumental variables. In particular, they consist of an index of democratic accountability, an index of internal conflict, regional dummies, and the year of introduction of current electoral rule, all of which do not appear to be correlated with the dependent variable, see Table 1 for details. The democratic accountability index is related to institutional quality and the country-level perception of labor regulations, because democratic countries tend to be more stable, are more receptive to claims and opinions of different social groups, and thus tend to have better institutions that may also help change perception of labor regulations.¹⁵ The same occurs with our second instrument, internal conflict. If a country has an armed opposition to the government and if the government indulges in arbitrary violence, direct or indirect, against its own people, this

may reflect that fact that institutions may not be solid enough. Furthermore, individuals may bias their opinions about regulation imposed by government, such as labor ones, as a result of internal conflict. Another set of instruments used are regional dummies, which are particularly helpful in our random effects probit estimations. Finally, our last instrument is the year of introduction of the current electoral rule, and it is similar to democratic accountability, as it is expected that countries with longer democratic tradition will also tend to be more stable. Table 5 replicates the regressions of Table 4 using instrumental variables, with the first four columns utilizing the original sample, and the last four, the random sample, as before. The main results hold, in particular, country differences in institutional quality have a negative and statistically significant effect with respect to informality, and that these differences across countries are smoothed when including the gross domestic product.

INSERT TABLE 5

Robustness

Appendices 1 and 2 address robustness. In particular, Appendix 1 presents results of running analogous specifications to Table 4, particularly, columns 3 and 5, but with different cut-off points in the dependent variable - results remain virtually unchanged.

More importantly, Appendix 2 presents results when testing alternative measures of institutional quality, in particular, sub-components of the ICRG index, as well as other governance indicators (Kaufmann et al., 2005), see the upper part. The results confirm that country-wide differences in institutional quality matter for individual firms' degree of informality, more so than firm-specific characteristics as is reflected by the differences in the

between countries fit and the within countries fit¹⁶.

Also in Appendix 2 (see bottom part), we check the robustness to the use of alternative dependent variables, in particular, ones related to illegality and corruption. The World Bank Economic Survey contains information on the frequency of bribery payments made to various government agencies, such as the licensing authority, telephone companies, and tax authorities. The reported results include the coefficients of the ICRG variables, the R-Squared and the joint significance test chi-values. As can be seen, the results are even stronger than in the case of informality; thus, the between countries fit for “frequency of payments to licensing authorities: is 0.49 as opposed to the within countries fit of 0.14.¹⁷

Specification

We have also assessed the robustness of our specification by following Sala-i-Martin’s (1997) influential approach. The idea is to look at the entire distribution of the estimator of the variable of interest by focusing on the fraction of the density function lying on each side of zero¹⁸. Given that zero divides the area under the density in two, the larger of the two areas is denoted $cdf(0)$, regardless of whether it is above or below zero. Under the assumption that the distribution of the coefficient of interest is non-normal the $cdf(0)$ is calculated as follows. We consider a group of n variables classified as: (i) *dependent variable* (y_i), (ii) *core explanatory variables* ($x_{B,i}$), or vector of basic determinants and (iii) *ancillary variables* ($x_{A,i}$), representing a set of related auxiliary variables identified as possible determinants of our variable of interest.

Using our benchmark specification, we have augmented the empirical models with a pool of ancillary variables, choosing up to two variables at a time and performing regressions with all possible combinations from that pool¹⁹. The results have remained qualitatively unchanged, and all of the statistically significant coefficients have remained so under this sensitivity test.

5. CONCLUDING REMARKS

This research studies how the rule of law translates itself into firms' legal compliance in different countries. It enables us to critically examine the recently popularized thesis that many economically relevant features of behavior are now similar across nations. The specific context that the paper focuses on, legal compliance, has been shown in previous work to be a significant element in determining economic growth. Our model studies the extent of illegality chosen by firms and shows how these choices depend on country-wide level of legal enforcement, implying its effect on the variation in illegality across the firms.

Our empirical part employs the availability of information on various aspects of illegality at a firm level across various countries with diverse institutional quality. We find that firm-level characteristics, such as the nature of firm ownership, its size and age, matter for the extent of illegality chosen by the firm; yet, the bulk of variation in illegality across the firms in our sample comes from country-wide measures of institutional quality. These results are robust to the specific measures of illegality and to the measures of institutional quality. We are thus confident in refuting the claim that “countries no longer matter”. We do, however, find some evidence that the importance of country-wide characteristics is reduced

with their level of development, so that the extent of illegality in poorest countries is most susceptible to these characteristics.

Several interesting questions remain beyond this paper's reach. An important issue, which the available data do not enable addressing, is the intertemporal change in the relative importance of country-wide characteristics. A related but different one concerns the effects of openness on the role of cross-country variation in institutional quality in explaining the variance in illegality. Provided that differences across countries prevail in explaining illegality, a next step would be to more thoroughly examine the causes of these differences. The main finding, that even in the context of a globalized economy country differences in legal compliance matter, may have macroeconomic implications for issues of capital flows, economic growth and income convergence across countries. In particular, not only capital flows to poor countries may be limited because of institutional frictions (Alfaro et al., 2008); the latter may also be detrimental for investment and efficient resource allocation, thus preventing income convergence. Finally, the sources of these pervasive differences – whether history, culture, norms, or political economy - are of tremendous interest as well. Some of these issues will hopefully be addressed in future research.

