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### **ABSTRACT**

In developing countries, informal firms (those that are not registered with the government) account for about half of all economic activity. We consider three broad views of the role of such firms in economic development. According to the romantic view, these firms would become the engine of economic growth if not stopped by government regulation. According to the parasite view, informal firms, by avoiding taxes and regulations, unfairly compete with the more efficient formal firms and, by taking away their market share, undermine economic progress. According to the dual view, informal firms are highly inefficient, do not pose much threat to the formal firms, but also do not contribute to economic growth, which is driven by the efficient formal firms.

Using data from World Bank firm level surveys, we find that informal firms are small and extremely unproductive, compared even to the small formal firms, and especially relative to the larger formal firms. Compared to the informal firms, formal ones are run by much better educated managers. As a consequence, they use more capital, have different customers, market their products, and use more external finance. Hardly any formal firms had ever operated informally. This evidence is inconsistent with the romantic and parasite views, but supports the dual view. In this "Walmart" theory of economic development, growth comes from the creation of the highly productive formal firms. Informal firms keep millions of people alive, but disappear over time.

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## **I. Introduction.**

In many developing countries, unofficial economic activity -- that conducted by unregistered firms or by registered firms but hidden from taxation -- accounts to between a third and a half of the total. This share declines sharply as the economy develops. Despite the sheer magnitude of this unofficial activity, little is understood about its role in the process of economic development, and in particular about how important "officializing" these hidden resources might be for economic growth.

In this paper, we attempt to shed some light on these issues by presenting some new facts about the unofficial economy and interpreting them in light of various theories. We begin in section II by reviewing the basic stylized facts: that the official economy is huge, that it shrinks sharply in relative terms as the economy develops, and that various policy variables that determine the costs and benefits of becoming and staying official influence its size. This evidence is consistent with the generally accepted view that unofficial firms avoid paying taxes and adhering to regulations, but lose the access to public goods and other benefits of official status, such as external finance. Much of the existing literature on the unofficial economy, including De Soto (1989), Loayza (1996), Johnson et al. (1997), Friedman et al. (2001), Djankov et al. (2002), Almeida and Carneiro (2006), Dabla-Norris, Gradstein, and Inchauste (2008), and Russo (2008), as well as the recent work on Brazil (De Paula and Scheinkman 2008, Monteiro and Assuncao 2006, Fajnzylber, Maloney, and Rojas 2006) emphasizes these public policy aspects of the problem.

Yet crucial as this perspective might be, it does not tell us much about the role of unofficial firms in development. There are three broad views of this role, which we refer to as the romantic view, the parasite view, and the dual economy (or dual for short) view. According to the romantic view, which we associate with the work of De Soto (1989, 2000), unofficial firms are either actually or potentially extremely productive, and are held back by government taxes and regulations, as well as by lack of secure property rights and of access to finance. Pending the necessary legal reforms "four billion people around the world are robbed of the chance to better their lives and climb out of poverty, because they are excluded from the rule of law" (United Nations, 2008, page 1). If the barriers to officialdom are lowered and capital is supplied through micro finance, unofficial firms will register, borrow, take advantage of other benefits of official status, and by doing so expand and spark economic growth. The key aspect of this optimistic view is that unofficial firms are fundamentally similar to the official ones, but kept down by policy. In particular, unofficial firms should look similar to official firms

with respect to characteristics not affected by government policies, such as the characteristics of entrepreneurs (e.g., their education).

The other two views are more skeptical about the unofficial firms, and in particular see them as quite unproductive not just because they are deprived of the benefits of the official status, but also because they are run by lower human capital entrepreneurs. In these alternative views, development does not come from the unleashing of informal firms as much as from their displacement by efficient formal firms, usually run by totally different people. It is the “Walmart” theory of development.

The two views differ in what they see the benefits and the harms of the unofficial sector. The parasite view, associated primarily with the excellent empirical studies by the McKinsey Global Institute, sees the unofficial firms primarily from the perspective of their illegality. These firms need to stay small to avoid detection and, therefore, lack the necessary scale to produce efficiently. However, the “substantial cost advantage that informal companies gain by avoiding taxes and regulations more than offsets their low productivity and small scale” (Farrell, 2004, page 28). The cost advantage conferred by avoiding taxes and regulations allows unofficial firms to undercut official firms in prices. Informal firms then hurt growth both because their small scale makes them unproductive and because they take away market share from bigger, more productive formal competitors. According to one McKinsey report, “The high proportion of small firms in service industries makes them particularly likely to operate informally, ignoring tax requirements, employee benefits, and other regulations. This is a much larger barrier to growth than most policymakers in emerging – and developed – economies acknowledged. Steps in reducing informality in local service sectors will be rewarded with rapid increases in their productivity, growth, and employment.” (Baily, Farrell, and Remes 2005, page 18). The first step to redress the problems created by informal firms is to “add resources and beef up a government’s audit capabilities” (Farrell, 2004, page 34). More broadly, government policy should aim to eradicate informal firms by reducing tax evasion and increasing the enforcement of government regulations.

The dual view, associated in our minds with traditional development economics a la Harris-Todaro (1970), likewise emphasizes the inherent inefficiency of unofficial firms. This view is intimately related to the big push models of development economics, which see the coordinated transition from the informal/pre-industrial economy to the formal/industrial one as the crucial strategy of economic development (e.g., Rosenstein-Rodan 1943, Rostow 1960, Murphy, Shleifer, and Vishny 1989). The earliest formal model of the unofficial economy is Rauch (1991), who uses the Lucas (1978) framework to consider the allocation of talent between the unofficial and the official sectors. In Rauch’s

framework, the lower human capital workers work in informal and smaller firms, and receive lower wages, whereas the higher human capital workers allocate to the larger and more productive firms, and receive higher wages (see also Amaral and Quintin 2006, and de Paula and Scheinkman 2008).

Unlike the romantic view, the dual view predicts that unofficial firms should look very different from official firms in their characteristics not affected by government policies. Productive entrepreneurs pay taxes and bear the cost of government regulation in order to advertise their products, raise outside capital, and access public goods. Such entrepreneurs find it more profitable to run the bigger official firms than the smaller unofficial ones. In contrast, the increase in firm value that less-able entrepreneurs or managers would be able to generate by operating formally is not large enough to offset the additional costs from taxes and regulations. The strong prediction of the dual view is that managers and assets are matched through a sorting process that results in low-ability managers being paired with low-quality assets.

Unlike the parasite view, the dual model does not see the unofficial firms as threatening the official ones, because they are hugely inefficient and are unlikely be able to charge lower prices for the same products. Indeed, official and unofficial firms operate largely in different markets and have different customers. The dual view sees the unofficial firms as providers of livelihood to millions, perhaps billions, of extremely poor people (Tokman 1992), and cautions against any policies raising the costs of the unofficial firms. The dual view sees the hope of economic development in policies, such as human capital, tax, and regulatory policies that promote the creation of official firms, letting the unofficial ones die as the economy develops. The official firms will be new firms run by new people, not the previously unofficial ones<sup>1</sup>.

To shed light on these alternative views, this paper follows the presentation of basic correlations with a comparative analysis of characteristics and productivity of official and unofficial firms in several developing countries. We use three sets of surveys of both official and unofficial firms conducted recently by the World Bank. The first set of surveys, known as Enterprise Surveys, covers small, medium, and large registered firms in nearly 100 countries. We use these surveys largely for comparison. The second set of surveys, known as Informal Surveys, cover primarily unregistered, but

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<sup>1</sup> The sharp distinction we draw between the parasite and the dual views is too extreme. For example, informal firms may compete with formal ones in some industries and not in others, and might pose a greater competitive threat at higher levels of economic development, when they perhaps become more “similar.” We will return to the discussion of the relevance of the two views after presenting some of the data.

also some registered, small firms in about a dozen countries. The third set of surveys, known as Micro Surveys, covers primarily registered, but also some unregistered, small firms in about a dozen mostly different countries. These surveys enable us to make comparative statements about size, inputs, management characteristics, and – in a rough way – productivity of both official and unofficial firms.

We note from the start that the data we use have many problems, not the least because we focus on firms that are by definition avoiding the government's notice. Nonetheless, our findings tend to favor the dual view over the romantic and the parasite views. The unofficial firms tend to be small and unproductive – compared even to the small but registered firms (which themselves are much less productive than larger registered firms). The unofficial firms use lower quality inputs and have less access to public goods and finance. Extremely few of the registered firms have ever operated as unregistered, again suggesting, as argued by Rauch (1991), that the two groups are very separate animals. The evidence points to substantial difference between the registered and the unregistered firms in the human capital of their managers, and suggests that this human capital drives many other differences, including the quality of inputs and access to finance. The unregistered firms pay sharply lower wages to their employees, again consistent with the dual model.

As a final step, we consider the perception of obstacles to doing business by firms in the three surveys. Informal firms see lack of access to markets and finance as their biggest problems. Formal firms emphasize those, but also taxes, tax administration, and corruption. The legal system, regulations, and registration procedures do not rank as highly as obstacles to doing business among either formal or informal firms. Finally, there is little evidence in the surveys that unregistered firms pose much of a competitive threat to the registered ones: the latter do not treat such competition (or unfair competition more generally) as a serious problem. This last result does not support the parasite view of the unofficial economy, which focuses on price undercutting by informal firms.

Overall, the evidence paints a relatively consistent picture. There is very little support for the romantic view, and indeed the differences in productivity between the formal and informal firms are so large that it is very hard to believe that the registration of unregistered firms would eliminate the gap. On the other hand, there is not much support for the parasite view, either, and the evidence suggests that beefing up “enforcement” against the unofficial firms would devastate the livelihood of millions of people surviving near subsistence. The evidence rather points to the dual view, with the fairly standard implication that the hope of economic development lies in the creation of large registered firms, run by

educated managers and utilizing modern practices, including modern technology, marketing, and finance.

## **II. The size of the informal economy**

This section examines the size of the informal economy and its determinants. Measuring the size of the informal economy is inherently difficult. To start with, the informal economy encompasses very different phenomena. One is hidden firms. Such firms hide all of their output from the police, the tax authorities, or the regulators. Another phenomenon is hidden output. Output may be hidden even by registered firms to reduce their tax liability. In a developing country, there are always some hidden firms but also output hidden from tax authorities even by registered firms. Indeed, the face of informality may change as the economy develops, from firms being entirely informal at earlier stages to mere tax avoidance in the richer countries.

Beyond these conceptual issues, there are serious practical problems in measuring hidden firms and output. Nevertheless, a variety of methods have been proposed to measure the size of the informal economy. Since each method has strengths and weaknesses, we gather data on seven measures of the informal economy based on alternative methodologies and sources. All these measures of the informal economy are --if anything-- likely to understate its true size.

Surveys are the most direct, although necessarily subjective, measure of the size of the informal economy. We assemble data on two survey measures. The first is an indicator of the business activity that is unofficial or unregistered from the *2006-2007 World Competitiveness Report*. Top business leaders from 125 countries were asked to estimate the size of the informal sector using a 1 to 7 scale, where 1 indicates that more than 50% of economic activity is unrecorded and 7 that all business is registered. For comparability with the other measures of the informal economy, we rescale this index on a scale from 0% to 50% of GDP. The 50% cutoff adopted by the *World Competitiveness Report* is arbitrary and introduces a downward bias in this measure of the informal economy. The second survey measure is the percentage of total sales that a typical establishment reports for tax purposes from the *World Bank Enterprise Survey*. The respondents are the top managers of registered businesses in (mostly) developing countries. Accordingly, this measure of tax evasion likely understates the size of the informal economy as entrepreneurs in the informal sector are not surveyed. This measure of tax evasion

is available for 95 countries. Most countries have been surveyed twice and we average the available observations between 2002 and 2006.

An alternative method for measuring the informal economy relies on inferring its size from observable variables. The list of candidate variables includes the incidence of micro and small enterprises, male participation rate in the labor force, the fraction of workers contributing to social security, electricity consumption, and currency in circulation. We gather data on three of such indicators.

The first indicator is the percentage of the active labor force that is self-employed. The definition of self-employed includes “jobs where the remuneration is directly dependent upon the profits derived from the goods and services produced” (International Labor Office, 2007) but not unpaid family workers, although the incidence of informality among the latter is probably high. This is admittedly a crude measure of the informal economy. In most developing countries, there is a strong association between self-employment and informal activity, as most self employed tend to be low-skilled, unregistered workers (Loayza and Rigolini, 2006). Of course, self-employment in developing countries may be high not only because informality is prevalent but also because self-employment is common in agriculture. For this reason, the second indicator of the size of the informal economy is the percentage of self-employment in the non-agricultural sector. Other interpretations of self-employment are also possible. In particular, self-employment has been used as an indicator of entrepreneurial activity in the United States. However, the vast majority of self-employed workers in our data are, in fact, “own-account” workers that do not hire persons to work for them. Mondragon-Velez and Pena-Parga (2008) show along these lines that the self- employed are rarely business owners in Colombia. Data on self-employment is collected through population censuses as well as through household or labor force surveys.<sup>2</sup> Data on total and non-agricultural self-employment is available for 133 countries and 96 countries, respectively, from the *International Labor Organization*.

The third objective indicator of the informal economy is based on electricity consumption. For each country, the ratio of electricity consumption to overall GDP for a base period is calculated and then

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<sup>2</sup> There are two known biases in the self-employment data. First, OECD statistics relate to civilian employment and, as such, leave out the armed forces. Second, self-employment statistics in most Latin American countries relate to urban areas only. Self-employment statistics understate the true size of self-employment as a result of these two biases.



extrapolated to the present assuming that the elasticity of electricity consumption to overall GDP is one (Johnson et al. 1997, Enste and Schneider 1998). The size of the informal sector is then computed as the difference between the overall and the official GDP. This measure of the informal economy understates its size to the extent that informal activities are less electricity intensive than formal activities. Similarly, the size of the informal economy will also be biased down if technological progress makes it possible to increase the output generated by a unit of electricity. This indicator is available for 57 countries from Friedman et al. (2001).

Still another approach to measuring the informal economy models hidden output as a latent variable using several indicator and causal variables. This is the approach followed by Schneider (2007) to estimate a multiple indicators multiple causes (MIMIC) model. The indicator variables include the age 18-64 labor force participation rate, annual GDP growth, and the change in local currency per capita. The causal variables are the tax-to-GDP ratio, the Heritage Foundation index of economic freedom, the unemployment rate, GDP per capita, and lagged values of the latent variable. This measure of the informal economy is only as good as the model that supports it. Later in this section, we present evidence that the correlation between the size of the informal economy and variables such as tax rates is not particularly robust. This measure of the informal sector is available for 145 countries from Schneider (2007).

As a final robustness check we gather data on a direct measure of the *formal* economy: the number of registered businesses per one thousand inhabitants. This measure of the informal economy –like all the previous ones – has problems. The number of firms per capita may increase with development, for example, as product variety expands. The number of firms per capita may also be affected by cross-country differences in entrepreneurship. Finally, the data on total registered firms may be biased upward because of underreporting of firms that have closed or exited, especially in developing countries. Data on the number of registered businesses is available for 83 countries from the *World Development Indicators*.

We group the determinants of the size of the unofficial economy into three broad categories: the cost of becoming formal, the cost of staying formal, and the benefits of being formal.

As a proxy for the cost of becoming formal, we use the (log) number of procedures required to legally start a business from Djankov et al. (2002) and the *2008 Doing Business Report*. The costs of staying formal include paying taxes and obeying government regulations. We use six proxies for the cost

of staying formal. First, we use two measures of the cost of paying taxes from Djankov et al. 2008: (1) the total tax rate payable by businesses (except for labor taxes) after accounting for deductions and exemptions as a percentage of profit; and (2) the time it takes to prepare, file and pay (or withhold) the corporate income tax, the value added tax and social security contributions (in hours per year). Second, we capture the cost of complying with labor laws with three variables: (1) an index of the difficulty of hiring a new worker; (2) an index of the difficulty and expense of firing a redundant worker; and (3) the nonwage labor costs (i.e. payroll taxes and social security payments) associated with hiring a new employee as a percentage of the worker's salary. Data on labor laws is from Botero et al. (2004) and the *2008 Doing Business Report*. Third, we capture the cost of red tape using the percentage of senior management's time spent in dealing with requirements imposed by government regulations (e.g. taxes, customs, labor regulations, licensing and registration) including dealings with officials, completing forms, etc. The latter variable is from the World Bank's *Enterprise Survey*.

The benefits of being formal include expanded access to both public goods and finance. Regarding public goods, registered business may find it easier to use courts to enforce property rights and adjudicate disputes. We use two proxies for the efficiency of courts: (1) the (log) number of steps required to collect on a bounced check from Djankov et al. (2003) and the *2008 Doing Business* report; and (2) the efficiency of the bankruptcy procedure from Djankov et al. (2008). We measure the quality of property rights using the indices of corruption and rule of law from Kaufman et al. (2005). In addition, we use road density from the *World Development Indicators* as a rough proxy for the scope of the domestic market. Finally, we measure the benefits of access to finance using three indicators of size of financial markets. The first two indicators are standard: private credit and the market capitalization of domestic firms, both as a ratio to GDP. These two variables are also from the World Development Indicators. The third measure of the size of financial markets is a subjective indicator of the ease of access to credit from the World Economic Forum's Global Competitiveness Report 2006-2007. The index ranges from 1 (impossible) to 7 (easy).

Table I presents our measures of the size of the informal economy. Countries are grouped into quartiles based of average per capita PPP income over the period 1996-2006. In practice, measures of the size of the informal sector based on multiple indicators, energy consumption, self-employment and the World Economic Forum survey are highly correlated with each other (see the correlation table in the appendix). In contrast, tax evasion and the number of registered businesses are less correlated with the other four indicators of the informal economy.

Two facts stand out. First, the average size of the informal economy is large, ranging from 22.5% according to the tax evasion measure to 34.5% according to the multiple-indicators approach. These are large numbers in light of the fact that our measures of the informal economy are likely biased down. About 26.5% of the workers are, on average, self-employed. That figure rises to 30.8% in the non-agricultural sector. Respondents of the World Economic Forum survey estimate that 27.6% of output is informal. Estimates based on electricity consumption suggest that 29% of output is informal. The various estimates thus suggest that, in an average country, roughly 30% of the economy is informal.

Second, the size of the informal economy is strongly negatively correlated with income per capita. Figure I illustrates the relationship between the size of the informal economy as proxied by the multiple indicators variable and income per capita. This implies that the size of the informal economy is very large in poor countries, ranging from 29% according to the tax evasion measure to 57.3% according to the non-agricultural self-employment measure. Survey measures suggest that the size of the informal economy is, depending on the measure, between 18 and 21 percentage points larger in poor countries than in rich ones. Estimates based on electricity consumption and multiple indicators also suggest that the informal economy is between 21 and 24 percentage points larger in poor countries than in rich ones, respectively. Even tax evasion by registered businesses –which is likely to understate tax evasion in poor countries – is 21 percentage points higher in poor countries than in rich ones. The self-employment statistics show that the fraction of self-employed workers rises from 13.3% in rich countries to 46.4% in poor ones. Figure II illustrates the striking relationship between self-employment and income per capita. The pattern for non-agricultural self-employment is even more extreme: self-employment as a share of non-agricultural employment rises by 44.8 percentage points as we move from the rich countries to the poor ones. Consistent with this pattern, the number of registered businesses rises from 3.2 to 41.8 per thousand inhabitants as we move from the poor to the rich countries. These findings suggest that understanding the decline of informal firms may be central to development economics.