References

- Acemoglu, D. and S. Johnson, 2005, "Unbundling institutions," *Journal of Political Economy*, 113, 949-995.
- Acemoglu, D., S. Johnson, and J.A. Robinson, 2005, "Institutions as a fundamental cause of development," in *Handbook of Economic Growth*, Aghion, P. and S. Durlauf, eds., North-Holland, Amsterdam.
- Alfaro, L., Kalemli-Ozcan, S., and V. Volosovych, 2008, "Why doesn't capital flow from rich to poor countries? An empirical investigation," *Review of Economics and Statistics*, 90, 347-368.
- Allingham, M. and A. Sandmo, 1972, "Income tax evasion: A theoretical analysis," *Journal of Public Economics*, 1, 323-338.
- Becker, G., 1968, "Crime and punishment: An economic approach," *Journal of Political Economy*, 76, 169-217.
- Berkowitz, D., Moenius, J., and K. Pistor, 2006, "Trade, law, and product complexity," *Review of Economics and Statistics*, 88, 363-373.
- Botero, J., S. Djankov, R. La Porta, F. Lopez-de-Silanes, A. Shleifer, 2004, "The Regulation of Labor," *Quarterly Journal of Economics*, 119, 1339-1382.
- Chong, A., and M. Gradstein (2007) "Informality and Inequality," *Journal of Public Economics*.
- Chong, A. and M. Gradstein (2008) "Volatility and Economic Growth", Working Paper, Inter-American Development Bank.
- Dabla-Norris, E., Gradstein, M., and G. Inchauste, 2008, "What causes firms to hide output? The determinants of informality," *Journal of Development Economics*, 85, 1-27.
- De Soto, H., 1989, *The other path: Invisible Revolution in the Third World*, Harper and Row, New York.
- De Soto, H., 2000, *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else*, Basic Books.
- Djankov, S., La Porta, R., Lopez-De-Silanes, F., and A. Shleifer, 2003, "Courts," *Quarterly Journal of Economics*, 117, 453-517.
- Doidge, C., Karolyi, A.G., and Stulz, R.M., 2007, "Why do countries matter so much for corporate governance?" *Journal of Financial Economics*, 2007, 1-39.
- Fisman, R. and E. Miguel, 2006, "Cultures of corruption: Evidence from diplomatic parking tickets," mimeo.
- Friedman, E., S. Johnson, D. Kaufman, and P. Zoido-Lobaton, 2000, "Dodging the Grabbing Hand: The Determinants of Unofficial Activity in 69 countries," *Journal of Public Economics*, 76, 459-492.
- Friedman, T. L., 2006, *The World is Flat: A Brief History of the Twenty First Century*, Farrar, Strauss, and Giroux, New York.
- Glaeser, E. and A. Shleifer, 2002, "Legal origins," *Quarterly Journal of Economics*, 117, 1193-1230.
- ICRG, 2006, <http://www.icrg.org>
- Johnson, S., McMillan, J., and C. Woodruff, 2002a, "Courts and Relational Contracts,"

- Journal of Law, Economics, and Organization*, 18, 221-277.
- Johnson, S., McMillan, J., and C. Woodruff, 2002b, "Property rights and finance", *The American Economic Review*, Vol. 92, 5: 1335-1356.
- Kaufmann, D., Kraay, A., and M. Mastruzzi, 2005, "Governance matters IV: Governance indicators for 1996-2004," World Bank Policy Research Paper 3630.
- La Porta, R., Lopez-de-Silanes, F., and A. Shleifer, 2008, "The economic consequences of legal origins," *Journal of Economic Literature*, 46, 285-332.
- Leamer, E.E., 2007, "A flat world, a level playing field, a small world after all, or none of the above?" *Journal of Economic Literature*, 45, 83-126.
- Mobarak, A.M., 2005, "Democracy, volatility and economic development," *Review of Economics and Statistics*, 87, 348-361.
- Quinn, D. and J. Woolley, 2001, "Democracy and national economic performance: The preference for stability," *American Political Science Review*, 45, 634-657.
- Persson T. and G. Tabellini, 2003, *The Economic Effect of Constitutions*, MIT Press: Cambridge.
- Rodrik, D., Subramanian, A., and F. Trebbi, 2004, "Institutions rule: The primacy of institutions over geography and integration in economic development," *Journal of Economic Growth*, 9, 131-165.
- Sala-i-Martin, X., 1997, "I just ran two million regressions," *American Economic Review Papers and Proceedings*, 87, 178-183.
- Wooldridge, J., 2006, *Cluster-sample methods in Applied Econometrics: An Extended Analysis*. Working Paper.
- World Business Environment Survey (WBES), 2000, World Bank.
<http://info.worldbank.org/governance/wbes/>
- World Development Indicators (WDI), 2007, World Bank.