Table II examines the determinants of the size of the informal sector. We first present results without GDP per capita (Panel A) and then with GDP per capita (Panel B). The dependent variables are the five proxies for the size of the informal economy as well as the number of registered businesses per capita. (We omit presenting the results using non-agricultural self-employment as they are qualitatively similar as those for total self-employment). The independent variables are proxies for the cost of

becoming formal and the costs and benefits of operating in the formal sector. Each cell in Panel A presents the results from a univariate regression (we do not report the constant).

The results in Panel A show the influence of policy variables. First, our proxy for the cost of becoming formal --the number of procedures to start a business – is consistently associated with a larger informal sector as well as with fewer registered firms. However, the economic effect is modest in size. For example, a one standard deviation increase in the number of procedures is associated with a 4.9 percentage point rise in the multiple-indicators measure of the size of the informal economy.

Second, the results for proxies for the cost of staying formal are mixed. All six proxies for the cost of operating in the formal sector are statistically significant when the dependent variable is the measure from the *World Economic Forum* survey. On the other hand, none of the explanatory variables is significant when using the tax evasion proxy. Results for the other dependent variables are in between these two extremes. Among the explanatory variables in this category, the most consistent one is the time required to comply with taxes, which is significant for all dependent variables except tax evasion. Even then, the effect of increasing the time required to comply with taxes by one standard deviation is associated with an increase of only 4.8 percentage points in the multiple-indicators measure of the size of the informal economy.

Third, the proxies for the benefits of being formal are consistently associated with the size of the informal sector and the number of registered firms (the only two exceptions are court formalism in the regressions for tax evasion and registered firms). The economic impact of increasing these variables by one standard deviation on the multiple-indicator measure of the informal economy ranges from 5.8 percentage points for court formalism to 9.6 percentage points for rule of law. In sum, without controlling for income per capita, both the cost of becoming formal and the benefits of operating in the formal sector have a reliable but modest impact on the size of the informal economy. Our proxies for the cost of operating in the formal sector also have a modest effect on the size of the informal sector but are less often significant.

Next, we rerun the previous regressions adding GDP per capita. The motivation for including GDP per capita in the regressions is that the extent of the informal economy may be correlated with a country's development level. In poor countries, the informal economy may provide subsistence income for workers who are unable to find formal employment. To the extent that informal firms avoid labor laws, the benefits of informality may be larger in the labor-intensive activities common in poor countries

than in the capital-intensive activities common in rich countries. Along the same lines, informality may decline as more transactions are intermediated through the financial system. Finally, tax compliance may rise with income per capita as governments become more efficient at collecting taxes. On the other hand, we may be over-correcting by including GDP per capita in the regressions since it is correlated with some of the institutional variables that we are interested in. In particular, GDP per capita is strongly correlated (i.e. 70%+) with the efficiency of bankruptcy, private credit, corruption, as well as the rule of law (see the correlation table in the appendix). Interestingly, variables that explicitly capture a country's economic structure (e.g. the share of agriculture in GDP) leave unchanged much of the explanatory power of income per capita.

With these caveats in mind, Panel B shows the coefficients for the variables of interest when we control for GDP per capita. As in Panel A, we do not report the constant. Moreover, we do not report the coefficient for GDP per capita either, but it is strongly significant in all regressions. Most estimated coefficients fall in value and loose significance. Results remain consistently significant only for the *World Economic Forum* survey (estimated coefficients are significant in 11 of the 14 regressions). Results for the other dependent variables are mostly insignificant. Our proxy for the cost of becoming formal remains significant in four of the six regressions (*World Economic Forum* survey, tax evasion, multiple indicators, and registered firms). Among the proxies for the cost of operating in the formal sector, the strongest variable is the time to comply with taxes, which is significant in four of the six regressions. Yet, in contrast to the results on tax rates, nonwage costs are significant in only one regression. Finally, among the proxies for the benefits of operating in the formal sector, the strongest variables are road density (significant in four regressions) and the subjective assessment of access to credit (significant in five regressions). The results using objective measures of the development of financial markets are mixed: private credit remains significant in three regressions, but market capitalization does so in only two regressions

In sum, GDP per capita is the most robust predictor of the size of the informal economy. The most straightforward interpretation of the results in this section is that the informal economy is a manifestation of underdevelopment. It recedes as the economy develops, perhaps because public goods become better and financial markets larger or because avoiding detection becomes harder. It remains a crucial, and open, question whether this decline of the informal sector results from the conversion of informal firms to the official status, or from their death and replacement by formal firms.

An alternative interpretation is that we are over-correcting by including GDP per capita. Although GDP per capita is strongly correlated with some of the determinants of the size of the informal economy, multicollinearity is unlikely to explain why tax rates, non-wage costs, and labor laws work so poorly when we control for GDP per capita. We return to this issue in Section IV when we examine the productivity of informal firms using micro data.

Although the cross-country evidence reveals some interesting patterns, it is merely suggestive and does not discriminate among the hypotheses. For this we need micro data, which we analyze next. Accordingly, the remainder of the paper is organized as follows. Section III describes our data on informal and formal firms. We ask questions such as: Are informal firms engines of growth as the romantic view would hold? For example, do informal firms grow quickly and over time join the formal sector? Is there evidence that --consistent with the parasite view-- formal and informal firms operate in the same markets or that formal firms fear competition from informal firms? What evidence is there that --as predicted by the dual view -- informal firms have inferior assets and management?

Section IV is the heart of the paper. It presents evidence on the relative productivity of formal and informal firms. We ask five questions. First, is our data on productivity reliable? Second, how big are the differences in productivity between formal and informal firms? We want to know whether the prediction of the parasite view that informal firms have a cost advantage is borne out by the data. Third, what views of the informal economy are consistent with the observed differences in productivity? We want to examine whether it is plausible to believe --as in the romantic view -- that all that is holding back informal firms are high taxes and bad government regulation. Fourth, what accounts for the difference in the productivity of formal and informal firms? The goal is to see whether differences in productivity can be traced to differences in inputs. Finally, what evidence is there that better-able managers run firms with better assets? Evidence of a strong selection effect would support the dual view and cast doubt on the prediction of the romantic view that relieving informal firms from oppressive taxes and regulation would put an end to poverty as we know it.

Section V focuses on obstacles to doing business, as reported by firms in all three surveys. We ask which of several problems, such as access to markets, financing, taxes, regulations, but also unfair competition are perceived as principal obstacles to doing business. These results shed light on alternative theories, but perhaps bear most directly on the parasite theory. Section VI concludes with some implications of the evidence.

### ***III. Characteristics of informal firms.***

In this section we describe our data and present simple descriptive statistics. Our basic approach is to compare country-by-country the relative performance of formal and informal firms. To do so, we combine data from three World Bank surveys of individual firms. The first survey –the Enterprise survey—covers formal firms and is available for 105 countries. The other two surveys –the Informal and Micro surveys-- contain information on both informal and formal firms in a few poor countries. The Informal survey is available for 13 countries, including Bangladesh, Brazil, Cambodia, Cape Verde, Guatemala, India, Indonesia, Kenya, Niger, Pakistan, Senegal, Tanzania and Uganda. With the exception of Brazil, all these countries are below the world median income in 2003 and 7 out of 13 are below the 25<sup>th</sup> percentile. The Micro survey is available for 14, mostly African, countries, including Angola, Botswana, Burundi, Congo, Gambia, Guinea, Guinea-Bissau, India, Mauritania, Namibia, Rwanda, Swaziland, Tanzania, and Uganda. With the exception of Botswana, all are below the world median income, and 9 out of 14 are below the 25<sup>th</sup> percentile. The concept of informality used in the Informal and Micro surveys focuses on registration (as we discuss below, there are several possible kinds of registration). Although questions about tax avoidance are asked, they are indirect. As discussed in Section II, this definition has both advantages and conceptual limitations.

Before describing the data in detail, we need to preempt a possible misconception about the nature of the firms in our data. In the context of poor countries, the term informal firm evokes the image of street hawkers selling goods out of baskets or of eateries in front of homes. In fact, such image is a good description of how the very poor people make a living (Banerjee and Duflo, 2007). However, the informal firms in our sample do not fit that image. For example, roughly 85% of the observations in the Informal and Micro surveys have –in addition to the entrepreneur-- two employees or more. The informal firms in our sample are likely to be substantially more productive than the own-account workers of Banerjee and Duflo.

#### ***III.A Data***

All three World Bank surveys have a similar structure and differ mainly in the firms that they sample. It is easiest to start by describing the Enterprise Survey--the source for our control group of *registered* or formal firms. It covers mainly manufacturing and certain services firms with five or more employees in 105 countries. The earliest available data is from 2002 and the latest is from 2007. The

initial step in carrying out an Enterprise survey involves contacting the government statistical office of the relevant country to request a list of registered establishments. In some instances, the World Bank supplements the government's list with firms registered with the Chamber of Commerce of the relevant country or listed by *Dun and Bradstreet* or by similar private vendors of business directories. Thus, although firms in the Enterprise Survey may hide some of their output, the government typically knows of their existence. We refer to these firms as "registered" and define the term below. The next step involves contacting the firms that will be sampled. Enterprise Surveys use either simple random sampling or random stratified sampling. A local World Bank contractor phones the firms to set up an interview with the person who most often deals with banks or government agencies. At that stage, firms with fewer than 5 employees are dropped from the sample, as are government-owned establishments, cooperatives, and community-owned establishments. Typical final sample sizes range between 250 and 1,500 businesses per country. The core questionnaire is organized in two parts. The first part seeks managers' opinions on the business environment. The second part focuses on productivity measures and is often completed with the help of the chief accountant or human resource manager.

The World Bank has also conducted separate surveys of informal firms to complement the Enterprise Survey in countries with large informal economies. Initially, data on the unofficial sector was collected through the "Informal Sector" questionnaire. Starting in 2005, the World Bank has switched to the "Micro Sector" questionnaire while phasing out the "Informal Sector" questionnaire. Institutional amnesia makes it hard to ascertain the precise methodology followed with the Informal Sector questionnaire. Nevertheless, the basic outlines of what was done are clear. World Bank contractors identified neighborhoods perceived to have a large number of informal firms. These neighborhoods were then divided into enumeration blocks. These enumeration blocks were subsequently surveyed on foot.

A similar methodology was followed to implement the Micro Sector questionnaire. Specifically, a local contractor selected districts and zones of each district where, based on national information sources, there was a high concentration of establishments with fewer than five employees (i.e. "micro" establishments). The contractor then created a comprehensive list of all establishments in these zones. Finally, the contractor selected randomly from that list and went door-to-door to set up interviews with the top managers of the selected establishments. Although the Micro survey targets establishments



with fewer than five employees, larger establishments are not dropped from the sample. In fact, establishments with fewer than five employees account for only 50% of the Micro sample.

Participation in the surveys is voluntary, and respondents are not paid to participate.<sup>3</sup> Respondents are asked sequentially about the business environment, infrastructure, government relations, employment, financing, and firm productivity. There is some variation in the response rate across questions. To illustrate, out of 6,466 Informal and Micro firms surveyed, we have: (1) the age of 6,412 firms, (2) the number of employees of 6,416 firms, (3) the sales of 6,136 firms, (4) the fraction of investment financed internally of 5,689 firms, (5) assessments of the fraction of taxes typically evaded by firms in their industry of 4,670 respondents, and (6) capacity utilization of 3,083 firms. Since Informal and Micro firms typically do not keep detailed records of their operations, some respondents may simply not know the information being asked. Unfortunately, we have no way of quantifying the biases, if any, from missing data.

Critically, the “Informal” and “Micro” surveys cover registered firms as well as firms that exist without the government’s knowledge (i.e., “unregistered” firms). In the remainder of this paper, we focus on informality understood in terms of hidden firms rather than hidden output. To compare the performance of registered and unregistered firms, we need to define what it means to be registered. The questions regarding the legal status of the firm are worded differently in the Informal and Micro questionnaires. In the Informal Survey, we rely on respondent’s answer to whether firms are “registered with any agency of the central government”. In practical terms, firms are registered with an agency of the central government if they have obtained a tax identification number. In the Micro Survey, we rely on respondent’s answer to whether firms have either “registered with the Office of the Registrar...or other government institutions responsible for commercial registration” or have “obtained a tax identification number from the tax administration or other agency responsible for tax registration”.<sup>4</sup> Both surveys also keep track of whether firms are registered with “any local government agency” or with any “industry board or agency”. We focus on registration with the central government because this form of registration is more directly relevant to avoiding taxes, enforcing contracts, and raising finance. We will also present statistics on municipal and industry board registration. In sum, the Informal and Micro surveys allow us to examine the productivity of (small)

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<sup>3</sup> We lack detailed data on non-participation rates. In Mali, the only country for which we have data on non-participation, the refusal rate is 9%.

<sup>4</sup> We obtain very similar results if the definition of Micro “registered” firms only includes firms that have a tax identification number.

registered and unregistered firms whereas the Enterprise Survey provides information on the productivity of registered firms that have at least five employees.

### ***III.B. Descriptive Statistics***

Table III lists the countries surveyed and presents the number of observations and average sales for the Informal (Panel A) and Micro samples (Panel B). Each panel also shows similar statistics for a control group of firms from the Enterprise Survey. Most of the surveys (19 out of a total of 27) were carried out in African countries but there are also 6 surveys done in Asia and 2 in Latin America. India, Uganda, and Tanzania were surveyed with both the Informal and Micro questionnaires. As indicated earlier, most countries covered by the Informal and Micro surveys are poor. The average income per capita in purchasing power terms is roughly \$2,400, and ranges from \$281 in Congo to \$12,744 in Botswana.

The Informal Survey covered 13 countries. They were typically carried out in 2003 and, on average, have 223 firms with non-missing sales in each country. The Micro surveys were carried out in 14 countries in 2006 and, on average, have 214 firms with non-missing sales per country. The World Bank also carried out Enterprise surveys in parallel with the relevant Informal and Micro surveys. We use firms from the Enterprise survey as a control group. The average number of firms in the control group with available sales data is 474 for the Informal sample (Panel A) and 554 for the Micro sample (Panel B), and ranges from 53 in Niger (Panel A) to 3,860 in India (Panel B).

Throughout the paper we emphasize productivity differences between registered and unregistered firms and between small and big firms. Critically, whereas firms in the Informal survey are typically unregistered, firms in the Micro survey are typically registered. The average Informal survey has 31 *registered* firms out of a total of 223 firms, while the average Micro survey has 137 *registered* firms out of a total of 214 firms. To examine differences in size, we group Enterprise-survey firms in three categories according to the number of employees: (1) fewer than 20 employees (“Small”); between 20 and 99 employees (“Medium”); and 100 employees or more (“Big”). When assessing some of our results on productivity, it is worth keeping in mind that the distribution of firms across these three categories is fairly uneven. For example, there is one Big firm with non-missing sales data (out of 93) in the control group for firms in Cape Verde but 337 (out of 640) in the control group for firms in Indonesia (see Panel A). Related to the small number of observations, there are few extreme outliers in the data (most likely resulting from errors in currency units). To mitigate the role of outliers, we cap

at the 95<sup>th</sup> percentile the value of sales, sales per employee, and value added per employee in each country and in each survey. Capping does not qualitatively change the results we present.

The most striking fact in Table III is that the average sales of firms in the Informal and Micro surveys is tiny even in comparison with the average annual sales of Small firms in the Enterprise survey. Specifically, average sales are \$24,671 for Informal firms but \$948,805 for Small Enterprise firms in the control group. Similarly, average sales are \$50,853 for Micro firms but \$354,318 for Small Enterprise firms in the control group. Unregistered firms are even smaller than the average firm in the Informal and Micro surveys. For example, in the Informal survey sample, average sales for unregistered Brazilian firms are \$32,528 compared to \$51,227 for registered firms. Looking across countries, unregistered firms in the Informal survey sample have average sales of \$23,509 compared to \$36,240 for registered firms. Similarly, unregistered firms in the Micro survey sample have sales of \$29,994 compared to \$59,335 for registered firms. It is natural to worry that the reported sales of unregistered firms may be low because respondents lie about their output. We address this issue in Section IV.

What do unregistered firms do? Tables IV and V shed light on some of the basic characteristics of firms in the Informal and Micro surveys, respectively. Both Tables have a similar –but not identical-- structure since there are only small differences between the two questionnaires. For each variable, we present the mean for each group (e.g., unregistered, registered, Small, Medium, and Big) as well as t-statistics for the difference between the means of different groups of interest (e.g. Small vs. unregistered). To avoid the possibility that the results are driven by the country with the most observations, we first average all observations within a country and then compute means and t-statistics across countries.

We discuss both tables in order, beginning with Table IV. The first block of variables shows some general characteristics of the firms. Unregistered firms, although younger (9.9 years) than the average firm in the control group (17.8), have been operating for quite a long time. By definition, unregistered firms are not registered with the central government. Yet, 34% of them are registered with a local government agency and 7.2% are registered with an industry board or agency.

The next four variables describe the assets owned by firms in the Informal survey. Unregistered firms own 52.3% of the land and 45.1% of the buildings that they occupy. Registered firms have comparable figures (55.5% and 48.1%). In contrast, firms in the Enterprise survey own a significantly larger fraction of the land and buildings that they occupy (on average, 67.4% and 71.2%, respectively).

The ownership of electric generators –a key asset in poor countries – shows a similar pattern. Few unregistered and registered firms own a generator (5.5% and 5.1%, respectively). In contrast, 20.1% of the Small firms in the Enterprise survey and 77% of Big firms in that survey own a generator. Capacity utilization rates do not vary much between unregistered and Enterprise survey firms (61.9% vs. 68.2%, respectively). The evidence suggests that unregistered and registered firms may not share the same clients. In the Informal survey, only 1.2% of the unregistered firms make the largest fraction of their sales to large firms. In contrast, large firms are the main client of 13.5% of registered firms – a percentage comparable to the average firm in the Enterprise survey (15.1%).

The next block of variables describes the employees and their human capital in the Informal survey. Unsurprisingly, unregistered firms have the smallest average number of employees (3.9). More interestingly, registered firms and Small Enterprise firms have very similar employment levels (9.8 vs. 10.3). The key fact regarding informal firms is that –consistent with the dual view but not with the other two views-- their top managers have low human capital. For example, the probability that the top manager of a firm has some college education is only 6.1% if the firm is unregistered compared to 15.9% for registered firms and 63.9% for all firms in the Enterprise survey. To summarize the differences in human capital, we create an index ranging from 1 to 4 according to whether the top manager attended primary school, secondary school, vocational school, or college. This index equals 1.6 for managers of unregistered firms and 3.3 for managers of Enterprise survey firms. We construct a similar index for the employees. Here the pattern is strikingly different than for top managers. Employees of informal firms have very similar levels of education as those of Enterprise survey firms (2.4 vs. 2.3).

Next, we turn to how firms are financed. All views of informality agree that greater access to finance is an important benefit of operating in the formal sector. In fact, roughly 75.1% of the unregistered informal firms have never even had a commercial loan. Instead, they finance 74.9% of investment with internal funds and 10.5% with help from the family. The most striking fact about financing is that all small firms –and not just unregistered ones--- lack access to finance. In fact, Small firms in the Enterprise survey finance 67.8% of their investment with internal funds and 6.3% with family funds. Big firms in the enterprise survey have more access to external finance than small ones. For example, internal funds pay for 50.4% of the investment of Big firms rather than for 67.8% as in the case of Small firms. Yet, the fact that all Small firms lack access to finance suggests that it may be misguided to put access to finance for unregistered firms at the center of the development agenda.

Finally, contrary to the romantic view, there is no evidence in the Informal survey that these young unregistered firms are dynamic engines of employment creation. Specifically, the two-year growth rate of employment is 5.2% for unregistered firms, 7.1% for registered firms, and 10% for all Enterprise survey firms.

Firms in the Micro sample show very similar patterns as those in the Informal sample (see Table V). For this reason, we discuss them only briefly focusing on the questions that are only available on the Micro questionnaire and on the few results that are different between the two questionnaires. The Micro questionnaire gives us a bit more insight into the firms' assets. Only 17.2% of the unregistered firms and 13.4% of the registered ones are located in the owners' house. Most unregistered (71.4%) and registered firms (80.4%) occupy a permanent structure. However, there is evidence of hardship resulting from the lack of secure title (De Soto, 2000). Specifically, 11.3% of registered firms and 8.8% of unregistered firms were forced to move in the previous year because of lack of secure title.

Much like their counterparts in the Informal survey, unregistered firms in the Micro sample are significantly less likely to own a generator than all other firms. The shortage of generators is suggestive of insufficient capital since registered firms are significantly less likely to have an electrical connection than registered ones (60% vs. 79.2%). Furthermore, unregistered firms are much less likely to use their own transportation equipment than registered firms (6.6% vs. 22.9%, respectively). Consistent with the view that unregistered and Enterprise survey firms may serve different clients, Big firms export 19.9% of their sales while unregistered firms export only 0.1% of their sales. Finally, there is evidence that unregistered firms have less access to computers than do other firms. In particular, unregistered firms are less likely to use email to communicate with their clients than either registered or Enterprise survey firms (3.2%, 9.1%, and 39%, respectively). Similarly, unregistered firms are less likely to use a webpage to connect with clients than either registered or Enterprise survey firms (0.9%, 2.8%, and 14.1%, respectively). Consistent with the dual view, unregistered firms own low quality assets.

Unregistered firms in the Micro sample – unlike their counterparts in the Informal sample – have a faster growth rate of employment than firms in the Enterprise Survey. The annual employment growth rate of unregistered firms (24.3%), while not quite matching the growth rate of registered firms (27.1%), exceeds that of Enterprise survey firms (17.6%). The fast employment growth rate of unregistered Micro firms is consistent with the romantic view. However, this finding needs to be interpreted cautiously since unregistered firms remain very small despite having been around for 7 years.

To complement the evidence on growth rates, we examine, for a few countries, how often registered firms initially started operating as unregistered. The Enterprise survey files for fourteen Latin American countries have available a question on whether firms were registered when they started operations and, if not, on whether they have since registered. As it turns out, all firms in this sample of fourteen countries are registered. Table VI shows the available data regarding the initial legal status of these firms. The fraction of firms that were registered initially ranges from 77.7% in El Salvador to 98% in Chile, and averages 91.2% (Panel A). Since 1.3% of the respondents did not answer the question, we estimate that only 7.5% of the firms registered after starting operations. Firms that start operations without being registered do so relatively quickly. Specifically, 36.5% of the initially unregistered firms had registered by the end of the second year of operations (Panel B). It is unclear whether those firms spent two years hiding from the government or, alternatively, started operations while their request for a permit was pending. Either way, firms rarely start as unregistered and later change their status. This is not the pattern that we would expect to see if the informal sector were a reservoir of entrepreneurial talent as predicted by the romantic view. Nor is it the pattern that we would expect to see if entrepreneurs used entry into the informal sector as a way of acquiring information (e.g. about demand for the firm's products) at a lower cost than entry into the formal sector (Bennett and Estrin, 2007).

We conclude this section by presenting some data on the institutional environment in which firms operate. All views of informality agree on the basic tradeoff faced by firms (i.e. taxes and regulatory burden vs. public goods and finance). The previous literature has emphasized access to public goods as one of the main attractions of operating in the formal sector. Table VII presents data on the institutional environment faced by firms and on how they operate in it. Panel A shows results for the Informal survey and Panel B for the Micro survey.

Three facts stand out. First, consistent with all views of informality, unregistered firms enjoy tangible advantages. Specifically, managers of unregistered firms in the Informal sample estimate that a typical firm in their sector evades 74.8% of its tax liability. Tax evasion sharply decreases with firm size. For example, managers of Small firms in the control group estimate that a typical firm in their sector evades 35.5% of its liability and tax evasion drops to 22.9% for Big firms in the control group. Tax evasion by unregistered Micro firms and Small firms in the control group follows a similar pattern (67.7% vs. 44.4%, respectively).

Likewise, the regulatory burden increases rapidly with firm size. Whereas managers of unregistered firms in the Informal (Micro) sample report spending 5.6% (1.5%) of their time dealing with

government regulations, that task requires 14.5% (10.5%) of time for managers of Big firms in the control group. Finally, unregistered firms pay a lower fraction of their sales in bribes than firms in the control group. Specifically, managers of unregistered firms in the Informal survey estimate that firms in their sectors pay 3.6% of their sales to “get things done”. In contrast, managers of registered firms in the Informal survey report that bribes equal 4.8% of sales, a percentage similar to that reported by firms in the control group (4.6%). Similarly, managers of unregistered firms in the Micro survey estimate that firms in their sectors pay 4.0% of their sales to “get things done”. In contrast, managers report that bribes equal 3.5% of sales for registered firms in the Micro survey and 6.6% of sales for firms in the control group. In sum, lower taxes and less regulation confer a clear cost advantage to unregistered firms.

Second, the quality of public goods in our sample is very bad. In the informal survey, unregistered firms report that they experienced power outages on 50 days of the previous year. Firms in the Enterprise survey fare only slightly better (48 days on average). On many days, firms experience multiple power outages. For this reason, the number of power outages for the Micro survey is radically higher than the number of days without power in the Informal survey. Specifically, unregistered firms in the Micro survey experienced 167.1 power outages in the previous year. Once again, Enterprise survey firms do only marginally better (143.7 days). In such an environment, only firms large enough to afford a generator can be productive. Outages of water, phones, and transportation are less frequent than power outages but nevertheless very high for the standards of developed countries. As a result, the performance of firms that are too small to provide for substitutes for public goods (e.g. use their own transportation equipment) may be severely impaired.

Third, outright theft is very prevalent in our sample, but small firms do not make much use of police and of courts. Theft affects all small firms and not just unregistered ones. Specifically, unregistered firms in the Informal survey report that, in a typical year, losses from theft amount to 2.9% of annual sales. Registered firms and Small firms in the enterprise survey report even higher losses (3.5% and 3.8%, respectively). Somewhat surprisingly, losses as a result of theft appear to be lower for Micro firms (0.5%) than for Small firms in the control group (2.6%). To put these figures in context, note that Enterprise Survey respondents estimate losses as a result of theft equal to 0.54% of sales in Germany, 0.26% in Ireland, and 0.22% in Spain.

In response to theft, firms spend heavily on security and make “protection” payments to gangsters. For example, security and protection payments equal respectively 1.8% and 1.0% of the sales

of unregistered firms in the Informal sample. Firms in the control group spend a bit more on security and a bit less on protection but their total expenditure is similar (3%) to that of unregistered firms (2.8%). The police do not appear to play a central role in addressing theft. In fact, most theft is not even reported to the police. Only 14.1% of the incidents suffered by unregistered firms in the Informal survey are reported to the police. In contrast, 26.2% of the incidents experienced by registered firms in the Informal survey are reported to the police—still a low figure. This pattern is consistent with the view that unregistered firms may have trouble protecting their property rights. Alternatively, the absolute value of the losses suffered by unregistered firms may be too low to justify filing a police complaint. Firm size does play a role in reporting theft to the police. However, even Big firms in the control group for the Informal sample only report to the police roughly half of the theft incidents (54%).

Interestingly, small firms do not make much use of courts to adjudicate disputes, either. Only 29.2% of unregistered and 33.2% of registered firms in the Micro sample used courts to resolve commercial disputes during the previous year. In the control group, the use of courts to solve commercial disputes rises quickly with firm size from 51.3% for Small firms to 81.8% for Big firms. Surprisingly, courts appear to work in a reasonably efficient manner. It takes roughly 62 days to resolve a commercial dispute in the Informal sample countries and approximately 52 days in the Micro sample countries. These figures are in line with the average length of court proceedings in Germany (35 days), Ireland (79), and Spain (91 days). The fact that unregistered firms and Small firms in the control group behave similarly regarding how they solve commercial disputes suggests that inadequate access to courts is unlikely to explain differences in productivity between the two groups of firms. The same argument applies to lack of police protection.

The tentative picture that emerges from this section is inconsistent with the romantic view. Unregistered firms have been around for a long time (7 to 10 years), but their sales are still trivially small. Moreover, few registered firms started out unregistered. The small size of unregistered firms is symptomatic of uneducated management and low-quality assets. When public goods are unreliable, unregistered firms are too small to afford owning generators, computers, or transportation equipment. They do not have large firms as clients. They do not export. Despite De Soto's emphasis on access to credit as the key to igniting the growth of unregistered firms, lack of external finance appears to be an attribute of all small firms in poor countries – not just of unregistered firms. In sum, the limitations of unregistered firms appear to be far more severe than acknowledged by proponents of the romantic view.



#### ***IV. Productivity of unregistered firms.***

In this section we examine the productivity of unregistered firms and present the key findings of the paper. In measuring the productivity of unregistered firms, we face severe data limitations. In particular, we do not have information on how much capital these firms have. The Informal and Micro questionnaires do not collect such information since unregistered entrepreneurs typically lack detailed records to estimate the value of their assets. We thus have to measure productivity without capital.

To this end, we use two crude measures of productivity: (1) sales per employee; and (2) (gross) value added per employee, where (gross) value added is defined as sales net of expenditure on raw materials and energy.<sup>5</sup> Thus, we define value added per employee for firm  $i$  in industry  $s$ :

$$VA_{si} = \frac{P_{si}Y_{si} - P_mM_{si} - P_EE_{si}}{L_{si}}$$

where  $P_{si}Y_{si}$  is the level of sales,  $P_mM_{si}$  is expenditure on raw materials,  $P_EE_{si}$  is expenditure on energy, and  $L_{si}$  is the number of employees. The definition of employees includes both full- and part-time workers but not seasonal workers. To the extent that seasonal employment is more prevalent in unregistered firms than in the formal sector, we overstate the productivity of unregistered firms. We use expenditure on production inputs (e.g., energy) as a crude proxy for capital invested.

This approach to productivity measurement has recently received considerable criticism, since the sales measure obviously combines physical output and prices. But in a competitive equilibrium, prices may vary inversely with efficiency exactly to eliminate any variation in productivity as measured by sales (or value added) per employee. The recognition of this problem in the absence of firm-specific price indices is credited to Klette and Griliches (1997); more recent studies that recognize and seek to address it include Bernard et al. (2003), Katayama, Lu, and Tybout (2003), Foster, Haltiwanger, and Syverson (2008), and Hsieh and Klenow (2007). We follow the approach of the latter study, which assumes that all firms in an industry use the same Cobb-Douglas production technology and that industry output is a CES aggregate of the outputs of all the firms. They then show that, in a competitive

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<sup>5</sup> Data on wages is unavailable for most countries in the Informal sample. For this reason, we are unable to remove labor costs from our measure of value added.

equilibrium, physical productivity  $A_{si}$  (or real output per employee) can be estimated from nominal sales using the following formula:

$$A_{si} = \kappa_s \frac{(P_{si} Y_{si})^{\frac{\sigma}{\sigma-1}}}{L_{si}}$$

where  $\kappa_s$  is an unobserved constant, and  $\sigma$  is the elasticity of substitution of output. Although we do not observe  $\kappa_s$ , relative productivities are unaffected by setting  $\kappa_s$  equal to 1 for each industry  $s$ . Intuitively, goods sold by very productive firms must command lower prices to induce buyers to demand the higher output. Raising sales to the power  $\sigma/(\sigma-1)$  yields  $Y_{si}$ , making it possible to infer real output from nominal revenues. Since registered firms tend to have higher sales, productivity differences between registered and unregistered firms are increasing in  $\sigma$ . Empirically, estimates of  $\sigma$  range from 3 to 10. We follow Hsieh and Klenow (2007) and conservatively set  $\sigma$  equal to 3.

Before turning to the results, we note the empirical finding of Foster et al. (2008) that the correlation between the sales-based and corrected measures of productivity is incredibly high, well over .9. Thus, although the theoretical objection to the traditional measures is compelling, its empirical significance appears to be minor. Indeed, Foster et al. have data on both prices and sales. The correlation that they report between nominal and real output is based on actual data rather than on a model.

#### ***V.A Measurement error***

Even aside from the theoretical concerns, we need to deal with the fact that our sales numbers come from unofficial firms, raising concerns about measurement error. There is good reason to worry that our productivity measures may be biased since unregistered entrepreneurs may choose to hide output not only from the government but also from the World Bank contractors. For example, de Mel, McKenzie, and Woodruff (2007) find that micro-enterprises underreport profits by 30% to researchers, although they attribute this more to lack of recall than to intentional understatement.

We offer two pieces of evidence that support the view that biases are unlikely to drive the main results in the paper. First, Table VIII shows the available information regarding expenditure on various production inputs (scaled by sales). If unregistered entrepreneurs lied only about sales, inputs as a

fraction of sales would be higher for unregistered firms than for other firms. In fact, expenditure on raw materials by Small firms in the control group is 12.7 percentage points higher than for unregistered firms in the Informal sample and 2.7 percentage points higher than for unregistered firms in the Micro sample. Moreover, expenditure on energy by unregistered firms is comparable to that of firms in the control group. Other variables show a mixed pattern. In particular, expenditure on labor by Small firms in the control group is 8.1 percentage points higher than that by unregistered firms in the Informal sample but 1.7 percentage points lower than that by unregistered firms in the Micro sample. Similarly, expenditure on machines by Small firms in the control group is 14.8 percentage points higher than by unregistered firms in the Micro sample but equal to that by unregistered firms in the Informal sample. Finally, there is weak evidence that unregistered firms in the Informal survey spend more on land and rent than Small firms in the control group. In sum, there is no evidence that unregistered firms consistently spend a larger fraction of their sales on inputs than Small firms in the control group as would be the case if unregistered entrepreneurs lied only about their sales.

Second, Table IX shows the available data on wages per employee. Under the dual hypothesis, unregistered firms should pay low wages (Harris and Todaro 1970). These low wages may be consistent with some on-the-job home production by workers in unregistered firms. Alternatively, workers in unregistered firms may be less skilled than those in registered firms. Either way, the dual view predicts that the measured output of unregistered firms should be low relative to the output of workers in the control group. In contrast, wages in the formal and informal sectors should be comparable if observed differences in productivity are due only to measurement error. Panel A shows wages per employee in Cape Verde – the only country in the Informal sample with wage data. Panel B shows wages per employee for the countries covered by the Micro sample. Wages are scaled by income per capita.

Three facts stand out. First, there is no clear correlation between size and wages within the control group. Big firms pay higher wages than do Small firms in Congo and Tanzania. The reverse is true in Angola. On average, wages in Big and Small firms are indistinguishable from each other. Second, unregistered firms consistently pay lower wages than Small firms in the control group. Cape Verde illustrates this point. Wages in unregistered firms are 10% lower than per capita income. In contrast, wages in the control group of Small firms are 2.92 times higher than per capita income. On average, in the Micro sample, wages are 1.9 times higher than per capita income in unregistered firms and 3.75 times higher in Small firms. Third, although there is considerable heterogeneity across countries, the workers of unregistered firms are not the poorest among the poor. In India, for example,

wages for the employees of unregistered firms exceed GDP per capita by 31%. Similarly, in the Micro sample, the average wage of unregistered workers is roughly equal to twice GDP per capita. Taken at face value, the large wedge in wages between unregistered firms and the control group is strongly consistent with the dual view of unregistered firms. Of course, we cannot rule out the alternative interpretation that respondents shrewdly lie to the World Bank about sales, inputs, and wages. However, the findings on inputs and wages should allay some of the concerns regarding data quality.

As a final point, it seems to us that concerns about intentional understatement of revenues should not be exaggerated for our data. Firms participating in the surveys do so voluntarily. Virtually all of them answer questions about sales, even though they do not have to. They also give answers suggesting massive underpayment of taxes and bribe payments by “firms like theirs.” This is not behavior of those fearful that World Bank contractors will turn them in (or that authorities would do anything about it). Our view is that most informal firms operate in the open, that they have done so for years, that they pay the police and other authorities to leave them alone, and that fear of reprisals for truly reporting revenues to the World Bank is very far from most of their minds. This particular concern is a rich-country fear rather than a poor country reality.

#### ***IV.B Productivity of unregistered firms***

Tables X and XI present the main findings in the paper. Table X shows estimates of (log) value added (Panel A), (log) sales per employee (Panel B), and (log) real output per employee (Panel C) for the Informal sample and its Enterprise Survey control group. Table XI shows analogous data for the Micro sample. Three key facts stand out. First, registered firms in either the Informal or the Micro surveys are more productive than the same-survey unregistered ones. Firms in India in the 2006 Micro Survey illustrate this pattern. Value added per employee for registered firms is 35% higher than for unregistered firms (8.40 vs. 8.05). Sales per employee for registered Indian firms are 46% higher than for unregistered ones (9.12 vs. 8.66). Real output per employee for registered Indian firms is 75% higher than for unregistered ones (13.59 vs. 12.84). Most countries exhibit a similar pattern although Burundi, Mauritania, Niger, and Pakistan are exceptions. On average, value added per employee for registered firms in the Informal and Micro samples are respectively 18% and 39% higher than for their unregistered counterparts. Differences in sales per employee are even larger: 38% for the Informal sample and 59%

for the Micro sample. Differences between unregistered and registered firms are most extreme for real output per employee: 47% in the Informal sample and 74% in the Micro sample.