Table 1: Variables Definition

Variable	Description
<i>Firms' behavior</i>	
Percentage of sales off the books	Recognizing the difficulties many enterprises face in fully complying with taxes and regulations, what percentage of total sales would you estimate the typical firm in your area of activity keeps "off the books": (0) Up to 30% (1) more than 30%. Source: WBES (2000).
Corruption indices:	
Frequency of payments to telephone authorities	Do firms like yours typically need to make extra, unofficial payments to public officials to get connected to telephone? 1=Never; 2= Seldom; 3= Sometimes; 4= Frequently; 5= Mostly; 6= Always. Source: WBES (2000).
Frequency of payments to licensing authorities	Do firms like yours typically need to make extra, unofficial payments to public officials to get licenses and permits? 1=Never; 2= Seldom; 3= Sometimes; 4= Frequently; 5= Mostly; 6= Always. Source: WBES (2000).
Frequency of payments to tax authorities	Do firms like yours typically need to make extra, unofficial payments to public officials to deal with tax and tax collection? 1=Never; 2= Seldom; 3= Sometimes; 4= Frequently; 5= Mostly; 6= Always. Source: WBES (2000).
Frequency of payments to gain government contracts	Do firms like yours typically need to make extra, unofficial payments to public officials to gain government contracts? 1=Never; 2= Seldom; 3= Sometimes; 4= Frequently; 5= Mostly; 6= Always. Source: WBES (2000).
<i>Firms' characteristics</i>	
Company is owned by a foreign investor	Dummy variable that takes on the value one if the company is owned by a foreign investor, zero otherwise. Source: WBES (2000).
Government owns the company	Dummy variable that takes on the value one if any government agency or state body has a financial stake in the ownership of the firm, zero otherwise. WBES
Exporter	If the firm exports. The variable takes the values: (1) Yes and (0) No. Source: WBES (2000).
Number of competitors	Answer to the question: How many competitors do you face in your markets? Source: WBES (2000).
Sector: Manufacturing, Services, Agriculture, and Construction	3 dummies: (1) Manufacturing, (2) Services, (3) Agriculture, (4) Construction, and (5) Other (commerce; mining and quarrying; and electricity, gas and water). In all the regressions (5) is the omitted dummy. Source: WBES (2000).
Size: Medium and Large	3 dummies: (1) Small: 50-fewer employees, (2) Medium: 51 to 500 employees, and (3) Large: 501 to more employees. In all the regressions (1) is the omitted dummy. Source: WBES (2000).
Years since the company was established	Difference between the year in which the interview was taken and the year in which the firm was established. Source: WBES (2000).
<i>Macroeconomic context</i>	
Log(GDP)	Logarithm of the average GDP for the period 1995-1999. Expressed in Constant 2000 US dollars. Source: WDI (2007).
GDP growth (%)	Average rate of GDP growth (%) for the period 1995-1999. Source: WDI (2007).
Labor regulations obstacle	Country-level average of the answers to the question: Judge on a four point scale how problematic is labor regulation for the operation and growth of your business? 1=No obstacle; 2=Minor obstacle; 3=Moderate Obstacle; 4=Major obstacle. Source: WBES (2000).
Inflation rate	Average rate of inflation of the consumers' price index for the period 1995-1999. Source: WDI (2007).
Effectiveness of the legislative	Index of the effectiveness of the legislature. Ascending scale from 1 to 4 (1=no legislature; 2=largely ineffective; 3=partly effective; 4=effective). Average of the years 1945 through 1998. Source: Botero et al. (2004).
<i>Institutional variables</i>	

ICRG index	Aggregate index for institutional risk. This index combines information on corruption, rule of law, and bureaucratic quality. Higher values of this index indicate lower risks. We use mean values of this index for the year 1998. Source: ICRG.
Corruption	Index on risks implied by corruption. Higher values of this index indicate lower risks. We use mean values of this index for the year 1998. Source: ICRG.
Rule of Law	Index on risk implied by the rule of law in each country. Higher values of this index indicate lower risks. We use mean values of this index for the year 1998. Source: ICRG.
Government Effectiveness	Synthetic Index which combines responses on the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies. The main focus of this index is on "inputs" required for the government to be able to produce and implement good policies and deliver public goods. Higher values of the index mean a more effective government. We use the average value of this index for year 2000. Source: Kaufmann, Kraay and Mastruzzi (2005).
Rule of Law	Synthetic Index which includes several indicators measuring the extent to which agents have confidence in and abide by the rules of society. These include perceptions of the incidence of crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts. Together, these indicators measure the success of a society in developing an environment in which fair and predictable rules form the basis for economic and social interactions, and importantly, the extent to which property rights are protected. Higher indicator denotes a higher quality rule of law. We use the average value of this index for year 2000. Source: Kaufmann, Kraay and Mastruzzi (2005).
Control of Corruption	Synthetic Index that measures perceptions of corruption, conventionally defined as the exercise of public power for private gain. Despite this straightforward focus, the particular aspect of corruption measured by the various sources differs somewhat, ranging from the frequency of "additional payments to get things done," to the effects of corruption on the business environment, to measuring "grand corruption" in the political arena or in the tendency of elite forms to engage in "state capture". The presence of corruption is often a manifestation of a lack of respect of both the corrupter (typically a private citizen or firm) and the corrupted (typically a public official or politician) for the rules which govern their interactions, and hence represents a failure of governance according to our definition. Higher values of the index mean a higher control of corruption. We use the average value of this index for year 2000. Source: Kaufmann, Kraay and Mastruzzi (2005).
<i>Instrumental variables (country level)</i>	
Democratic Accountability	This is a measure of how responsive government is to its people, on the basis that the less responsive it is, the more likely it is that the government will fall, peacefully in a democratic society, but possibly violently in a non-democratic one. The points in this component (six as maximum) are awarded on the basis of the type of governance enjoyed by the country in question. For this purpose, we have defined the following types of governance: Alternating Democracy, Dominated Democracy, De-Facto One-Party State, De-Jure One-Party State, and Autarchy. Average for each country from 1995 to 1999. Source: ICRG.
Internal Conflict	Assessment of political violence in the country and its actual or potential impact on governance. The highest rating is given to those countries where there is no armed opposition to the government and the government does not indulge in arbitrary violence, direct or indirect, against its own people. The lowest rating is given to a country embroiled in an on-going civil war. It is the sum of three categories (0-4). Average for each country from 1995 to 1999. Source: ICRG.
Year of introduction of current electoral rule	The year when the current electoral rule was first introduced, or the first year of democratic rule, whatever came last. Source: Persson and Tabellini (2003). (Dataset available at: http://www.iies.su.se/~persson/data.htm)
Regional dummies	Region to which a group of firms belong: East Asia and Pacific, Europe and Central Asia, Latin America and Caribbean, Middle East and North Africa, North America, South Asia, and West Europe. Source: WBES (2000).