Second, these differences become much more dramatic when we compare Informal or Micro survey firms to the Enterprise Survey firms. The productivity gap between unregistered firms and even the Small firms in the control group is truly enormous. Take the case of India in 2006 again. Value added per employee for Small firms is 70% higher than for unregistered firms, while sales and real output per employee for Small firms are 113% and 147% higher, respectively, than they are for unregistered ones. The example of India is representative of the results for other countries although value added and real output per employee in Burundi and sales per employee in Indonesia do not conform to this pattern. Bearing in mind that the observations are unevenly distributed across size groups (e.g. there are only 2 Small firms in Indonesia with non-missing sales), the consistency of the results across countries is striking. On average, based on the Informal sample, the productivity of Small Enterprise Survey firms is around 154%, 180%, or 282% higher than for unregistered firms depending on whether we look at value added, sales per employee, or real output per employee. Similarly, based on the Micro sample, the productivity wedge between Enterprise Survey Small firms and unregistered firms is 104%, 124%, or 210% depending on whether we look at value added, sales per employee, or real output per employee.

Third, Big firms are significantly more productive than Small ones. Continuing with the example of India in 2006, the productivity wedge between Big and Small firms is 68% for value added, 35% for sales per employee, and 269% for real output per employee. This large heterogeneity in firm productivity is consistent with work by Hsieh and Klenow (2007) showing sizable gaps in the marginal products of labor and capital across plants within narrowly-defined industries in China and India. On average, depending on the measure and on the sample, productivity of Big firms is between 59% and 246% higher than that of Small ones.

The cumulative effect of these productivity differences is large. Returning to the example of India in 2006, Big firms are 139%-416% more productive than unregistered firms. On average, the productivity wedge between Big and unregistered firms in the Informal sample is 212% for value added, 243% for sales per employee, and 526% for real output per employee. The numbers for the Micro sample are of the same order of magnitude: 171% for value added, 209% for sales per employee, and 460% for real output per employee.

To illustrate what these differences in productivity mean in practice, consider the average unregistered Micro firm in India. It has sales of \$2,420 per employee and value added of \$1,279 per employee. In contrast, an average Small firm in the control group has sales of \$12,285 per employee and value added of \$4,335 per employee. If the unregistered firm could achieve the value added level of a Small firm only by registering, would it choose to do that? By assumption, changing its legal status would generate \$3,056 ( $=\$4,335 - \$1,279$ ) in additional cash flow. However, the firm would have to pay registration fees and taxes as well as comply with regulations. The registration fee –including the value of the entrepreneurs' time – would probably amount to roughly \$400 (Djankov et al., 2002). The firm would also need to pay labor taxes (17%), corporate taxes (35%), and VAT (12.5%). Recall that our value added estimates are based on expenditures on energy and materials and do not exclude labor costs. To keep things simple, assume that wages are 20% of sales ( $=\$2,457$ ) and that there are no additional costs. Moreover, to bias the example against the firm choosing to register, assume that the firm would evade all taxes if unregistered but comply fully if registered. Under these assumptions, the firm would owe additional payments of \$418 ( $=0.17 * \$2,457$ ) in labor taxes, \$657 in corporate taxes ( $=0.35 * (\$4,335 - \$2,457)$ ), and VAT of \$235 ( $=0.125 * (\$4,335 - \$2,457)$ ). Thus, the firm would have to disburse \$1,710 per employee in taxes and fees. In this back-of-the-envelope calculation, the firm would pocket \$1,346 ( $=\$3,056 - \$1,710$ ) per employee by registering.

Of course, the gains would be even larger if the unregistered firm could –merely by registering -- duplicate the value added per employee of Big firms in the control group. On average, such firms have value added per employee of \$8,715 on sales of \$20,301. Calculations similar to the preceding ones suggest that the unregistered firm would gain \$4,135 per employee if -- only by registering-- it could duplicate the level of value added per employee of Big firms.

A similar set of calculations illustrates that unregistered entrepreneurs can simply not afford to pay taxes unless sales sharply increase from merely registering. Assuming wages equal 20% of sales ( $=\$484$ ), the average unregistered firm has a pre-tax profit per employee of \$795 ( $=1,279 - \$484$ ) and owes taxes of \$460 per employee.<sup>6</sup> Unless sales dramatically increase as a result of registering, the average unregistered firm would have considerable difficulty paying \$400 to register.

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<sup>6</sup> Such firm owes \$82 in labor taxes ( $=0.17 * \$484$ ), \$278 in corporate taxes ( $=0.35 * (\$1,279 - \$484)$ ), and \$99 in VAT ( $=0.125 * (\$1,279 - \$484)$ ).

In practice, these calculations mean that believers in the romantic view need to blame the precarious existence of unregistered firms on something beyond costly entry procedures and high tax rates. Given the very large difference in productivity between unregistered firms and the control group, the cost of complying with government regulations would have to be implausibly high to justify operating as an unregistered firm. A more realistic scenario is that –consistent with the dual view -- unregistered firms would not be able to achieve the performance of Small firms just by registering. Perhaps, for example, unregistered firms lack the human capital necessary to match the quality of the goods produced by formal firms. The image of unregistered firms consistent with their observed levels of productivity is not that of predators but rather that of relics of the past.

What accounts for the large difference in productivity between unregistered firms and the control group? We begin by running simple OLS regressions and discuss self-selection issues later. In principle, the productivity differences that we document in Tables X and XI could be driven by industry effects, by differences in inputs, including human capital, or by differences in size. The goal of the OLS regressions that follow is to examine whether unregistered firms remain unusually unproductive after we control for these factors. In simple terms, we interpret the estimated coefficient on the unregistered dummy as a measure of our ignorance regarding the production function of unregistered firms. Killing the unregistered dummy would not mean that unregistered firms are as productive as registered ones, but that differences in productivity are captured by differences in inputs, as in Rauch's (1991) selection story.

All specifications include the following four dummy variables: (1) the firm is in the Informal survey; (2) the firm is registered and in the Informal survey; (3) the firm is in the Micro survey; and (4) the firm is registered and in the Micro survey. Firms in the Enterprise survey are the omitted category. We then add –one at a time – (log) income per capita, eight industry dummies, expenditure on raw materials, expenditure on energy, expenditure on machines, the index of manager education, and (log) sales.<sup>7</sup> All three expenditure variables are scaled by employees.

Table XII shows OLS regressions for (log) value added per employee. Tables XIII and XIV show similar regressions for (log) sales and real output per employee, respectively. The results for value added, sales, and real output per employee are qualitatively similar. We discuss the findings on value added in some detail and point out where the results for sales and real output per employee differ. The

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<sup>7</sup> Errors are clustered at the country level. We do not include country fixed effects since frequency of unregistered firms in our sample may not reflect the incidence of unregistered firms in the population.

first regression only includes dummies for whether the firm is in the Informal sample or in the Micro sample, and the interactions between each of those two variables and whether the firm is registered.

The results confirm the findings in Tables X and XI. The estimated coefficients equal -1.78 for the Informal sample and -1.29 for the Micro one. Moreover, the interactions of Informal and Micro with registered equal 0.81 and 0.35, respectively. All four dummies are highly statistically significant. Adding GDP per capita does not change the basic pattern. Similarly, the estimated coefficients for the four dummies barely change as we add industry controls. Coefficients do change when we add expenditure on raw materials. Specifically, the estimated coefficients for each of the four dummies are roughly cut in half. Adding expenditure on energy further lowers the estimated coefficients on the four dummies but not significantly so. The four coefficients barely change as we add expenditure on machinery. The coefficients for expenditure on raw materials, energy, and machines are not only statistically significant but also economically important. For example, increasing raw materials by one standard deviation is associated with a 43% increase in value added. Similar increases in expenditure on energy and machines have somewhat smaller effects (32% and 16%, respectively). Coefficients fall another notch when we add manager education. Interestingly, ignoring selection issues, the estimated coefficient on manager education suggests that a top manager with some college education increases value added per employee by 27 percent ( $=0.09 \times 3$ ) relative to a top manager with some lower school education. Finally, there is no evidence that unregistered firms are unusually unproductive once we control for (log) sales. Specifically, the estimated coefficients on both Informal and Micro switch signs when we add (log) sales to the regression. In fact, the coefficient on the Micro is not only positive but also significant. The interaction between registered and informal is the only interaction dummy that remains statistically significant.

The results on sales and real output per employee (see Tables XIII and XIV, respectively) are very similar to those for value added. In the full specification, the estimated coefficients for both the Informal and the Micro dummies are positive and significant. The interaction between registered and informal is insignificant while the interaction between unregistered and Micro takes a small –but statistically significant—negative value.



#### ***IV.C Selection***

The OLS results in this section suggest that unregistered firms are not unusually unproductive once we take into account their expenditure on inputs, the human capital of their top managers, and their small size. Of course, these are all endogenous variables. In fact, a key distinguishing factor between the dual and other views of unregistered firms is the emphasis on the sorting process that matches able managers with good assets. High quality managers are willing to pay taxes and bear the cost of government regulation in exchange for being able to advertise their products, raise outside capital, and access public goods. In contrast, low quality managers avoid taxes and regulations since the benefits of operating in formal economy are less valuable for small firms.

Table XV examines the sorting process. Specifically, we examine the relationship between the quality of the firm's assets and the human capital of its top manager—our only proxy for managers' ability. The dependent variables fall into two categories: dummy variables (Panel A) and continuous variables (Panel B). The dummy variables include indicators for whether: (1) the firm is registered; (2) the firm has ever had a loan; (3) the main buyers are large firms; (4) the firm occupies a permanent structure; (5) the firm is located in the owner's house; (6) the firm owns the building it occupies; (7) the firm owns the land it occupies; (8) the firm uses its own transportation equipment; (9) the firm owns a generator; (10) the firm uses email to communicate with clients; (11) the firm uses a website to communicate with clients; and (12) the firm has an electrical connection. Finally, we use five continuous variables as dependent variables: (1) the percentage of investment that is financed internally; (2) expenditure on raw materials as a fraction of sales; (3) expenditure on energy as a fraction of sales; (4) expenditure on machines as a fraction of sales; and (5) capacity utilization. All regressions control for income per capita and include eight industry dummies.

Many—but not all—the correlations in Table XII are consistent with sorting on managers' ability. Specifically, firms with more educated managers are more likely to be registered, to sell to a large firm, to use their own transportation equipment, to own a generator, to communicate with clients through email, to have a webpage, and to have an electric connection. Along the same lines, managers who attended college are more likely to work for firms that own land and buildings. Moreover, firms with more educated managers use more raw materials and operate with higher capacity utilization. The economic significance of these coefficients is large. The probability of being registered increases by 41 percentage points if the top manager has some college education (rather than some lower school education). Having a top manager with some college also has large effects on the probability of having a

generator (+36.7 percentage points), the probability of using email (+48 percentage points), the probability of having a webpage (+25.7 percentage points), and the probability of having an electrical connection (+28.3 percentage points). In contrast, having a top manager with some college education has a moderate effect on the probability that the main buyers are large firms (+3.2 percentage points), the probability of owning a building (+11.2 percentage points), the probability of owning land (+9.8 percentage points), and the probability of owning transportation equipment (+11.8 percentage points). Similarly, having a top manager with some college education increases expenditure on raw materials by a modest 8.7 percentage points (the standard deviation is 23.3%), and capacity utilization by 5.5 percentage points (the standard deviation is 21.4%).

The evidence on external finance is mixed. On the one hand, firms with more educated managers rely more on external finance (Panel B). On the other hand, the education of managers does not affect the probability that the firm has ever had a loan (Panel A). The evidence on investment in machines is also weak. The only significant coefficient is for vocational schooling. Nor is there evidence that expenditure on energy increases with managers' education. Only one regression has statistically significant coefficients with the "wrong" sign: the likelihood that the firm operates in the house of the owner is higher when managers have attended secondary or vocational schools rather than lower schools.

These results suggest an explanation for the puzzling low productivity of unregistered firms. The productivity gap between registered firms and the control group disappears once we take into account crude proxies for physical and human capital and control for size. Of course, size is an endogenous variable. These results on manager selection are broadly consistent with the view that part of the reason why unregistered firms are small is that they are run by managers of low ability (Rauch 1991). These managers do not find it worthwhile to pay the cost of running a formal firm. Unregistered firms are small because they are run by less able managers and, as such, face a high cost of capital, few opportunities to advertise their products, and insufficient scale to own critical assets such as generators and computers.

## ***V. Obstacles to Doing Business.***

As a final step, we present information on obstacles to doing business, as reported by respondents in Informal, Micro, and Enterprise surveys. All obstacles are reported on the 0-4 scale for

their perceived significance, with 0 representing “no obstacle”, 1 “minor obstacle”, 2 “moderate obstacle”, 3 “major obstacle”, and 4 “very severe obstacle”. In Table XVI, we compare average responses about various obstacles for Informal firms (Panel A) and their Enterprise Survey counterparts, as well as for Micro survey firms and their control group (Panel B).

Starting with the Informal survey, the most striking finding is the similarity in many responses between the registered Informal Survey firms and Enterprise Survey firms. Both groups consider tax rates and tax administration as their most significant problems. Registered Informal survey firms, like Enterprise Survey firms, regard the cost of financing and access to financing as major obstacles as well. Neither the Informal Survey firms nor the Enterprise survey firms consider access to land, procedures to register, crime, skills of the workforce, labor regulations (with the exception of big firms), or the legal system to be major obstacles to doing business.

There are some significant differences as well. Informal firms consider access to or availability of markets to be a huge problem. The unregistered informal firms do not consider taxes or tax administration to be a huge problem, in obvious contrast to the registered firms. Corruption is a smaller problem for the informal firms than for the formal ones. Indeed, both tax administration and corruption are perceived as more serious obstacles by big firms than by small ones (but only differences in the perception of tax administration as an obstacle are statistically significant).

We can also use the information on obstacles to shed light on the parasite theory of the informal economy. Unfortunately, the question asked in the surveys is not ideal. Respondents provide an assessment on a 0-4 scale of whether “anticompetitive and informal practices” are an obstacle to their business. Of course, anticompetitive practices can come not only from the informal firms, but also from formal firms with political or other connections. Nevertheless, several points emerge from these data. First, contrary to the parasite view, “anticompetitive and informal” practices are not among the key obstacles perceived by managers of firms in either the Informal or the Enterprise survey (the average score is 1.78 for the Informal survey and 1.97 for the Enterprise survey).<sup>8</sup> Second, the answer is only slightly higher for the Enterprise Survey firms than for the Informal firms, which is not consistent with the view that the informal firms undercut formal ones. Third, one might have guessed that it is the

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<sup>8</sup> Among Big firms, concern over “anti-competitive or informal practices” ranks after concerns over: (1) tax rates; (2) tax administration; (3) cost of financing; (4) corruption; (5) macroeconomic instability; and (6) electricity. On the other hand, it ranks ahead of, among others, concerns over: (1) economic policy uncertainty; (2) access to financing; (3) crime, theft, and disorder; and (4) customs and trade regulations.

Small registered firms in the Enterprise survey that would be most severely affected by the informal firms. However, these firms perceive anti-competitive and informal practices to be a smaller problem, on average, than do the larger firms. None of this evidence is supportive of the parasite theory.

The patterns in the Micro survey are very similar to those in the Informal survey (except some of the questions differ). Access to financing and electricity emerge as by far the greatest obstacles to Micro firms. These are also huge obstacles for their counterpart Enterprise Survey firms, along with the tax rates. Finally, anti-competitive and informal practices are not among the top obstacles for firms in the Micro survey.

A final piece of evidence comes from the Informal survey, which in Cape Verde only asked the respondents about the benefits and obstacles to registering. The findings are summarized in Table XVII. The main benefits of registering are improved access to markets, to services, and to financing – broadly consistent with the previous findings about the obstacles to doing business faced by informal firms. Better property rights and lower need to pay bribes are not nearly as important. On the cost side, the main obstacles to registration are taxes and the cost of registering (along with the difficulty of obtaining information about how to register). Labor regulation and tax compliance are seen as much less important. Here as well, the picture that emerges is one in which the formal firms have better access to markets, services, and finance, and hence can be much more productive, but need to pay taxes. Presumably, for the Cape Verde firms in the Informal Survey, the tax price is too high to justify registration.

The evidence on obstacles further supports the dual theory, and seems rather inconsistent with the parasite theory. Between their extreme inefficiency and operation in very different markets, informal firms do not appear to pose much of a threat to the formal firms, at least as perceived by the latter. Informal firms clearly recognize the many benefits of being official, including access to markets and to finance (although it is far from clear that they would gain the latter even if they registered). They do not seem to think that regulation, or the cost of registration, and the biggest obstacles to registration. On the other hand, they do see taxes as a huge problem. In this respect, the results are consistent with the dual theory, as well as with the findings reported in Section II and by Djankov et al. (2008).

## ***VI. Conclusion.***

We briefly summarize our findings and discuss their implications. Our most basic finding is that high productivity comes from formal firms, and in particular large formal firms. Productivity jumps sharply if we compare small formal firms to informal firms, and rises rapidly with the size of formal firms. To the extent that productivity growth is central to economic development, the formation and growth of formal firms is necessary for economic growth (see also Lewis 2004, Banerjee and Duflo 2005).

Formal firms appear to be very different animals than informal firms, which accounts for their sharply superior productivity. Perhaps most importantly, they are run by much better educated managers. As a consequence, besides being larger, they tend to use more capital, have different customers, market their products, and use external finance to a greater extent than do the informal firms. There is no evidence that informal firms become formal as they grow. Rather, virtually none of the formal firms had ever been informal. Consistent with this result, Bruhn (2008) shows that business registration reform had a large effect on new registrations in Mexico, but that the new official entrants were former wage earners rather than informal entrepreneurs. Similarly, Mandragon-Velez and Pena-Parga (2008) find surprisingly little transition between self-employment and business ownership in Colombia. It does not appear from the available evidence that informal firms would sharply increase their productivity if only they registered.

This interpretation raises the crucial question of what happens to informal firms as the economy develops. After all, the most basic fact about the informal economy is that its role diminishes sharply as incomes grow. How does this happen? Do informal firms register or do they die? We do not have a definitive answer to this question, but what we have points in the direction of death rather than registration. It is still possible of course that a minority of informal firms, and especially the most productive ones, end up joining the formal economy, perhaps by supplying formal firms. But there is no evidence, at least in our data, that this is the typical story. The vast majority of informal firms appear to begin and to end their lives as unproductive informal firms.

Informal firms nonetheless play a crucial role in developing economies. They represent perhaps 30 to 40 percent of all economic activity. They provide livelihood to billions of poor people. Because these firms are so inefficient, taxing them or forcing them to comply with government regulations would likely put most of them out of business, with dire consequences for their employees and proprietors. If anything, strategies that keep these firms afloat and allow them to become more productive, such as microfinance, are probably desirable from the viewpoint of poverty alleviation. But these are not

growth strategies in that turning unofficial firms into official ones is unlikely to generate substantial improvements in productivity.

Growth strategies, then, need to focus on formal firms, especially the larger ones. Surely reducing the costs of formality, such as the registration costs, is a good idea, but this is not the whole story. Likewise, some of the almost-standard proposals for development, such as improving land rights, the legal environment, and even the human capital of the employees appear to be relatively minor factors, from the viewpoint of official entrepreneurs. The main obstacles to the operations of formal firms, according to our data, are three: 1) taxation, 2) electricity, and 3) finance.

To us, the most striking finding is the sharply higher education of managers of official than unofficial firms, with no corresponding difference in the human capital of the employees. This might suggest that educational policies, particularly those emphasizing secondary education, might be conducive to the formation of entrepreneurial talent that can run formal firms. We do not mean to suggest that formal education is either a necessary or sufficient condition for entrepreneurial skills. But the data seem to be quite clear that some types of management (for example marketing or finance) require education. One can also think of other sources of human capital, such as immigration, as supplying the required entrepreneurial talent.

There is growing evidence that corporate income taxation deters investment and formal entrepreneurship. Using a new data set of corporate income taxes in a large number of countries, Djankov et al. (2008) find strong evidence that these taxes reduce investment, foreign direct investment, and entrepreneurial activity. Our evidence similarly shows that official firms perceive taxation as the top obstacle to doing business. To the extent that formation and growth of official firms are the principal engines of development, this perception must be taken seriously. Needless to say, one needs to also think about alternative sources of public finance, as well as the size of government, in the developing countries to figure out whether corporate income tax cuts are warranted. But the evidence points to a potentially serious problem.

The evidence suggests that official firms (just like the unofficial ones) perceive lack of access to finance to be a serious obstacle to doing business. Recent research has pointed to a broad range of legal and regulatory reforms that can underpin the development of financial markets, reforms that broadly seek to improve the legal rights of creditors and (in the case of very large firms) shareholders (see La

Porta et al. 2008 for a survey). Unlike with tax cuts, there seem to be no compelling counterarguments to improving laws and institutions that underpin financial markets.

Finally, the evidence indicates that electricity supply, including disruptions, presents a problem for the unofficial as well as the smaller official firms. This compares to an interesting lack of concern with other limitations of infrastructure, such as transport, phone, or mail. Most large firms have their own generators, although smaller official firms, and the unofficial ones, do not and hence are more vulnerable.

The overall picture of economic development that emerges from this analysis is in many ways similar to the traditional pre-growth-theory development economics, although it is related to the modern reformulations of economic growth through the lens of development economics (Banerjee and Duflo 2005). The recipe for productivity growth is the formation of official firms, the larger and the more productive, the better. Such formation must perhaps be promoted through tax, human capital, infrastructure, and capital markets policies, very much along the lines of traditional dual economy theories. From the perspective of economic growth, we should not expect much from the unofficial economy, and its millions of entrepreneurs, except to hope that it disappears over time. This “Walmart” theory of economic development receives quite a bit of support from firm level data.

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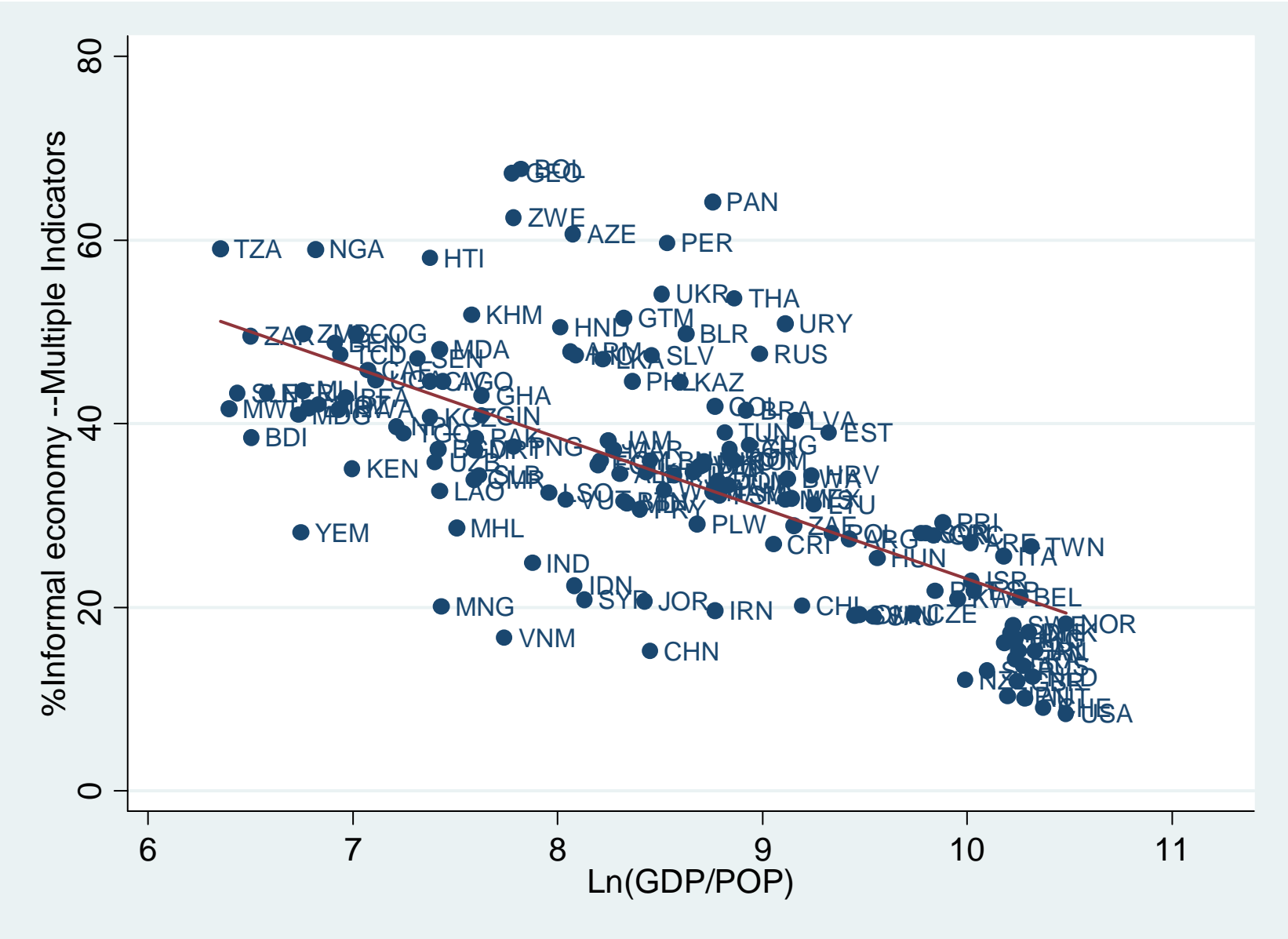


Figure 1. Scatter plot of the multiple-indicators measure of the size of the informal economy against (logarithm) GDP per capita in purchasing power terms.



**Table I: The size of the informal economy**

This table shows averages for seven indicators of the size of the informal sector for countries grouped into quartiles of GDP per capita in purchasing power terms.

	GDP/Population	Measure of Informality					Registered firms / population (000s)	
		% GDP Informal (World Economic Forum)	% Tax Evasion (Enterprise survey)	% Self-employment	% Self-employment non-agriculture	% GDP Informal (electricity consumption)		% GDP Informal (multiple indicators)
First GDP/POP quartile	429	35.4	29.0	46.4	57.3	38.9	42.3	3.2
Second GDP/POP quartile	1,362	33.7	23.3	35.7	37.1	42.7	39.8	8.2
Third GDP/POP quartile	4,002	27.6	19.7	23.1	24.6	31.3	34.1	28.7
Fourth GDP/POP quartile	20,348	17.3	8.2	13.3	12.5	17.6	18.3	41.8
Sample mean	10,015	27.6	22.5	26.5	30.8	29.0	34.5	24.7
First minus Fourth quartile	-19,919 <sup>a</sup>	-18.1 <sup>a</sup>	-20.8 <sup>a</sup>	-33.1 <sup>a</sup>	-44.8 <sup>a</sup>	-21.4 <sup>a</sup>	-23.9 <sup>a</sup>	38.7 <sup>a</sup>
Observations	185	125	95	133	96	57	145	83

Notes: <sup>a</sup> significant at the 1% level. <sup>b</sup> significant at the 5% level. <sup>c</sup> significant at the 10% level.

**Table II – Determinants of the size of the informal sector**

Panel A presents estimated coefficients for univariate OLS regressions. The regressions in Panel B also include GDP per capita. The dependent variables are six proxies for the size of the unofficial economy. All regressions include a constant (not reported). Robust standard errors are shown in parentheses.

Panel A: OLS regressions without controlling for GDP per capita

	%Informal (World Econ Forum)	Tax evasion	Self employment	%Informal (electricity)	%Informal (multiple indicators)	Registered firms
Ln(procedures register)	10.1815a (1.2958)	14.7558a (3.3801)	13.9296a (2.6355)	11.3482a (3.3149)	11.9328a (2.1122)	-23.8551a (4.4736)
Total Tax Rate	0.0426b (0.0173)	0.0599 (0.0524)	-0.0408 (0.0995)	-0.1107 (0.0774)	0.0579a (0.0182)	-0.2745b (0.1361)
Time to comply with taxes	5.9038a (0.8215)	-0.4877 (2.3969)	7.4048a (1.8772)	8.4290a (2.5841)	6.4492a (1.4057)	-13.2818a (3.4070)
% Management time regulations	0.5087a (0.1069)	0.3931 (0.2941)	0.6275a (0.2175)	0.4452 (0.3513)	0.3928 (0.2411)	-0.2511 (0.5630)
Hiring Index	0.1096a (0.0280)	0.0274 (0.0660)	0.0614 (0.0526)	0.0809 (0.0716)	0.1638a (0.0387)	-0.0859 (0.0875)
Firing Index	0.0942b (0.0371)	0.0079 (0.0599)	0.0996c (0.0574)	0.0558 (0.0971)	0.1147b (0.0530)	-0.2565b (0.1206)
Nonwage costs	0.1583a (0.0494)	-0.2358 (0.1553)	0.0880 (0.0794)	0.0273 (0.1159)	-0.1008 (0.0980)	-0.2031 (0.1359)
Formalism Check Collection	3.2047a (0.8214)	1.3864 (1.5126)	3.3703a (1.1305)	4.4214a (1.5261)	5.4614a (1.3257)	-5.0812 (3.2976)
Efficiency of bankruptcy	-0.2207a (0.0252)	-0.1832b (0.0757)	-0.2537a (0.0347)	-0.2686a (0.0677)	-0.2981a (0.0352)	0.3117b (0.1175)
Ln(paved roads / surface)	-0.0090a (0.0019)	-0.0334b (0.0130)	-0.0112a (0.0020)	-0.0137a (0.0023)	-0.0163a (0.0018)	0.0297a (0.0109)
Corruption	-7.4778a (0.3604)	-7.1143a (1.8722)	-10.8238a (0.9804)	-8.5364a (1.6594)	-9.4626a (0.5970)	11.9029a (1.9284)
Rule of law	-8.0286a (0.3697)	-6.0779a (1.7659)	-11.6845a (0.9440)	-9.1701a (2.0373)	-9.9850a (0.6170)	13.3112a (2.0744)
Private Credit / GDP	-14.3709a (1.5940)	-14.8612a (5.2608)	-19.2173a (2.8056)	-11.7983a (3.5882)	-19.7457a (2.3164)	25.4301a (8.9047)
Stock Market Cap / GDP	-9.3152a (1.7191)	-6.9204 (5.8906)	-10.5142a (2.5057)	-9.4449a (2.5483)	-13.8049a (3.0358)	10.2845b (4.2383)
Access to credit	51.5059a (1.6596)	32.8132a (5.3360)	60.4548a (4.8082)	71.4457a (7.8939)	62.0713a (3.3155)	-13.1594 (9.7251)

**Table II – Determinants of the size of the informal sector (continued)**

Panel B: OLS regressions controlling for GDP per capita

	%Informal (World Econ Forum)	Tax evasion	Self employment	%Informal (electricity)	%Informal (multiple indicators)	Registered firms
Ln(procedures register)	3.9083a (1.1217)	12.1526a (3.5141)	1.4158 (2.0266)	1.7380 (3.2263)	3.6917c (1.8926)	-13.1812b (5.2796)
Total Tax Rate	-0.0039 (0.0170)	0.0283 (0.0563)	0.0389 (0.0648)	-0.2306b (0.0866)	-0.0049 (0.0196)	-0.3029a (0.1019)
Time to comply with taxes	3.1399a (0.6296)	-0.5181 (2.3814)	2.6988c (1.5122)	2.5281 (2.6397)	3.3539a (1.2687)	-6.9528b (3.2654)
% Management time regulations	0.3950a (0.0725)	0.2007 (0.3011)	0.2610 (0.1829)	0.2312 (0.3418)	0.2400 (0.1962)	0.3767 (0.4977)
Hiring Index	0.0485a (0.0182)	-0.0033 (0.0631)	-0.0388 (0.0397)	-0.0201 (0.0526)	0.0777b (0.0342)	0.0537 (0.0682)
Firing Index	0.0311 (0.0275)	-0.0294 (0.0547)	0.0170 (0.0420)	-0.0469 (0.0752)	0.0274 (0.0470)	-0.1100 (0.1007)
Nonwage costs	0.0806b (0.0311)	-0.1075 (0.1649)	-0.0405 (0.0571)	-0.0966 (0.0714)	0.0917 (0.0769)	-0.0579 (0.1090)
Formalism Check Collection	1.7096a (0.5891)	2.2855 (1.5024)	0.5051 (0.8129)	-1.9308 (1.3614)	3.3370a (1.0474)	-2.0003 (2.8724)
Efficiency of bankruptcy	-0.0560 (0.0395)	-0.0491 (0.0863)	-0.0252 (0.0545)	0.2044b (0.0895)	-0.0356 (0.0417)	0.0752 (0.1736)
Ln(paved roads / surface)	-0.0025 (0.0016)	-0.0168c (0.0088)	-0.0029a (0.0010)	-0.0044b (0.0018)	-0.0051a (0.0016)	0.0175 (0.0119)
Corruption	-5.6768a (0.6844)	-3.4956 (3.0779)	-1.8315 (1.9129)	0.3169 (3.1140)	-6.9316a (1.1440)	3.8139 (3.7512)
Rule of law	-6.4793a (0.7095)	-2.1094 (3.0715)	-2.5183 (2.2886)	1.6005 (3.9196)	-7.7984a (1.3920)	4.9209 (3.3668)
Private Credit / GDP	-5.6811a (1.6812)	-6.1499 (6.1198)	2.7131 (2.3110)	9.3552b (4.5279)	-8.1961a (3.1009)	6.2312 (12.5764)
Stock Market Cap / GDP	-3.3739a (1.0313)	-1.1785 (5.7787)	0.5142 (1.4782)	0.6396 (2.0652)	-5.3196a (1.8352)	-3.5914 (8.0838)
Access to credit	68.5488a (4.2760)	-0.3639 (1.7380)	125.7942a (17.0908)	164.0424a (21.0187)	99.0417a (7.5245)	-82.9238a (14.1297)

Notes: <sup>a</sup> significant at the 1% level. <sup>b</sup> significant at the 5% level. <sup>c</sup> significant at the 10% level.



**Table III – Basic descriptive statistics**

This table presents average sales (in USD purchasing power terms) and number of observations for countries in the Informal survey (Panel A) and the Micro survey (Panel B). The control group is formed by firms in the Enterprise survey. Firms in the control group are broken in three categories: (1) Small (less than 20 employees), (2) Medium (between 20 and 99 employees), and (3) Big (at least 100 employees).

**Panel A: Informal Survey and control group from the Enterprise Survey**

		Informal Survey						Enterprise Survey							
		Unregistered		Registered		All		Small		Medium		Big		All	
		Sales	Obs.	Sales	Obs.	Sales	Obs.	Sales	Obs.	Sales	Obs.	Sales	Obs.	Sales	Obs.
Bangladesh	2003	19,794	195	48,856	2	20,089	197	321,193	64	2,360,761	259	8,367,846	642	6,221,918	965
Brazil	2003	32,528	218	51,227	126	39,377	344	767,484	252	3,419,992	811	24,100,000	406	8,683,195	1,469
Cambodia	2003	25,710	209	75,165	6	27,090	215	167,574	193	979,849	40	3,260,287	26	603,488	259
Cape Verde	2006	29,917	85	18,922	18	27,996	103	374,308	69	1,738,857	23	4,149,963	1	752,375	93
Guatemala	2003	16,339	183	23,604	10	16,716	193	460,772	163	1,782,770	131	9,557,032	83	2,922,765	377
India	2002	31,956	419	69,237	30	34,447	449	459,165	749	2,804,990	485	17,200,000	230	3,871,384	1,464
Indonesia	2003	29,237	276	.	.	29,237	276	34,244	2	4,608,116	301	41,500,000	337	24,000,000	640
Kenya	2003	20,297	149	30,712	36	22,323	185	1,675,268	49	6,070,552	65	31,800,000	41	11,500,000	155
Niger	2005	15,169	48	14,927	58	15,037	106	4,999,650	34	4,416,983	16	14,700,000	3	5,371,892	53
Pakistan	2003	15,435	210	7,805	3	15,327	213	2,066,015	7	4,316,266	66	9,332,258	33	5,729,247	106
Senegal	2004	24,944	153	29,827	41	25,976	194	433,291	86	4,542,087	90	18,400,000	35	5,169,733	211
Tanzania	2003	9,212	285	19,260	23	9,963	308	278,088	77	3,754,425	62	15,700,000	38	4,796,542	177
Uganda	2003	35,082	91	45,341	23	37,152	114	297,418	107	3,222,021	58	10,700,000	28	2,681,279	193
Average		23,509	194	36,240	31	24,671	223	948,805	142	3,385,975	185	16,059,030	146	6,331,063	474

**Panel B: Micro Survey and control group from the Enterprise Survey**

		Micro Survey						Enterprise Survey							
		Unregistered		Registered		All		Small		Medium		Big		All	
		Sales	Obs.	Sales	Obs.	Sales	Obs.	Sales	Obs.	Sales	Obs.	Sales	Obs.	Sales	Obs.
Angola	2006	22,524	8	46,153	107	44,509	115	219,543	353	440,131	64	826,909	6	261,533	423
Botswana	2006	27,192	27	105,688	73	84,494	100	1,054,364	212	4,027,974	86	9,497,498	39	2,790,306	337
Burundi	2006	31,950	16	44,336	121	42,889	137	262,566	219	1,313,305	43	2,923,213	8	508,740	270
Congo, Dem. Rep.	2006	20,150	40	32,891	64	27,991	104	156,191	258	779,580	71	1,675,336	11	335,518	340
Gambia, The	2006	12,955	47	20,307	76	17,498	123	191,976	118	975,985	47	3,564,678	7	543,472	172
Guinea	2006	93,345	27	129,568	77	120,164	104	180,759	194	979,018	19	2,246,573	7	315,430	220
Guinea-Bissau	2006	22,532	29	48,451	108	42,965	137	155,735	97	441,720	16			196,228	113
India	2006	40,179	643	92,382	906	70,713	1,549	391,872	2,839	2,121,049	714	8,301,780	307	1,340,829	3,860
Mauritania	2006	56,070	69	38,977	53	48,644	122	258,159	181	2,287,588	44	8,216,648	5	819,408	230
Namibia	2006	5,392	49	31,419	47	18,134	96	665,167	225	2,917,353	82	9,329,198	17	1,689,759	324
Rwanda	2006	8,295	22	46,821	106	40,199	128	344,204	143	2,071,016	53	7,671,968	16	1,328,946	212
Swaziland	2006	5,658	34	52,230	83	38,696	117	391,593	207	2,418,694	55	6,982,505	32	1,488,191	294
Tanzania	2006	30,093	25	48,327	40	41,314	65	326,825	259	3,430,273	111	16,400,000	44	2,866,305	414
Uganda	2006	43,584	38	93,144	59	73,729	97	361,505	367	1,609,611	149	5,885,212	36	1,058,645	552
Average		29,994	77	59,335	137	50,853	214	354,318	405	1,843,807	111	6,424,732	41	1,110,236	554

**Table IV: Attributes of the firms in the Informal Survey**

This table presents indicators of general firm characteristics, employees, finance, and growth for the sample of countries in the Informal survey. Results for unregistered and registered firms in the Informal surveys are shown in columns 2 and 3, respectively. Results for a control group of Small (less than 20 employees), Medium (between 20 and 99 employees), and Big (at least 100 employees) firms from the Enterprise survey are shown in columns 5 through 7, respectively.