Table 2: Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
<i>Firm behavior</i>					
Percentage of sales off the books	3524	0.34	0.47	0	1
<i>Corruption: Frequency of payments to:</i>					
Telephone authorities	1342	0.22	0.42	0	1
Licensing authorities	1442	0.33	0.47	0	1
Tax authorities	1430	0.26	0.44	0	1
Gain government contracts	1158	0.25	0.43	0	1
<i>Firm's characteristics</i>					
State shares ownership	3524	0.09	0.29	0	1
Foreign shares ownership	3524	0.19	0.40	0	1
Sector: Manufacturing	3524	0.39	0.49	0	1
Sector: Service	3524	0.47	0.50	0	1
Sector: Agriculture	3524	0.06	0.23	0	1
Sector: Construction	3524	0.08	0.28	0	1
If the firm exports	3524	0.35	0.48	0	1
Number of competitors	3522	2.32	0.72	0	9
Firm size: medium	3524	0.44	0.50	0	1
Firm size: large	3524	0.18	0.39	0	1
Years since the firm was established	3524	18.93	19.85	0	111
<i>Macroeconomic context^{1/}</i>					
Log(GDP)	34	25.75	1.62	22.77	29.79
GDP growth	34	2.96	2.05	-1.20	8.76
Inflation rate	34	23.21	45.84	0.76	252.66
Effectiveness of the legislative	34	1.75	0.74	0.91	3.00
Labor regulations obstacle	34	2.45	0.43	1.68	3.46
<i>Institutional variables^{1/}</i>					
ICRG institutional index	34	6.54	1.93	3.33	10.00
<i>ICRG sub indices</i>					
Corruption	34	3.44	1.31	1.00	6
Rule of Law	34	4.32	1.27	2	6
<i>Governance</i>					
Control of Corruption	34	0.34	1.05	-1.02	2.50
Rule of Law	34	0.37	0.94	-0.93	1.99
Government Effectiveness	34	0.43	0.89	-1.05	2.01
Voice and Accountability	34	0.42	0.79	-1.53	1.56
<i>Instruments^{1/}</i>					
Internal conflict	33	9.92	1.76	5.78	12.00
Democracy accountability	33	4.54	1.16	1.50	6.00
Year of introduction of current electoral rule	31	1965	47	1800	1994

1/ These are country-level variables, so the number of observations we present corresponds to the number of countries (in our firm-level sample) for which available data are available.

Table 3: Correlation Matrix

	Percentage of sales off the books	Foreign shares ownership	State shares ownership	Sector: Manufact.	Sector: Services	Sector: Agriculture	Sector: Construct	If the firm exports	Number of compet.	Size: Medium	Size: Large	Years since the firm was established	Log(GDP)	GDP growth	Inflation rate	Effectiv of the legislative	Labor regulations obstacle	ICRG institutional index
Foreign shares ownership	-0.1122 0.0000																	
State shares ownership	-0.0644 0.0001	-0.0180 0.2850																
Sector: Manufacturing	0.0046 0.7831	0.1233 0.0000	0.0613 0.0003															
Sector: Service	-0.0183 0.2769	-0.0434 0.0100	-0.0785 0.0000	-0.7489 0.0000														
Sector: Agriculture	0.0074 0.6620	-0.0847 0.0000	0.0593 0.0004	-0.1920 0.0000	-0.2297 0.0000													
Sector: Construction	0.0181 0.2840	-0.0641 0.0001	-0.0266 0.1139	-0.2405 0.0000	-0.2876 0.0000	-0.0738 0.0000												
If the firm exports	-0.0849 0.0000	0.2669 0.0000	0.0618 0.0002	0.3638 0.0000	-0.2615 0.0000	-0.0700 0.0000	-0.1056 0.0000											
Number of competitors	0.1066 0.0000	-0.1083 0.0000	-0.0202 0.2314	-0.0573 0.0007	-0.0351 0.0371	0.0971 0.0000	0.0811 0.0000	-0.0870 0.0000										
Size: Medium	-0.0267 0.1134	0.0389 0.0208	0.0967 0.0000	0.0584 0.0005	-0.0921 0.0000	0.0749 0.0000	0.0005 0.9742	0.0509 0.0025	-0.0340 0.0433									
Size: Large	-0.0951 0.0000	0.2359 0.0000	0.1113 0.0000	0.1491 0.0000	-0.0979 0.0000	-0.0276 0.1013	-0.0585 0.0005	0.2494 0.0000	-0.1658 0.0000	-0.4165 0.0000								
Years since the firm was established	-0.1096 0.0000	0.1193 0.0000	0.1081 0.0000	0.1010 0.0000	-0.0506 0.0026	-0.0713 0.0000	-0.0290 0.0850	0.1781 0.0000	-0.2347 0.0000	0.0304 0.0714	0.3020 0.0000							
Log(GDP)	-0.0883 0.0000	0.0227 0.1776	-0.0061 0.7155	-0.0771 0.0000	0.0535 0.0015	-0.0229 0.1732	0.0655 0.0001	-0.0035 0.8354	-0.1213 0.0000	0.0752 0.0000	-0.0392 0.0199	0.1071 0.0000						
GDP growth	-0.0907 0.0000	0.1090 0.0000	0.0081 0.6296	0.1011 0.0000	-0.0044 0.7930	-0.1974 0.0000	-0.0084 0.6170	0.1884 0.0000	-0.1647 0.0000	-0.0363 0.0313	0.1195 0.0000	0.1754 0.0000	0.1495 0.0000					
Inflation rate	0.0742 0.0000	-0.1440 0.0000	0.1495 0.0000	0.0051 0.7638	-0.1150 0.0000	0.2063 0.0000	0.0296 0.0790	-0.1220 0.0000	0.2260 0.4880	0.0117 0.0000	-0.0979 0.0000	-0.1786 0.0000	-0.3028 0.0000	-0.5531 0.0000				
Effectiveness of the legislative	-0.2148 0.0000	0.0793 0.0000	-0.0703 0.0000	0.0128 0.4484	0.0326 0.0529	-0.1486 0.0000	0.0482 0.0042	0.1286 0.0000	-0.3579 0.0000	0.0274 0.1039	0.0957 0.0000	0.2977 0.0000	0.5379 0.0000	0.2865 0.0000	-0.3197 0.0000			
Labor regulations obstacle	-0.0231 0.1710	0.1698 0.0000	-0.1439 0.0000	0.0678 0.0001	0.0513 0.0023	-0.2222 0.0000	-0.0212 0.2082	0.1679 0.0000	-0.2998 0.0000	0.0379 0.0244	0.1201 0.0000	0.2900 0.0000	0.0908 0.0000	0.2703 0.0000	-0.4331 0.0000	0.3502 0.0000		
ICRG institutional index	-0.2114 0.0000	0.0240 0.1551	0.0200 0.2361	-0.0635 0.0002	0.0994 0.0000	-0.1176 0.0000	0.0167 0.3221	0.1071 0.0000	-0.1337 0.0000	-0.0545 0.0012	-0.0488 0.0038	0.1357 0.0000	0.3095 0.0000	0.4388 0.0000	-0.3391 0.0000	0.5453 0.0000	0.0686 0.0000	

Pairwise correlations with p-values (in second row).