	Informal Survey			Enterprise Survey				Differences			
	Unregistered	Registered	All	Small	Medium	Big	All	Enterprise vs Informal	Registered vs Unregistered	Small vs Unregistered	Big vs Small
<i>General Characteristics:</i>											
Age of the firm (in years)	9.9	11.6	9.9	14.4	18.8	22.6	17.8	7.9 <sup>a</sup>	1.7	4.5 <sup>a</sup>	8.1 <sup>a</sup>
% of firms that are registered with a central government agency	0.0%	100.0%	14.9%	.	.	.	.	.	100.0%	.	.
% of firms that are registered with a local government agency	34.0%	47.2%	37.0%	.	.	.	.	.	13.2%	.	.
% of firms that are registered with an industry board or agency	7.2%	14.8%	8.9%	.	.	.	.	.	7.6%	.	.
% of occupied land that is owned by the firm	52.3%	55.5%	53.9%	59.0%	70.9%	70.8%	67.4%	13.5%	3.2%	6.7%	11.8%
% of occupied buildings that is owned by the firm	45.1%	48.1%	44.9%	60.8%	74.8%	79.3%	71.2%	26.2% <sup>b</sup>	3.0%	15.7%	18.4% <sup>b</sup>
% of firms that own a generator	5.5%	5.1%	5.6%	20.1%	53.9%	77.0%	45.9%	40.3% <sup>a</sup>	-0.4%	14.6% <sup>a</sup>	56.8% <sup>a</sup>
Average capacity utilization (%)	61.9%	65.8%	62.4%	66.5%	68.0%	71.2%	68.2%	5.8%	3.9%	4.5%	4.7%
% of firms for which the main buyer are large firms	1.2%	13.5%	1.6%	9.2%	17.8%	16.1%	15.1%	13.5% <sup>a</sup>	12.3%	8.0% <sup>a</sup>	6.9%
Anticompetitive and informal practices a big obstacle (0-4)	1.74	2.16	1.78	1.74	1.98	2.11	1.97	0.2	0.4	0.0	0.4
<i>Employees</i>											
Average number of employees	3.9	9.8	4.1	10.3	43.1	487.8	151.0	146.9 <sup>a</sup>	5.9	6.4 <sup>a</sup>	477.5 <sup>a</sup>
Median number of employees	3.8	4.6	4.1	10.2	42.9	426.7	100.6	96.5 <sup>a</sup>	0.9	6.4 <sup>a</sup>	416.5 <sup>a</sup>
Index of education of top manager	1.6	2.0	1.6	2.8	3.3	3.8	3.3	1.7 <sup>a</sup>	0.4 <sup>b</sup>	1.2 <sup>a</sup>	1.0 <sup>a</sup>
% of top managers with primary education	64.8%	47.8%	64.2%	13.0%	7.0%	2.1%	8.9%	-55.3% <sup>a</sup>	-17.0% <sup>c</sup>	-51.8% <sup>a</sup>	-10.9% <sup>a</sup>
% of top managers with secondary education	19.3%	20.8%	18.6%	34.8%	19.5%	5.9%	18.1%	-0.5%	1.4%	15.4% <sup>c</sup>	-28.9% <sup>a</sup>
% of top managers with vocational education	9.8%	15.6%	10.4%	10.9%	8.2%	4.6%	9.1%	-1.3%	5.8%	1.0%	-6.3% <sup>c</sup>
% of top managers with college education	6.1%	15.9%	6.8%	41.4%	65.2%	87.5%	63.9%	57.0% <sup>a</sup>	9.8% <sup>b</sup>	35.3% <sup>a</sup>	46.1% <sup>a</sup>
Index of education of average employee	2.4	2.5	2.4	2.3	2.3	2.4	2.3	-0.1	0.1	-0.1	0.2
% of employees with primary education	59.0%	50.0%	58.2%	52.3%	51.5%	45.2%	47.9%	-10.3%	-9.1%	-6.8%	-7.1%
% of employees with secondary education	34.3%	40.2%	34.9%	24.4%	27.7%	33.5%	32.5%	-2.4%	5.9%	-9.9%	9.0%
% of employees with college education	6.7%	9.8%	6.9%	21.8%	18.3%	17.7%	17.4%	10.5% <sup>a</sup>	3.2%	15.1% <sup>b</sup>	-4.0%
<i>Finance</i>											
%firms that have ever had a loan	24.9%	35.6%	26.0%	.	.	.	.	.	10.7%	.	.
% of financing from internal funds	74.9%	71.0%	75.7%	67.8%	56.3%	50.4%	58.2%	-17.5% <sup>a</sup>	-3.9%	-7.2%	-17.4% <sup>b</sup>
% of financing from trade	4.6%	6.2%	4.7%	4.9%	6.2%	7.2%	5.9%	1.2%	1.7%	0.4%	2.2%
% of financing from family	10.5%	9.1%	9.5%	6.3%	6.3%	3.7%	6.6%	-2.9%	-1.4%	-4.2%	-2.6%
% of financing from banks	3.0%	4.0%	3.0%	9.6%	16.0%	20.9%	15.0%	12.0% <sup>a</sup>	1.1%	6.6% <sup>b</sup>	11.4% <sup>a</sup>
Duration of last loan (in months)	14.6	13.3	14.1	29.0	32.7	35.1	32.2	18.1 <sup>b</sup>	-1.2	14.5 <sup>b</sup>	6.1
<i>Growth</i>											
Annual growth in employees over previous two years	5.2%	7.1%	5.4%	8.1%	11.1%	11.6%	10.0%	4.6% <sup>c</sup>	1.9%	2.9%	3.5%

Notes: <sup>a</sup> significant at the 1% level. <sup>b</sup> significant at the 5% level. <sup>c</sup> significant at the 10% level.

**Table V: Attributes of the firms in the Micro Survey**

This table presents indicators of general firm characteristics, employees, finance, and growth for the sample of countries in the Micro survey. Results for unregistered and registered firms in the Micro surveys are shown in columns 2 and 3, respectively. Results for a control group of Small (less than 20 employees), Medium (between 20 and 99 employees), and Big (at least 100 employees) firms from the Enterprise survey are shown in columns 5 through 7, respectively.

	Micro Survey			Enterprise Survey				Differences			
	Unregistered	Registered	All	Small	Medium	Big	All	Enterprise vs Micro	Registered vs Unregistered	Small vs Unregistered	Big vs Small
<i>General Characteristics:</i>											
Age of the firm (in years)	7.0	8.2	7.8	9.2	14.3	18.3	10.7	3.0 <sup>a</sup>	1.2	2.2 <sup>a</sup>	9.1 <sup>a</sup>
% of firms that are registered with a central government agency	0.0%	100.0%	68.4%	.	.	.	.	.	100.0%	.	.
% of firms that are registered with a local government agency	39.4%	81.1%	68.7%	.	.	.	.	.	41.7% <sup>a</sup>	.	.
% of firms that are registered with an industry board or agency	5.0%	30.7%	20.0%	.	.	.	.	.	25.7%	.	.
% of firms located in the owners home	17.2%	13.4%	13.8%	.	.	.	.	.	-3.9%	.	.
% of firms located in a permanent structure	71.4%	80.4%	77.0%	.	.	.	.	.	9.0%	.	.
% of occupied land that is owned by the firm	21.7%	20.1%	20.1%	28.4%	54.3%	71.0%	36.2%	16.1% <sup>a</sup>	-1.6%	6.7%	42.7% <sup>a</sup>
% of firms forced to move last year because of lack of secure title	11.3%	8.8%	9.8%	.	.	.	.	.	-2.5%	.	.
% of firms that own a generator	12.7%	23.6%	20.2%	32.5%	52.1%	75.8%	43.0%	22.8% <sup>a</sup>	10.9% <sup>c</sup>	19.8% <sup>a</sup>	43.3% <sup>a</sup>
% of firms with an electrical connection	60.0%	79.2%	73.6%	.	.	.	.	.	19.2% <sup>c</sup>	.	.
% uses own transportation equipment	6.6%	22.9%	18.2%	.	.	.	.	.	16.3% <sup>a</sup>	.	.
Hours per week that the firm operates	64.8	64.6	64.9	59.4	60.9	79.8	62.2	-2.7	-0.2	-5.4	20.4 <sup>a</sup>
% of firms for which the main buyer are large firms	0.4%	2.6%	1.8%	21.1%	36.1%	44.7%	29.0%	27.2%	2.2% <sup>a</sup>	20.7%	23.6%
% exports	0.1%	0.7%	0.5%	0.9%	4.4%	19.9%	2.8%	2.3% <sup>a</sup>	0.7% <sup>a</sup>	0.8% <sup>a</sup>	19.0% <sup>a</sup>
% of firms that use email to connect with clients	3.2%	9.1%	7.1%	29.5%	57.8%	78.7%	39.0%	31.9% <sup>a</sup>	5.9% <sup>a</sup>	26.3% <sup>a</sup>	49.1% <sup>a</sup>
% of firms that use a webpage to connect with clients	0.9%	2.8%	2.2%	8.9%	22.2%	42.2%	14.1%	11.8% <sup>a</sup>	2.0% <sup>b</sup>	8.0% <sup>a</sup>	33.3% <sup>a</sup>
Anticompetitive and informal practices a big obstacle (0-4)	1.54	1.43	1.47	1.40	1.46	1.48	1.41	-0.1 <sup>a</sup>	-0.1	-0.1 <sup>a</sup>	0.1
<i>Employees</i>											
Average number of employees	2.9	4.5	3.9	8.7	38.7	290.4	32.7	28.8 <sup>a</sup>	1.5 <sup>b</sup>	5.8 <sup>a</sup>	281.6 <sup>a</sup>
Median number of employees	2.7	3.7	3.5	8.7	39.4	253.2	29.1	25.6 <sup>a</sup>	1.0 <sup>b</sup>	5.9 <sup>a</sup>	244.5 <sup>a</sup>
Index of education of top manager	1.8	2.3	2.1	2.7	3.2	3.8	2.8	0.7 <sup>a</sup>	0.4 <sup>a</sup>	0.8 <sup>a</sup>	1.1 <sup>a</sup>
% of top managers with primary education	49.8%	35.9%	40.2%	22.1%	0.1	2.2%	19.6%	-20.6% <sup>a</sup>	-13.9% <sup>c</sup>	-27.7% <sup>a</sup>	-19.9% <sup>a</sup>
% of top managers with secondary education	27.8%	26.2%	26.2%	25.3%	0.1	5.5%	21.6%	-4.6%	-1.7%	-2.6%	-19.8% <sup>a</sup>
% of top managers with vocational education	10.2%	13.4%	12.4%	17.0%	0.1	6.9%	15.7%	3.3%	3.2%	6.8% <sup>b</sup>	-10.1% <sup>a</sup>
% of top managers with college education	12.2%	24.6%	21.2%	35.7%	0.6	85.3%	43.1%	21.9% <sup>a</sup>	12.4% <sup>a</sup>	23.5% <sup>a</sup>	49.7% <sup>a</sup>
Index of education of average employee	2.3	2.3	2.3	2.5	2.5	2.8	2.5	0.2	0.0	0.1	0.3 <sup>b</sup>
% of employees with primary education	48.7%	46.1%	46.4%	47.8%	0.4	31.2%	44.8%	-1.6%	-2.7%	-0.9%	-16.5% <sup>b</sup>
% of employees with secondary education	40.2%	41.2%	41.3%	42.9%	0.5	52.8%	45.8%	4.5%	1.0%	2.7%	9.9%
% of employees with college education	4.0%	5.7%	5.3%	9.3%	0.1	16.0%	9.4%	4.1%	1.7%	5.3%	6.6%
<i>Finance</i>											
% firms that have ever had a loan	7.3%	12.5%	10.9%	.	.	.	.	.	5.1% <sup>b</sup>	.	.
% of financing from internal funds	81.9%	76.9%	78.9%	75.5%	64.4%	59.1%	72.4%	-6.5% <sup>c</sup>	-5.1%	-6.4% <sup>c</sup>	-16.4% <sup>a</sup>
% of financing from trade	8.3%	11.5%	10.6%	13.3%	17.3%	16.5%	14.2%	3.6%	3.3%	5.0% <sup>c</sup>	3.2%
% of financing from family	6.6%	6.7%	6.2%	4.6%	3.1%	0.9%	4.1%	-2.1%	0.1%	-2.0%	-3.7% <sup>a</sup>
% of financing from banks	0.4%	2.0%	1.5%	4.1%	11.3%	18.5%	6.4%	4.9% <sup>a</sup>	1.6% <sup>a</sup>	3.7% <sup>a</sup>	14.4%
Duration of last loan (in months)	13.2	29.9	26.8	30.5	39.3	55.5	37.6	10.8 <sup>c</sup>	16.8 <sup>b</sup>	17.4 <sup>b</sup>	25.0 <sup>b</sup>
<i>Growth</i>											
Annual growth in employees over previous two years	24.3%	27.1%	25.9%	17.5%	18.9%	14.6%	17.6%	-8.3% <sup>a</sup>	2.8%	-6.8% <sup>b</sup>	-2.9%

Notes: <sup>a</sup> significant at the 1% level. <sup>b</sup> significant at the 5% level. <sup>c</sup> significant at the 10% level.

**Table VI: Legal status of Enterprise Survey firms in selected countries**

Panel A presents the percentage of firms that started operating as registered firms, as well as their age, for Latin American firms in the 2006 Enterprise Survey. Panel B reports the frequency distribution of the time that it took firms that were initially unregistered to register. All firms were registered at the time of the survey.

**Panel A: Legal status of Enterprise Survey firms when they started operations**

Country	Observations	%Started registered	%Does not know	Firm Age
Argentina	1,051	92.8%	1.1%	28.6
Bolivia	609	85.7%	0.7%	21.8
Chile	1,007	98.0%	1.0%	26.6
Colombia	995	89.0%	0.5%	17.0
Ecuador	652	91.6%	0.9%	21.3
El Salvador	683	77.7%	1.4%	21.4
Guatemala	511	90.4%	2.1%	20.9
Honduras	424	89.4%	2.8%	20.5
Mexico	1,439	94.9%	2.8%	18.5
Nicaragua	474	80.4%	0.8%	22.9
Panama	601	97.8%	0.5%	24.5
Paraguay	608	94.4%	0.8%	21.3
Peru	630	96.8%	0.3%	19.8
Uruguay	607	97.5%	2.3%	28.8
Average		91.2%	1.3%	22.4

**Panel B: Time to register for firms that were initially unregistered**

Years	Frequency	Percent	Cumulative Percent
1	129	17.9	17.9
2	134	18.6	36.5
3	79	11.0	47.5
4	52	7.2	54.7
5	58	8.1	62.8
6	26	3.6	66.4
7	28	3.9	70.3
8	19	2.6	72.9
9	22	3.1	76.0
10	23	3.2	79.2

**Table VII: Institutional environment**

This table presents indicators of compliance with government regulations, the quality of public goods, and property rights for the sample of countries in the Informal survey (Panel A) and in the Micro survey (Panel B). Results for unregistered and registered firms in the Informal and Micro surveys are shown in columns 2 and 3, respectively. Results for a control group of Small (less than 20 employees), Medium (between 20 and 99 employees), and Big (at least 100 employees) firms from the Enterprise survey are shown in columns 5 through 7, respectively.