Table 4: Informality, institutions and GDP

	<i>Dependent variable: Percentage of sales off the books</i>									
	Complete sample					Randomized sample				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Foreign shares ownership	-0.377*** (0.068)		0.376*** (0.068)		0.375*** (0.068)	0.357*** (0.084)		0.357*** (0.084)		0.354*** (0.084)
State shares ownership	-0.185** (0.091)		-0.192** (0.091)		-0.191** (0.091)	0.028 (0.121)		0.022 (0.122)		0.024 (0.122)
Sector: Manufacturing	-0.254 (0.470)		-0.279 (0.470)		-0.313 (0.471)	-0.589 (0.641)		-0.614 (0.642)		-0.662 (0.643)
Sector: Service	-0.369 (0.469)		-0.387 (0.469)		-0.422 (0.470)	-0.746 (0.640)		-0.757 (0.641)		-0.808 (0.642)
Sector: Agriculture	-0.424 (0.477)		-0.446 (0.478)		-0.477 (0.478)	-0.625 (0.657)		-0.645 (0.658)		-0.689 (0.659)
Sector: Construction	-0.272 (0.474)		-0.284 (0.474)		-0.316 (0.475)	-0.685 (0.648)		-0.684 (0.649)		-0.729 (0.650)
If the firm exports	-0.105* (0.058)		-0.100* (0.058)		-0.099* (0.058)	-0.132* (0.073)		-0.120 (0.073)		-0.118 (0.073)
Number of competitors	0.101** (0.044)		0.083* (0.043)		0.086** (0.043)	0.055 (0.057)		0.034 (0.057)		0.041 (0.056)
Size: Medium	-0.109* (0.056)		-0.117** (0.056)		-0.118** (0.056)	-0.121 (0.074)		-0.138* (0.074)		-0.140* (0.074)
Size: Large	-0.278*** (0.082)		0.290*** (0.081)		0.292*** (0.081)	-0.166 (0.101)		-0.191* (0.101)		-0.196* (0.101)
Years since the firm was established	-0.002 (0.001)		-0.002 (0.001)		-0.002 (0.001)	-0.004** (0.002)		-0.004** (0.002)		-0.004** (0.002)
Log(GDP)		0.049 (0.051)	0.045 (0.052)	-0.295 (0.181)	-0.340* (0.185)		0.067 (0.052)	0.065 (0.052)	-0.290 (0.185)	-0.316* (0.183)
GDP growth		0.024 (0.037)	0.036 (0.038)	0.041 (0.036)	0.055 (0.037)		0.021 (0.038)	0.029 (0.038)	0.039 (0.037)	0.048 (0.037)
Inflation rate		0.002 (0.002)	0.001 (0.002)	0.002 (0.002)	0.002 (0.002)		0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)
Effectiveness of the legislative		0.358*** (0.128)	-0.305** (0.133)	0.490*** (0.139)	0.450*** (0.142)		0.397*** (0.132)	0.343*** (0.133)	0.531*** (0.142)	0.483*** (0.141)
Labor regulations obstacle		0.158 (0.173)	0.234 (0.179)	0.174 (0.164)	0.253 (0.168)		0.194 (0.178)	0.285 (0.178)	0.211 (0.168)	0.304* (0.167)
ICRG institutional index		-0.103** (0.044)	0.124*** (0.045)	-1.492** (0.707)	-1.677** (0.719)		-0.092** (0.045)	-0.107** (0.045)	-1.524** (0.718)	-1.635** (0.709)
ICRG institutional index * GDP				0.054** (0.027)	0.060** (0.028)				0.056** (0.028)	0.059** (0.027)
Constant	-0.200 (0.487)	-1.014 (1.363)	-0.677 (1.473)	7.920* (4.720)	9.344* (4.833)	0.263 (0.655)	-1.564 (1.395)	-0.834 (1.521)	7.681 (4.813)	9.067* (4.809)
Observations	3522	3524	3522	3524	3522	2147	2147	2147	2147	2147
Number of countries	34	34	34	34	34	34	34	34	34	34
Chi2 - firm variables	98.09 0.00	-	97.17 0.00	-	97.87 0.00	49.27 0.00	-	48.53 0.00	-	49.13 0.00
Chi2 - country variables	-	33.84 0.00	31.81 0.00	41.16 0.00	40.40 0.00	-	31.01 0.00	29.54 0.00	38.43 0.00	37.97 0.00
Chi2 - all variables	98.09 0.00	33.84 0.00	128.2 0.00	41.16 0.00	136.3 0.00	49.27 0	31.01 0.00	78.88 0.00	38.43 0.00	87.25 0.00
Between countries fit	0.103	0.254	0.256	0.260	0.264	0.104	0.262	0.269	0.272	0.277
Within countries fit	0.155	-	0.163	-	0.161	0.136	-	0.147	-	0.145
Overall fit	0.183	0.254	0.303	0.260	0.309	0.167	0.262	0.306	0.272	0.313
Rho (portion of variance due to u _i)	0.204	0.100	0.106	0.0895	0.0920	0.191	0.0993	0.0970	0.0870	0.0832
Log likelihood	-2028	-2068	-2017	-2066	-2015	-1191	-1206	-1181	-1204	-1179

Clustered by country, indeed robust, standard errors in parentheses; (*) significant at 10 percent; (**) significant at 5 percent; (***) significant at 1 percent. Chi2-test of joint significance and its corresponding p-values are reported for each group of variables. Results shown correspond to marginal coefficients of random effects probit regressions.