**Panel A: Informal sample and Enterprise survey control group**

	Informal Survey			Enterprise Survey				Differences			
	Unregistered	Registered	All	Small	Medium	Big	All	Enterprise vs Informal	Registered vs Unregistered	Small vs Unregistered	Big vs Small
<i>Compliance with government regulations</i>											
% of tax liability evaded by "typical" firm	74.8%	53.5%	72.2%	35.5%	28.6%	22.9%	30.3%	-41.9% <sup>a</sup>	-21.4% <sup>c</sup>	-39.3% <sup>a</sup>	-12.6% <sup>b</sup>
% of management's time spent dealing with government regulations	5.6%	6.8%	5.3%	9.8%	15.4%	14.5%	12.9%	7.6% <sup>a</sup>	1.2%	4.2% <sup>c</sup>	4.7% <sup>b</sup>
% of sales a "typical" firm pays in informal gifts or payments to get things done	3.6%	4.8%	3.9%	4.6%	4.1%	3.8%	4.6%	0.7%	1.1%	1.0%	-0.8%
<i>Public goods</i>											
Days last year with power outages	50.0	56.3	50.6	44.9	52.1	53.5	48.0	-2.6	6.3	-5.0	8.6
Days last year with water outages	33.6	31.3	34.3	22.5	24.4	24.2	23.5	-10.8	-2.4	-11.1	1.6
Days last year with telephone outages	4.1	19.3	14.2	13.1	10.6	11.8	11.7	-2.5	15.2	9.0	-1.3
Days last year with transportation outages	33.6	22.0	32.7	7.1	9.2	10.9	9.1	-23.6	-11.6	-26.5	3.8
<i>Property rights</i>											
% of sales lost last year owing to theft	2.9%	3.5%	3.1%	3.8%	1.7%	0.8%	2.2%	-0.9%	0.6%	0.9%	-3.0%
% of sales spent on security expenses	1.8%	1.2%	1.6%	2.2%	2.3%	2.5%	2.3%	0.6%	-0.6%	0.4%	0.3%
% of sales spent on "protection payments"	1.0%	0.5%	1.0%	0.5%	0.8%	0.7%	0.7%	-0.3%	-0.5%	-0.5%	0.3%
% of incidents reported to the police	14.1%	26.2%	19.1%	36.0%	38.0%	54.0%	42.6%	23.5% <sup>b</sup>	12.1%	21.9% <sup>b</sup>	18.1%
% of firms that had payment dispute in last 2 years	21.5%	0.0%	21.3%	.	.	.	.	.	-21.5%	.	.
Days it took a typical court case to be resolved	60.9	90.3	66.2	67.9	56.1	68.3	61.9	-4.3	29.4	7.0	0.4

**Panel B: Micro sample and Enterprise survey control group**

	Micro Survey			Enterprise Survey				Differences			
	Unregistered	Registered	All	Small	Medium	Big	All	Enterprise vs Micro	Registered vs Unregistered	Small vs Unregistered	Big vs Small
<i>Compliance with government regulations</i>											
% of tax liability evaded by "typical" firm	67.7%	54.2%	58.3%	44.4%	33.7%	32.5%	41.6%	-16.6% <sup>b</sup>	-13.5%	-23.3% <sup>a</sup>	-11.9% <sup>c</sup>
% of management's time spent dealing with government regulations	1.5%	4.2%	3.5%	8.2%	9.3%	10.5%	8.5%	5.0% <sup>a</sup>	2.7% <sup>a</sup>	6.6% <sup>a</sup>	2.3% <sup>c</sup>
% of sales a "typical" firm pays in informal gifts or payments to get things done	4.0%	3.5%	3.3%	6.6%	7.1%	5.6%	6.6%	3.2% <sup>a</sup>	-0.5%	2.6%	-1.0%
<i>Public goods</i>											
Number of power outages in the last year	167.1	134.4	138.8	138.3	151.7	157.9	143.7	4.9	-32.7	-28.8	19.6
Days last year with water outages	.	.	.	57.9	56.4	51.8	51.9	.	.	.	-6.1
Days last year with telephone outages	.	.	.	3.7	4.8	3.5	4.0	.	.	.	-0.2
<i>Property rights</i>											
% of sales lost last year owing to theft	0.5%	0.5%	0.5%	2.6%	1.8%	1.6%	2.4%	1.8% <sup>a</sup>	0.0%	2.1% <sup>a</sup>	-1.0%
% of sales spent on security expenses	3.4%	2.8%	2.9%	2.3%	2.1%	1.2%	2.1%	-0.8% <sup>c</sup>	-0.6%	-1.1%	-1.1% <sup>a</sup>
% of sales spent on "protection payments"	.	.	.	0.4%	2.9%	0.2%	1.2%	.	.	.	-0.1%
% of firms that had payment dispute in last 2 years	6.0%	8.4%	7.5%	9.5%	16.6%	19.4%	11.4%	4.0% <sup>c</sup>	2.3%	3.5%	9.9% <sup>a</sup>
If there was a payment dispute, % of firms that used court to resolve it	29.2%	33.2%	30.1%	51.3%	67.6%	81.8%	58.3%	28.3% <sup>a</sup>	4%	22% <sup>c</sup>	31% <sup>a</sup>
Days it took a typical court case to be resolved	.	44.3	44.3	45.4	74.1	64.4	51.9	7.7	.	.	19.1

Notes: <sup>a</sup> significant at the 1% level. <sup>b</sup> significant at the 5% level. <sup>c</sup> significant at the 10% level.

**Table VIII: Production Inputs**

This table presents average expenditure to sales ratios for the sample of countries in the Informal survey (Panel A) and in the Micro survey (Panel B). Results for unregistered and registered firms in the Informal and Micro surveys are shown in columns 2 and 3, respectively. Results for a control group of Small (less than 20 employees), Medium (between 20 and 99 employees), and Big (at least 100 employees) firms from the Enterprise survey are shown in columns 5 through 7, respectively.

**Panel A: Enterprise survey and control group**

	Informal Survey			Enterprise Survey				Differences			
	Unregistered	Registered	All	Small	Medium	Big	All	Enterprise vs Informal	Registered vs Unregistered	Small vs Unregistered	Big vs Small
Expenditure on raw materials / Sales (%)	30.5%	35.2%	31.0%	43.2%	47.2%	41.3%	46.4%	15.4% <sup>a</sup>	4.7%	12.7% <sup>b</sup>	-1.9%
Expenditure on energy / Sales (%)	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	0.0%	0.0%	0.0%	0.0%
Expenditure on labor / Sales (%)	13.4%	21.8%	14.9%	21.5%	17.8%	17.3%	18.9%	4.0%	8.4%	8.1%	-4.2% <sup>c</sup>
Expenditure on machines / Sales (%)	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
Expenditure on land / Sales (%)	8.3%	13.2%	10.4%	4.2%	1.6%	2.0%	3.6%	-6.8%	4.9%	-4.1%	-2.2%
Expenditure on rent / Sales (%)	7.5%	9.7%	7.9%	3.9%	2.2%	1.3%	2.8%	-5.1% <sup>a</sup>	2.3%	-3.6% <sup>b</sup>	-2.6% <sup>b</sup>
Average								1.3%	3.4%	2.2%	-1.8%

**Panel B: Micro survey and control group**

	Micro Survey			Enterprise Survey				Differences			
	Unregistered	Registered	All	Small	Medium	Big	All	Enterprise vs Informal	Registered vs Unregistered	Small vs Unregistered	Big vs Small
Expenditure on raw materials / Sales (%)	38.5%	39.7%	39.6%	41.3%	44.4%	49.3%	42.6%	3.0%	1.2%	2.7%	8.0%
Expenditure on energy / Sales (%)	3.6%	2.9%	2.9%	4.2%	3.8%	4.6%	4.1%	1.2% <sup>c</sup>	-0.7%	0.6%	0.4%
Expenditure on labor / Sales (%)	23.3%	21.0%	21.5%	21.6%	19.7%	17.7%	20.9%	-0.5%	-2.3%	-1.7%	-3.9% <sup>c</sup>
Expenditure on machines / Sales (%)	2.9%	3.3%	3.1%	17.8%	44.1%	32.9%	18.6%	15.5%	0.4%	14.8%	15.1%
Expenditure on land / Sales (%)	.	.	.	0.7%	0.7%	0.7%	0.7%	.	.	.	0.0%
Expenditure on rent / Sales (%)	7.4%	8.3%	8.0%	6.7%	3.5%	2.3%	5.8%	-2.2% <sup>c</sup>	0.9%	-0.6%	-4.4% <sup>a</sup>
Average								3.4%	-0.1%	3.2%	2.5%

Notes: <sup>a</sup> significant at the 1% level. <sup>b</sup> significant at the 5% level. <sup>c</sup> significant at the 10% level.

**Table IX: Wages per employee**

This table presents the average ratio of wage per employee to GDP per capita for the sample of countries in the Informal survey (Panel A) and in the Micro survey (Panel B). Results for unregistered and registered firms in the Informal and Micro surveys are shown in columns 3 and 4, respectively. Results for a control group of Small (less than 20 employees), Medium (between 20 and 99 employees), and Big (at least 100 employees) firms from the Enterprise survey are shown in columns 6 through 8, respectively.

**Panel A: Informal sample and control group**

	Year	Informal Survey			Enterprise Survey				Differences			
		Unregistered	Registered	All	Small	Medium	Big	All	Enterprise vs Informal	Registered vs Unregistered	Small vs Unregistered	Big vs Small
Cape Verde	2006	0.90	1.25	0.96	2.92	4.03	2.62	3.19	2.23 <sup>a</sup>	0.35	2.03 <sup>a</sup>	-0.30

**Panel B: Micro sample and control group**

	Year	Micro Survey			Enterprise Survey				Differences			
		Unregistered	Registered	All	Small	Medium	Big	All	Enterprise vs Micro	Registered vs Unregistered	Small vs Unregistered	Big vs Small
Angola	2006	1.35	2.23	2.17	3.26	3.02	1.51	3.20	1.03 <sup>a</sup>	0.88 <sup>c</sup>	1.91 <sup>a</sup>	-1.74 <sup>a</sup>
Botswana	2006	0.35	0.58	0.52	0.89	1.05	1.03	0.95	0.43 <sup>a</sup>	0.23 <sup>a</sup>	0.54 <sup>a</sup>	0.14
Burundi	2006	1.76	3.13	2.97	5.84	7.29	4.82	6.04	3.07 <sup>a</sup>	1.37 <sup>c</sup>	4.08 <sup>a</sup>	-1.02
Congo, Dem. Rep.	2006	5.64	5.45	5.52	8.25	11.35	9.26	8.93	3.41 <sup>a</sup>	-0.18	2.62 <sup>a</sup>	1.01 <sup>a</sup>
Gambia, The	2006	0.54	1.04	0.85	1.52	2.41	1.92	1.78	0.94 <sup>a</sup>	0.49 <sup>a</sup>	0.98 <sup>a</sup>	0.40
Guinea	2006	0.83	1.23	1.13	1.30	1.13	0.91	1.27	0.15 <sup>c</sup>	0.40 <sup>b</sup>	0.47 <sup>a</sup>	-0.39
Guinea-Bissau	2006	6.11	7.21	6.97	9.64	6.92	.	9.25	2.29 <sup>b</sup>	1.10	3.53 <sup>c</sup>	.
India	2006	1.31	1.43	1.39	1.54	1.82	1.62	1.64	0.25 <sup>a</sup>	0.12 <sup>a</sup>	0.22 <sup>a</sup>	0.09
Mauritania	2006	2.12	2.10	2.11	3.88	3.98	4.33	3.91	1.80 <sup>a</sup>	-0.02	1.76 <sup>a</sup>	0.44
Namibia	2006	0.27	0.79	0.55	2.48	2.56	2.30	2.49	1.94 <sup>a</sup>	0.51 <sup>a</sup>	2.21 <sup>a</sup>	-0.19
Rwanda	2006	1.29	1.52	1.47	4.01	5.70	3.12	4.36	2.89 <sup>a</sup>	0.23	2.72 <sup>a</sup>	-0.89
Swaziland	2006	0.50	1.20	1.05	1.92	2.21	1.88	1.97	0.92 <sup>a</sup>	0.69 <sup>a</sup>	1.42 <sup>a</sup>	-0.04
Tanzania	2006	1.44	1.59	1.53	3.59	5.07	5.72	4.21	2.68 <sup>a</sup>	0.16	2.15 <sup>a</sup>	2.13 <sup>a</sup>
Uganda	2006	3.08	3.93	3.60	4.32	4.90	3.91	4.45	0.85 <sup>b</sup>	0.85	1.24 <sup>b</sup>	-0.42
Average		1.90	2.39	2.27	3.75	4.24	3.26	3.89	1.62 <sup>b</sup>	0.49	1.85 <sup>b</sup>	-0.04

Notes: <sup>a</sup> significant at the 1% level. <sup>b</sup> significant at the 5% level. <sup>c</sup> significant at the 10% level.

**Table X – Productivity of firms in the Informal Survey**

Panel A presents average values of (logarithm) value added per employee for the countries in the Informal survey. Panel B presents average values of (logarithm) sales per employee for the countries covered in the Informal survey. Panel C presents average values of (logarithm) real output per employee for the countries covered in the informal survey. Results for unregistered and registered firms in the Informal survey are shown in columns 3 and 4, respectively. Results for a control group of Small (less than 20 employees), Medium (between 20 and 99 employees), and Big (at least 100 employees) firms from the Enterprise survey are shown in columns 6 through 8, respectively.

**Panel A: Log of value added per employee**

Country	Year	Informal Survey			Enterprise Survey				Differences			
		Unregistered	Registered	All	Small	Medium	Big	All	Registered vs Unregistered	Small vs Unregistered	Big vs Small	Big vs Unregistered
Bangladesh	2003	7.09	7.92	7.10	7.96	8.53	8.69	8.61	0.83	0.87 <sup>b</sup>	0.73	1.60 <sup>a</sup>
Brazil	2003	8.30	8.77	8.47	9.22	9.58	10.36	9.74	0.48 <sup>a</sup>	0.92 <sup>a</sup>	1.14 <sup>a</sup>	2.06 <sup>a</sup>
Cambodia	2003	7.19	8.01	7.22	.	.	.	.	0.82	.	.	.
Cape Verde	2006	8.12	7.85	8.07	8.47	9.21	9.78	8.78	-0.27	0.35	1.30	1.65
Guatemala	2003	7.37	8.59	7.48	8.95	9.39	9.42	9.21	1.22	1.57 <sup>a</sup>	0.48 <sup>a</sup>	2.05 <sup>a</sup>
India	2002	7.64	8.29	7.69	9.16	9.43	9.90	9.36	0.64 <sup>a</sup>	1.52 <sup>a</sup>	0.74 <sup>a</sup>	2.26 <sup>a</sup>
Indonesia	2003	7.73	.	7.73	8.53	8.39	9.16	8.80	.	0.80	0.64	1.44 <sup>a</sup>
Kenya	2003	7.76	8.04	7.83	9.58	9.99	10.30	9.94	0.28	1.82 <sup>a</sup>	0.71 <sup>a</sup>	2.54 <sup>a</sup>
Niger	2005	9.32	7.16	8.24	11.44	10.01	9.98	10.83	-2.16	2.12	-1.46	0.66
Pakistan	2003	7.21	6.59	7.20	9.78	9.76	9.18	9.58	-0.62	2.58 <sup>a</sup>	-0.60	1.98 <sup>a</sup>
Senegal	2004	7.19	7.22	7.20	9.09	9.81	9.96	9.54	0.03	1.90 <sup>a</sup>	0.87 <sup>a</sup>	2.77 <sup>a</sup>
Tanzania	2003	6.23	.	6.23	8.65	9.51	9.83	9.40	.	2.43 <sup>a</sup>	1.18	3.61 <sup>a</sup>
Uganda	2003	7.15	7.92	7.30	8.71	9.33	10.02	9.09	0.76	1.56 <sup>a</sup>	1.31 <sup>a</sup>	2.87 <sup>a</sup>
Average		7.56	7.85	7.52	9.13	9.41	9.72	9.41	0.18 <sup>a</sup>	1.54 <sup>a</sup>	0.59 <sup>b</sup>	2.12 <sup>a</sup>

**Panel B: Log of sales per employee**

Country	Year	Informal Survey			Enterprise Survey				Differences			
		Unregistered	Registered	All	Small	Medium	Big	All	Registered vs Unregistered	Small vs Unregistered	Big vs Small	Big vs Unregistered
Bangladesh	2003	7.82	8.82	7.83	9.39	10.00	9.61	9.70	1.00	1.57 <sup>a</sup>	0.22 <sup>c</sup>	1.79 <sup>a</sup>
Brazil	2003	8.63	9.18	8.83	9.84	10.23	11.02	10.38	0.55 <sup>a</sup>	1.21 <sup>a</sup>	1.18 <sup>a</sup>	2.40 <sup>a</sup>
Cambodia	2003	7.77	9.10	7.80	8.84	8.95	8.61	8.84	1.33 <sup>a</sup>	1.08 <sup>a</sup>	-0.24	0.84 <sup>a</sup>
Cape Verde	2006	8.35	8.33	8.34	9.82	10.35	9.94	9.96	-0.02	1.48 <sup>a</sup>	0.12	1.60
Guatemala	2003	7.80	8.12	7.81	9.70	10.14	10.19	9.96	0.32	1.90 <sup>a</sup>	0.49 <sup>a</sup>	2.39 <sup>a</sup>
India	2002	8.20	8.83	8.25	10.09	10.32	10.77	10.27	0.63 <sup>a</sup>	1.89 <sup>a</sup>	0.67 <sup>a</sup>	2.56 <sup>a</sup>
Indonesia	2003	8.38	.	8.38	7.66	9.07	10.04	9.58	.	-0.72	2.38 <sup>b</sup>	1.66 <sup>a</sup>
Kenya	2003	8.11	8.34	8.15	10.76	11.07	10.98	10.95	0.24	2.65 <sup>a</sup>	0.22	2.87 <sup>a</sup>
Niger	2005	7.80	7.45	7.61	11.40	10.76	10.95	11.18	-0.35 <sup>c</sup>	3.60 <sup>a</sup>	-0.45	3.15 <sup>a</sup>
Pakistan	2003	7.73	7.30	7.73	10.73	10.83	10.17	10.62	-0.44	2.99 <sup>a</sup>	-0.56	2.43 <sup>a</sup>
Senegal	2004	7.81	7.95	7.84	10.16	10.77	11.34	10.61	0.14	2.35 <sup>a</sup>	1.19 <sup>a</sup>	3.53 <sup>a</sup>
Tanzania	2003	7.26	8.08	7.32	8.96	10.28	10.68	9.79	0.82 <sup>a</sup>	1.70 <sup>a</sup>	1.73 <sup>a</sup>	3.42 <sup>a</sup>
Uganda	2003	7.73	8.12	7.81	9.42	10.02	10.69	9.79	0.38	1.69 <sup>a</sup>	1.27 <sup>a</sup>	2.96 <sup>a</sup>
Average		7.95	8.30	7.98	9.75	10.21	10.38	10.12	0.38 <sup>b</sup>	1.80 <sup>a</sup>	0.63 <sup>b</sup>	2.43 <sup>a</sup>



Table X (continued)

## Panel C: Log of real output per employee

Country	Year	Informal Survey			Enterprise Survey				Differences			
		Unregistered	Registered	All	Small	Medium	Big	All	Registered vs Unregistered	Small vs Unregistered	Big vs Small	Big vs Unregistered
Bangladesh	2003	12.49	14.79	12.51	15.35	16.90	17.29	17.05	2.30 <sup>b</sup>	2.86 <sup>a</sup>	1.94 <sup>a</sup>	4.80 <sup>a</sup>
Brazil	2003	13.49	14.34	13.80	16.12	17.21	19.25	17.59	0.85 <sup>a</sup>	2.63 <sup>a</sup>	3.13 <sup>a</sup>	5.76 <sup>a</sup>
Cambodia	2003	12.56	14.66	12.62	14.23	15.26	16.00	14.57	2.10 <sup>a</sup>	1.67 <sup>a</sup>	1.77 <sup>a</sup>	3.44 <sup>a</sup>
Cape Verde	2006	13.02	13.09	13.03	15.87	17.28	17.66	16.24	0.06	2.84 <sup>a</sup>	1.80	4.64
Guatemala	2003	12.46	13.00	12.49	15.74	17.04	18.15	16.72	0.54	3.28 <sup>a</sup>	2.40 <sup>a</sup>	5.69 <sup>a</sup>
India	2002	13.14	14.18	13.21	16.29	17.24	18.98	17.02	1.04 <sup>a</sup>	3.15 <sup>a</sup>	2.69 <sup>a</sup>	5.84 <sup>a</sup>
Indonesia	2003	13.32	.	13.32	12.69	15.42	18.25	16.90	.	-0.62	5.55 <sup>a</sup>	4.93 <sup>a</sup>
Kenya	2003	12.82	13.29	12.91	17.36	18.51	19.31	18.36	0.47	4.54 <sup>a</sup>	1.95 <sup>a</sup>	6.49 <sup>a</sup>
Niger	2005	12.27	12.01	12.13	18.31	18.10	19.16	18.29	-0.26	6.03 <sup>a</sup>	0.85	6.88 <sup>a</sup>
Pakistan	2003	12.38	11.63	12.37	17.26	18.08	18.08	18.03	-0.75	4.88 <sup>a</sup>	0.82	5.70 <sup>a</sup>
Senegal	2004	12.51	12.69	12.55	16.35	17.99	19.71	17.61	0.18	3.84 <sup>a</sup>	3.36 <sup>a</sup>	7.20 <sup>a</sup>
Tanzania	2003	11.55	12.85	11.65	14.55	17.28	18.72	16.40	1.30 <sup>a</sup>	2.99 <sup>a</sup>	4.17 <sup>a</sup>	7.17 <sup>a</sup>
Uganda	2003	12.39	13.08	12.53	15.05	16.66	18.59	16.05	0.69	2.66 <sup>a</sup>	3.54 <sup>a</sup>	6.20 <sup>a</sup>
Average		12.65	13.30	12.70	15.78	17.15	18.40	16.99	0.71 <sup>a</sup>	3.14 <sup>a</sup>	2.61 <sup>a</sup>	5.75 <sup>a</sup>

Notes: <sup>a</sup> significant at the 1% level. <sup>b</sup> significant at the 5% level. <sup>c</sup> significant at the 10% level.