Table 5: Informality, institutions and GDP – Instrumental Variables

	<i>Dependent variable: Percentage of sales off the books</i>							
	Complete sample				Randomized sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Foreign shares ownership		-0.383*** (0.072)		-0.382*** (0.072)		-0.351*** (0.091)		-0.349*** (0.091)
State shares ownership		-0.281*** (0.098)		-0.280*** (0.098)		-0.136 (0.135)		-0.133 (0.135)
Sector: Manufacturing		-0.129 (0.544)		-0.308 (0.548)		-0.283 (0.784)		-0.454 (0.787)
Sector: Service		-0.257 (0.541)		-0.438 (0.546)		-0.437 (0.782)		-0.611 (0.785)
Sector: Agriculture		-0.288 (0.550)		-0.458 (0.554)		-0.297 (0.799)		-0.457 (0.802)
Sector: Construction		-0.102 (0.546)		-0.278 (0.550)		-0.304 (0.788)		-0.474 (0.792)
If the firm exports		-0.098 (0.061)		-0.098 (0.061)		-0.114 (0.078)		-0.112 (0.078)
Number of competitors		0.093** (0.045)		0.097** (0.045)		0.044 (0.060)		0.052 (0.060)
Size: Medium		-0.095 (0.059)		-0.096 (0.059)		-0.083 (0.079)		-0.087 (0.079)
Size: Large		-0.272*** (0.087)		-0.277*** (0.087)		-0.146 (0.110)		-0.155 (0.110)
Years since the firm was established		-0.002 (0.002)		-0.002 (0.002)		-0.004* (0.002)		-0.004* (0.002)
Log(GDP)	0.040 (0.059)	0.031 (0.060)	-0.321* (0.192)	-0.378** (0.191)	0.055 (0.063)	0.051 (0.063)	-0.319 (0.202)	-0.357* (0.201)
GDP growth	-0.024 (0.045)	-0.027 (0.046)	-0.001 (0.044)	-0.001 (0.044)	-0.022 (0.048)	-0.021 (0.049)	0.002 (0.047)	0.006 (0.047)
Inflation rate	0.000 (0.002)	-0.000 (0.002)	0.001 (0.002)	0.000 (0.002)	0.000 (0.002)	-0.000 (0.002)	0.000 (0.002)	-0.000 (0.002)
Effectiveness of the legislative			-				-	
	-0.259* (0.137)	-0.210 (0.140)	0.366*** (0.139)	-0.328** (0.139)	-0.284* (0.146)	-0.242 (0.148)	0.394*** (0.149)	-0.359** (0.148)
Labor regulations obstacle	0.015 (0.198)	0.116 (0.204)	0.056 (0.187)	0.166 (0.190)	0.046 (0.237)	0.141 (0.241)	0.098 (0.225)	0.203 (0.227)
ICRG institutional index								
	0.130** (0.052)	-0.141*** (0.053)	-1.561** (0.733)	-1.760** (0.726)	0.119** (0.056)	-0.125** (0.057)	-1.589** (0.763)	-1.729** (0.755)
ICRG institutional index * GDP			0.055* (0.028)	0.062** (0.028)			0.057* (0.029)	0.062** (0.029)
Constant	-0.295 (1.499)	-0.056 (1.610)	9.038* (4.970)	10.673** (5.027)	-0.810 (1.607)	-0.451 (1.786)	8.836* (5.217)	10.229* (5.294)
Observations	3234	3232	3234	3232	1924	1924	1924	1924
Number of countries	30	30	30	30	30	30	30	30
Chi2 - firm variables	41.37 0.00	94.20 0.00	94.20 0.00	95.68 0.00	95.68 0.00	40.34 0.00	40.34 0.00	41.37 0.00
Chi2 - country variables	32.15 0.00	30.36 0.00	39.99 0.00	40.20 0.00	25.49 0.00	23.08 0.00	32.30 0.00	30.87 0.00
Chi2 - all variables	32.15 0.00	123.7 0.00	39.99 0.00	133.3 0.00	25.49 0.00	64.30 0.00	32.30 0.00	72.13 0.00
Between countries fit	0.254	0.259	0.269	0.277	0.242	0.245	0.257	0.262
Within countries fit	-	0.170	-	0.168	-	0.143	-	0.141
Overall fit	0.254	0.310	0.269	0.324	0.242	0.283	0.257	0.297
Rho (portion of variance due to u _i)	0.0930	0.0944	0.0806	0.0786	0.0985	0.0978	0.0850	0.0822
Log likelihood	-1873	-1824	-1872	-1822	-1052	-1031	-1050	-1029

Clustered by country, indeed robust, standard errors in parentheses; (*) significant at 10 percent; (**) significant at 5 percent; (***) significant at 1 percent. Chi2-test of joint significance and its corresponding p-values are reported for each group of variables. Results shown correspond to marginal coefficients of random effects probit regressions. Two variables were instrumented in these regressions: labor regulations obstacle and ICRG institutional index. For both of them, we used as instruments: democratic accountability, internal conflict, regional dummies, and the year of introduction of current electoral rule.

Appendix 1: Sensitivity to changes in Cut-Off Point of Dependent Variable

	<i>Dependent variable:</i>			
	<i>Percentage of sales off the books</i>			
	<i>=1 if more than 20% unreported</i>		<i>=1 if more than 40% unreported</i>	
	(1)	(2)	(3)	(4)
Foreign shares ownership	-0.378*** (0.064)	-0.377*** (0.064)	-0.365*** (0.072)	-0.364*** (0.072)
State shares ownership	-0.296*** (0.087)	-0.294*** (0.087)	-0.138 (0.096)	-0.137 (0.096)
Sector: Manufacturing	-0.648 (0.484)	-0.677 (0.484)	-0.195 (0.510)	-0.230 (0.510)
Sector: Service	-0.744 (0.483)	-0.774 (0.483)	-0.288 (0.508)	-0.324 (0.509)
Sector: Agriculture	-0.920* (0.491)	-0.947* (0.491)	-0.338 (0.517)	-0.371 (0.518)
Sector: Construction	-0.631 (0.488)	-0.658 (0.488)	-0.283 (0.514)	-0.315 (0.514)
If the firm exports	-0.149*** (0.056)	-0.148*** (0.056)	-0.131** (0.061)	-0.130** (0.061)
Number of competitors	0.065 (0.042)	0.068 (0.042)	0.052 (0.045)	0.054 (0.045)
Size: Medium	-0.125** (0.055)	-0.125** (0.055)	-0.111* (0.059)	-0.112* (0.059)
Size: Large	-0.305*** (0.078)	-0.307*** (0.078)	-0.190** (0.085)	-0.193** (0.085)
Years since the firm was established	-0.002 (0.001)	-0.002 (0.001)	0.001 (0.002)	0.001 (0.002)
Log(GDP)	0.036 (0.057)	-0.419** (0.201)	0.015 (0.052)	-0.310* (0.187)
GDP growth	0.014 (0.042)	0.036 (0.040)	0.074** (0.037)	0.090** (0.037)
Inflation rate	0.001 (0.002)	0.001 (0.002)	0.002 (0.002)	0.002 (0.002)
Effectiveness of the legislative	-0.289** (0.146)	-0.458*** (0.153)	-0.247* (0.132)	-0.371*** (0.144)
Labor regulations obstacle	0.132 (0.196)	0.157 (0.182)	0.156 (0.176)	0.171 (0.169)
ICRG institutional index	-0.102** (0.050)	-1.930** (0.778)	-0.147*** (0.045)	-1.467** (0.731)
ICRG institutional index * GDP		0.071** (0.030)		0.051* (0.028)
Constant	0.481 (1.606)	12.297** (5.238)	-0.136 (1.472)	8.355* (4.898)
Observations	3522	3522	3522	3522
Number of countries	34	34	34	34
Chi2 - firm variables	138.9 0.00	139.5 0.00	60.79 0.00	60.98 0.00
Chi2 - country variables	21.04 0.00	29.76 0.00	36.20 0.00	42.22 0.00
Chi2 - all variables	159.6 0.00	168.0 0.00	95.21 0.00	100.8 0.00
Between countries fit	0.255	0.267	0.232	0.235
Within countries fit	0.190	0.189	0.131	0.131
Overall fit	0.318	0.327	0.266	0.269
Rho (portion of variance due to u_i)	0.130	0.111	0.101	0.0916
Log likelihood	-2150	-2148	-1794	-1792

Clustered by country, indeed robust, standard errors in parentheses; (*) significant at 10 percent; (**) significant at 5 percent; (***) significant at 1 percent. Chi2-test of joint significance and its corresponding p-values are reported for each group of variables. Results shown correspond to marginal coefficients of random effects probit regressions.

Appendix 2: Robustness Issues

	Institutions	Institutions*GDP	Obs.	Number of count.	Chi2 - firm variables	Chi2 - country variables	Chi2 - all variables	Between countries fit	Within countries fit	Overall fit
<i>Dependent variable: Percentage of sales off the books</i>										
ICRG sub indices										
Corruption										
(1)	-0.199*** (0.055)		3522	34	97.37	40.82	136.8	0.284	0.163	0.327
(2)	-3.340** (1.386)	0.122** (0.054)	3522	34	98.18	13.98	146.9	0.288	0.162	0.330
Rule of Law (0-6)										
(3)	-0.107 (0.071)		3522	34	96.37	23.49	120.2	0.222	0.161	0.274
(4)	-2.885*** (0.906)	0.108*** (0.035)	3522	34	97.62	23.17	134.9	0.247	0.160	0.294
Governance										
Control of Corruption										
(5)	-0.312*** (0.090)		3522	34	95.93	38.53	134.5	0.255	0.162	0.302
(6)	-3.014*** (1.128)	0.104** (0.043)	3522	34	95.71	10.88	144.9	0.262	0.160	0.308
Rule of Law										
(7)	-0.302*** (0.102)		3522	34	96.66	33.45	129.7	0.237	0.162	0.287
(8)	-3.232** (1.266)	0.112** (0.048)	3522	34	96.95	11.75	138.7	0.239	0.160	0.287
Government Effectiveness										
(9)	-0.269** (0.118)		3522	34	95.96	27.97	124.4	0.233	0.162	0.284
(10)	-2.982** (1.323)	0.104** (0.050)	3522	34	96.05	11.74	131.1	0.233	0.160	0.283
Voice and Accountability										
(11)	-0.376*** (0.086)		3522	34	97.48	50.25	145.7	0.282	0.163	0.325
(12)	-0.638 (1.876)	0.010 (0.073)	3522	34	97.45	8.825	145.8	0.281	0.163	0.325
<i>Dependent variable: Different corruption indices</i>										
Frequency of payments to telephone authorities										
(13)	-0.191* (0.114)		1341	23	34.39	35.85	61.35	0.490	0.138	0.509
(14)	-4.488** (2.027)	0.167** (0.079)	1341	23	35.39	50.14	73.67	0.521	0.150	0.542
Frequency of payments to licensing authorities										
(15)	-0.191** (0.079)		1442	31	39.30	42.14	80.03	0.458	0.136	0.477
(16)	-3.188** (1.331)	0.116** (0.051)	1442	31	40.14	54.37	93.03	0.485	0.140	0.504
Frequency of payments to tax authorities										
(17)	-0.210* (0.126)		1430	29	23.54	36.81	56.48	0.556	0.0895	0.562
(18)	-3.697* (1.955)	0.135* (0.076)	1430	29	24.16	45.11	64.36	0.580	0.0886	0.585
Frequency of payments to gain government contracts										
(19)	-0.297** (0.115)		1158	28	34.64	29.00	59.43	0.404	0.151	0.431
(20)	-4.473** (1.819)	0.162** (0.070)	1158	28	34.92	42.74	73.09	0.441	0.154	0.467

Clustered by country, indeed robust, standard errors in parentheses; (*) significant at 10 percent; (**) significant at 5 percent; (***) significant at 1 percent. Chi2-test of joint significance and its corresponding p-values are reported for each group of variables. Results shown correspond to marginal coefficients of random effects probit regressions. Specifications used for each pair of regressions are the same used in regressions (3) and (5) of Table 4, respectively, except for the ICRG institutional index in regressions (1) to (12).

Gianmarco Leon and Vanessa Rios provided remarkable research assistance. We thank an anonymous referee and the editor, Luis Garicano, for their insightful comments, which led to significant improvements in the paper. This work began when the second author was visiting the IMF and revised when visiting the Economics Department at Harvard University, for whose hospitality he is grateful.

¹ More generally, with mild changes in interpretations, the model can be conceived in terms of law compliance.

² The earlier version of the paper provides standard micro foundations for this.

³ For example, some firms may find it easier than other to borrow in order to comply with regulations. Indeed, the literature on financial imperfections suggests that larger firms have much easier time overcoming financial barriers than smaller firms, see

⁴ A broader interpretation is that weak institutional quality manifests in the inability of informal entrepreneurs to secure property rights, access credit markets, and have recourse to the legal system.

⁵ This assumption is made for simplicity and nothing substantial changes when the fine is fixed at different rate.

⁶ <http://info.worldbank.org/governance/wbes/>

⁷ The particular requirements that had to be filled by the sample selected were as follows. Sector: In each country, the sectoral composition in terms of Manufacturing (including agro-processing) versus Services (including commerce) will be determined by relative contribution to GDP, subject to a 15% minimum for each category. Size: At least 15% of the sample shall be in the small and 15% in the large size categories. Ownership: At least 15% of the firms will have foreign control. Exporters: At least 15% of firms will be exporters, meaning that some significant share of their output is exported. Location: At least 15% of firms will be in the category “small city or countryside”

⁸ The survey also asks questions about additional aspects of illegality, and we present their analysis in an appendix; we choose to focus on informality because the extent of coverage is broadest for this variable.

⁹ It is an imperfect measure for two reasons. First, all the firms in the survey are registered firms, which implies that they all operate in the formal economy, but many of them hide at least some output. Therefore, we are ignoring firms that are completely unregistered, particularly small enterprises, and omitting a potentially important part of the economy in developing countries (see de Soto, 1989). This omission would likely bias our estimates of hidden activity downwards for economies where there is a greater incidence of informality. Second, the question is phrased in terms of typical behavior by firms in that sector, rather than the behavior of the given firm, which may introduce a bias towards the average behavior of other firms in that environment.

¹⁰ It should be noted that the WBES survey only covers firms already in existence, so we cannot infer anything about the relative importance of these obstacles for potential entrepreneurs who are considering the decision to be formal versus informal.

¹¹ After including all variables of interest, we are left with 34 countries and more than 3500 firms. The list of countries, along with the polled number of firms, is as follows: Argentina (78), Bolivia (73), Brazil (154), Bulgaria (92), Canada (86), Chile (79), China (78), Colombia (89), Czech Rep (92), Ecuador (52), France (71), Germany (76), Hungary (108), India (129), Indonesia (70), Italy (69), Malaysia (45), Mexico (43), Pakistan (72), Panama (50), Peru (79), Philippines (90), Poland (194), Portugal (75), Romania (124), Russia (456), Spain (82), Sweden (73), Thailand (352), Turkey (116), UK (59), US (90), Uruguay (66), and Venezuela (60).

¹² We tested a broad array of empirical specifications and found the institutional variable to be extremely robust among country-level variables. Similarly, at the firm level, both firm size and foreign ownership are also quite robust.

¹³ We replicate all our specifications using ordered probits, and obtain analogous results. These findings are available upon request.

¹⁴ When we draw random samples using population as our benchmark variable our results do not change.

¹⁵ Quinn and Woolley, 1993, and Mobarak, 2005, argue that decisions in less democratic governments tend to be manipulated.

¹⁶ For the sake of economy we show the coefficients of our variables of interest only, although we include the corresponding R-Squared and Chi statistic values of the joint significance tests. Full results are available upon request.

¹⁷ The difference in results may have to do with country differences in specific regulations, such as in the area of licensing, or the tax code.

¹⁸ If 95 percent of the density function for the estimates of the coefficient of interest lies to the right of zero, one could say that this variable is more likely to be correlated with our dependent variable.

¹⁹ The ancillary variables employed are the share of urban population, the share of female workers, fiscal deficit, inflation rate, rate of growth, income inequality, size of the informal sector, and firm-level perception of bureaucratic quality. We test our basic specification for all possible combinations of ancillary variables and compute the coefficient estimates, its variance, the (integrated) likelihood, and the individual $cdf(0)$ for each regression. This is summarized in the following vector: $\{\hat{\gamma}_{I,j}, \hat{\sigma}_{I,j}^2, L_{I,j}, \Phi_{I,j}(0/\hat{\gamma}_{I,j}, \hat{\sigma}_{I,j}^2)\}$; (ii) We

compute the aggregate $cdf(0)$ of our coefficient of interest γ_I as the weighted average of all individual $cdf(0)$ s

$$\Phi_I(0) = \sum_{j=1}^M \omega_{I,j} \Phi_{I,j}(0/\hat{\gamma}_{I,j}, \hat{\sigma}_{I,j}^2) \text{ where the weights, } \omega_{I,j}, \text{ are the integrated likelihoods, } \omega_{I,j} = \frac{L_{I,j}}{\sum_{k=1}^M L_{I,k}}.$$

The variable of interest is said to be strongly correlated (i.e., is robust) with probability of ending up on a determined quintile if the weighted $cdf(0)$, is greater than or equal to 0.95.