**Table XI – Productivity of firms in the Micro Survey**

Panel A presents average values of (logarithm) value added per employee for the countries in the Micro survey. Panel B presents average values of (logarithm) sales per employee for the countries covered in the Micro survey. Results for unregistered and registered firms in the Micro survey are shown in columns 3 and 4, respectively. Results for a control group of Small (less than 20 employees), Medium (between 20 and 99 employees), and Big (at least 100 employees) firms from the Enterprise survey are shown in columns 6 through 8, respectively.

**Panel A: Log of value added per employee**

Country	Year	Micro Survey			Enterprise Survey				Differences			
		Unregistered	Registered	All	Small	Medium	Big	All	Registered vs Unregistered	Small vs Unregistered	Big vs Small	Big vs Unregistered
Angola	2006	7.48	8.35	8.30	8.97	8.86	9.34	8.97	0.87 <sup>a</sup>	1.50 <sup>a</sup>	0.36	1.86 <sup>a</sup>
Botswana	2006	9.00	8.85	8.88	9.49	10.02	9.52	9.66	-0.15	0.48	0.03	0.51
Burundi	2006	8.52	7.81	7.91	8.19	9.23	9.11	8.47	-0.72	-0.33	0.92 <sup>b</sup>	0.59
Congo, Dem. Rep.	2006	6.91	7.65	7.38	8.25	8.89	8.53	8.47	0.74 <sup>b</sup>	1.34 <sup>a</sup>	0.28	1.62 <sup>a</sup>
Gambia, The	2006	6.86	7.39	7.24	8.23	8.76	9.35	8.44	0.52 <sup>c</sup>	1.37 <sup>a</sup>	1.12	2.49 <sup>a</sup>
Guinea	2006	8.01	8.65	8.49	8.34	8.67	9.60	8.41	0.64 <sup>c</sup>	0.33	1.26 <sup>a</sup>	1.59 <sup>b</sup>
Guinea-Bissau	2006	7.78	8.39	8.31	8.28	8.47	.	8.32	0.61	0.50	.	.
India	2006	8.05	8.40	8.25	8.75	8.99	9.44	8.93	0.35 <sup>a</sup>	0.70 <sup>a</sup>	0.68 <sup>a</sup>	1.39 <sup>a</sup>
Mauritania	2006	8.43	7.50	8.16	8.69	9.23	9.34	8.92	-0.93 <sup>b</sup>	0.26	0.66 <sup>b</sup>	0.91 <sup>c</sup>
Namibia	2006	6.76	7.82	7.51	9.81	10.21	10.44	10.04	1.06 <sup>b</sup>	3.05 <sup>a</sup>	0.63 <sup>b</sup>	3.68 <sup>a</sup>
Rwanda	2006	7.51	8.38	8.32	9.15	9.36	9.10	9.21	0.86	1.64 <sup>a</sup>	-0.05	1.59 <sup>c</sup>
Swaziland	2006	7.63	8.64	8.54	9.83	9.55	9.62	9.67	1.00 <sup>b</sup>	2.20 <sup>a</sup>	-0.21	1.99 <sup>a</sup>
Tanzania	2006	7.88	8.21	8.09	8.92	9.74	10.37	9.32	0.33	1.05 <sup>a</sup>	1.44 <sup>a</sup>	2.49 <sup>a</sup>
Uganda	2006	8.13	8.40	8.30	8.66	8.92	9.71	8.80	0.27	0.52 <sup>a</sup>	1.05 <sup>a</sup>	1.57 <sup>a</sup>
Average		7.78	8.17	8.12	8.83	9.21	9.50	8.97	0.39 <sup>b</sup>	1.04 <sup>a</sup>	0.63 <sup>a</sup>	1.71 <sup>a</sup>

**Panel B: Log of sales per employee**

Country	Year	Micro Survey			Enterprise Survey				Differences			
		Unregistered	Registered	All	Small	Medium	Big	All	Registered vs Unregistered	Small vs Unregistered	Big vs Small	Big vs Unregistered
Angola	2006	8.16	8.90	8.85	9.58	9.50	9.92	9.58	0.74 <sup>a</sup>	1.43 <sup>a</sup>	0.34	1.77 <sup>a</sup>
Botswana	2006	8.53	9.49	9.23	10.33	10.78	10.62	10.48	0.95 <sup>a</sup>	1.80 <sup>a</sup>	0.28	2.08 <sup>a</sup>
Burundi	2006	9.09	8.69	8.73	9.25	9.86	10.15	9.37	-0.40	0.16	0.91 <sup>b</sup>	1.06 <sup>b</sup>
Congo, Dem. Rep.	2006	7.91	8.38	8.20	8.91	9.52	9.57	9.06	0.48 <sup>c</sup>	1.01 <sup>a</sup>	0.66 <sup>b</sup>	1.67 <sup>a</sup>
Gambia, The	2006	7.42	8.02	7.79	8.76	9.41	10.30	9.00	0.60 <sup>a</sup>	1.34 <sup>a</sup>	1.55 <sup>a</sup>	2.88 <sup>a</sup>
Guinea	2006	8.88	9.53	9.36	8.92	9.18	9.90	8.98	0.66 <sup>b</sup>	0.05	0.98 <sup>b</sup>	1.03
Guinea-Bissau	2006	8.49	9.05	8.93	9.27	9.35	.	9.28	0.57 <sup>c</sup>	0.79 <sup>a</sup>	.	.
India	2006	8.66	9.12	8.93	9.79	9.93	10.14	9.85	0.46 <sup>a</sup>	1.13 <sup>a</sup>	0.35 <sup>a</sup>	1.48 <sup>a</sup>
Mauritania	2006	9.14	8.79	8.99	9.98	10.24	11.14	10.05	-0.35 <sup>b</sup>	0.84 <sup>a</sup>	1.17 <sup>s</sup>	2.00 <sup>a</sup>
Namibia	2006	7.17	8.21	7.68	10.34	10.65	10.96	10.45	1.04 <sup>a</sup>	3.16 <sup>a</sup>	0.63 <sup>a</sup>	3.79 <sup>a</sup>
Rwanda	2006	7.39	8.62	8.41	9.26	9.96	10.01	9.49	1.23 <sup>a</sup>	1.87 <sup>a</sup>	0.74 <sup>b</sup>	2.61 <sup>a</sup>
Swaziland	2006	7.62	8.94	8.55	9.87	10.25	10.06	9.96	1.32 <sup>a</sup>	2.25 <sup>a</sup>	0.19	2.44 <sup>a</sup>
Tanzania	2006	8.51	8.93	8.77	9.36	10.21	11.12	9.77	0.42	0.85 <sup>a</sup>	1.76 <sup>a</sup>	2.61 <sup>a</sup>
Uganda	2006	8.66	9.17	8.97	9.32	9.69	10.36	9.49	0.50 <sup>a</sup>	0.66 <sup>a</sup>	1.04 <sup>a</sup>	1.70 <sup>a</sup>
Average		8.26	8.85	8.67	9.50	9.89	10.33	9.63	0.59 <sup>a</sup>	1.24 <sup>a</sup>	0.81 <sup>a</sup>	2.09 <sup>a</sup>

Table XI (continued)

## Panel C: Log of real output per employee

Country	Year	Micro Survey			Enterprise Survey				Differences			
		Unregistered	Registered	All	Small	Medium	Big	All	Registered vs Unregistered	Small vs Unregistered	Big vs Small	Big vs Unregistered
Angola	2006	12.97	14.13	14.05	15.57	15.94	17.27	15.65	1.16 <sup>a</sup>	2.60 <sup>a</sup>	1.71 <sup>a</sup>	4.30 <sup>a</sup>
Botswana	2006	13.38	14.89	14.49	16.63	18.01	18.54	17.20	1.52 <sup>a</sup>	3.25 <sup>a</sup>	1.92 <sup>a</sup>	5.16 <sup>a</sup>
Burundi	2006	14.20	13.67	13.73	14.96	16.58	17.71	15.30	-0.53	0.75	2.76 <sup>a</sup>	3.51 <sup>b</sup>
Congo, Dem. Rep.	2006	12.44	13.32	12.98	14.46	16.02	16.92	14.87	0.88 <sup>b</sup>	2.02 <sup>a</sup>	2.46 <sup>a</sup>	4.48 <sup>a</sup>
Gambia, The	2006	11.77	12.72	12.35	14.22	15.94	18.11	14.85	0.95 <sup>a</sup>	2.46 <sup>a</sup>	3.89 <sup>a</sup>	6.35 <sup>a</sup>
Guinea	2006	14.06	15.02	14.77	14.47	15.55	17.57	14.66	0.96 <sup>b</sup>	0.42	3.10 <sup>a</sup>	3.51 <sup>a</sup>
Guinea-Bissau	2006	13.23	14.01	13.84	15.01	15.78	.	15.12	0.78 <sup>c</sup>	1.78 <sup>a</sup>	.	.
India	2006	13.76	14.68	14.30	15.33	16.71	18.04	15.80	0.92 <sup>a</sup>	1.57 <sup>a</sup>	2.71 <sup>a</sup>	4.28 <sup>a</sup>
Mauritania	2006	14.42	13.92	14.20	16.07	17.15	19.31	16.35	-0.49 <sup>b</sup>	1.65 <sup>a</sup>	3.24 <sup>a</sup>	4.89 <sup>a</sup>
Namibia	2006	11.17	12.92	12.02	16.64	17.72	19.15	17.04	1.75 <sup>a</sup>	5.47 <sup>a</sup>	2.52 <sup>a</sup>	7.99 <sup>a</sup>
Rwanda	2006	11.62	13.44	13.13	15.00	16.75	17.89	15.65	1.82 <sup>a</sup>	3.38 <sup>a</sup>	2.89 <sup>a</sup>	6.27 <sup>a</sup>
Swaziland	2006	11.71	14.03	13.35	15.91	17.17	17.85	16.36	2.31 <sup>a</sup>	4.20 <sup>a</sup>	1.94 <sup>a</sup>	6.14 <sup>a</sup>
Tanzania	2006	13.33	14.13	13.82	15.17	17.16	19.36	16.15	0.80 <sup>c</sup>	1.84 <sup>a</sup>	4.19 <sup>a</sup>	6.03 <sup>a</sup>
Uganda	2006	13.79	14.72	14.36	15.14	16.33	18.28	15.66	0.94 <sup>a</sup>	1.35 <sup>a</sup>	3.15 <sup>a</sup>	4.50 <sup>a</sup>
Average		12.99	13.97	13.67	15.33	16.63	18.16	15.76	0.98 <sup>a</sup>	2.34 <sup>a</sup>	2.80 <sup>a</sup>	5.19 <sup>a</sup>

Notes: <sup>a</sup> significant at the 1% level. <sup>b</sup> significant at the 5% level. <sup>c</sup> significant at the 10% level.

**Table XII – OLS Regressions for (log) value added per employee**

This table presents results of OLS regressions for the sample of 27 countries covered by the Informal and Micro surveys. The dependent variable is (logarithm) value added per employee in purchasing power terms. The control variables include: (1) a dummy equal to 1 if the firm is in the Informal survey, (2) a dummy equal to 1 if the firm is in the Informal survey and is registered, (3) a dummy equal to 1 if the firm is in the Micro survey, (4) a dummy equal to 1 if the firm is in the Micro survey and is registered, (5) (logarithm) GDP per capita in purchasing power terms, (6) (logarithm) expenditure on raw materials per employee, (7) (logarithm) expenditure on energy per employee, (8) (logarithm) expenditure on machines per employee, (9) an index of the firm's top manager education, (10) (logarithm) sales, and (11) eight industry dummies. Errors are clustered at the country level and reported in parentheses.

Informal Survey	-1.7788a (0.1455)	-1.7894a (0.1265)	-1.8135a (0.1160)	-0.8875a (0.1788)	-0.7075a (0.1517)	-0.6901a (0.1543)	-0.5574a (0.1597)	0.1247 (0.1225)
Informal Survey and Registered	0.8077a (0.2476)	0.6241a (0.1499)	0.5906a (0.1204)	0.3032b (0.1449)	0.1612 (0.1223)	0.1705 (0.1237)	0.1281 (0.1226)	0.2948a (0.0939)
Micro Survey	-1.2910a (0.1464)	-1.2810a (0.0963)	-1.2488a (0.1035)	-0.7925a (0.1127)	-0.6626a (0.1256)	-0.5711a (0.1218)	-0.4746a (0.1133)	0.3720a (0.0660)
Micro Survey and Registered	0.3454a (0.0368)	0.3763a (0.0436)	0.3115a (0.0330)	0.1821a (0.0350)	0.1510a (0.0467)	0.1387a (0.0418)	0.0986b (0.0398)	-0.0728 (0.0527)
Ln(GDP per capita)		0.3960a (0.1164)	0.4279a (0.1333)	0.3272b (0.1184)	0.2985b (0.1166)	0.2739b (0.0983)	0.2665b (0.0966)	0.0584 (0.0760)
Ln(Raw Materials / Employee)				0.2873a (0.0509)	0.2140a (0.0491)	0.2034a (0.0489)	0.1977a (0.0483)	0.0381 (0.0392)
Ln(Energy/Employee)					0.2059a (0.0348)	0.1909a (0.0317)	0.1834a (0.0326)	0.1093a (0.0303)
Ln(Expenditure Machines / Employee)						0.0570a (0.0102)	0.0544a (0.0100)	0.0078 (0.0112)
Manager Education							0.0986a (0.0292)	-0.0231 (0.0160)
Ln(Sales)								0.4204a (0.0564)
Industry dummies	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Constant	9.2615a (0.1389)	6.1996a (0.9186)	5.7435a (1.0810)	4.0303a (0.9428)	3.6547a (0.9646)	3.7987a (0.8459)	3.6445a (0.8393)	1.9736a (0.6059)
Observations	8,478	8,478	8,478	8,478	8,478	8,478	8,478	8,478
Adjusted R <sup>2</sup>	24.19%	28.07%	29.90%	43.13%	46.83%	47.94%	48.47%	64.00%

Notes: <sup>a</sup> significant at the 1% level. <sup>b</sup> significant at the 5% level. <sup>c</sup> significant at the 10% level.

**Table XIII – OLS Regressions for sales per employee**

This table presents results of OLS regressions for the sample of 27 countries covered by the Informal and Micro surveys. The dependent variable is (logarithm) sales per employee in purchasing power terms. The control variables include: (1) a dummy equal to 1 if the firm is in the Informal survey, (2) a dummy equal to 1 if the firm is in the Informal survey and is registered, (3) a dummy equal to 1 if the firm is in the Micro survey, (4) a dummy equal to 1 if the firm is in the Micro survey and is registered, (5) (logarithm) GDP per capita in purchasing power terms, (6) (logarithm) expenditure on raw materials per employee, (7) (logarithm) expenditure on energy per employee, (8) (logarithm) expenditure on machines per employee, (9) an index of the firm's top manager education, (10) (logarithm) sales, and (11) eight industry dummies. Errors are clustered at the country level and reported in parentheses.

Informal Survey	-1.9768a (0.1395)	-1.9861a (0.1190)	-1.9875a (0.1173)	-0.5355a (0.1783)	-0.3742b (0.1468)	-0.3625b (0.1442)	-0.2536 (0.1548)	0.3420b (0.1349)
Informal Survey and Registered	0.7707a (0.2493)	0.6036a (0.1560)	0.5618a (0.1211)	0.1077 (0.1797)	-0.0215 (0.1615)	-0.0155 (0.1601)	-0.0501 (0.1620)	0.0916 (0.1069)
Micro Survey	-1.4258a (0.1389)	-1.4163a (0.1087)	-1.3843a (0.1151)	-0.6690a (0.1002)	-0.5474a (0.1126)	-0.4840a (0.1107)	-0.4048a (0.1018)	0.3288a (0.0515)
Micro Survey and Registered	0.4048a (0.0447)	0.4335a (0.0423)	0.3677a (0.0532)	0.1634a (0.0292)	0.1350a (0.0326)	0.1265a (0.0328)	0.0937a (0.0314)	-0.0554b (0.0217)
Ln(GDP per capita)		0.3685a (0.0903)	0.4094a (0.1081)	0.2533a (0.0762)	0.2271a (0.0736)	0.2101a (0.0605)	0.2040a (0.0590)	0.0233 (0.0420)
Ln(Raw Materials / Employee)				0.4536a (0.0509)	0.3835a (0.0479)	0.3759a (0.0478)	0.3713a (0.0475)	0.2300a (0.0449)
Ln(Energy/Employee)					0.1934a (0.0331)	0.1829a (0.0313)	0.1768a (0.0322)	0.1126a (0.0273)
Ln(Expenditure Machines / Employee)						0.0400a (0.0088)	0.0380a (0.0086)	-0.0031 (0.0096)
Manager Education							0.0807a (0.0247)	-0.0256 (0.0155)
Ln(Sales)								0.3675a (0.0485)
Industry dummies	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Constant	10.0297a (0.1430)	7.1802a (0.7136)	6.6180a (0.8958)	3.8967a (0.6490)	3.5466a (0.6878)	3.6473a (0.6190)	3.5206a (0.6062)	2.0659a (0.3207)
Observations	8,564	8,564	8,564	8,564	8,564	8,564	8,564	8,564
Adjusted R <sup>2</sup>	28.95%	32.20%	34.72%	68.86%	70.06%	70.60%	70.94%	82.59%

Notes: <sup>a</sup> significant at the 1% level. <sup>b</sup> significant at the 5% level. <sup>c</sup> significant at the 10% level.

**Table XIV – OLS Regressions for real output per employee**

This table presents results of OLS regressions for the sample of 27 countries covered by the Informal and Micro surveys. The dependent variable is (logarithm) real output per employee in purchasing power terms. The control variables include: (1) a dummy equal to 1 if the firm is in the Informal survey, (2) a dummy equal to 1 if the firm is in the Informal survey and is registered, (3) a dummy equal to 1 if the firm is in the Micro survey, (4) a dummy equal to 1 if the firm is in the Micro survey and is registered, (5) (logarithm) GDP per capita in purchasing power terms, (6) (logarithm) expenditure on raw materials per employee, (7) (logarithm) expenditure on energy per employee, (8) (logarithm) expenditure on machines per employee, (9) an index of the firm's top manager education, (10) (logarithm) sales, and (11) eight industry dummies. Errors are clustered at the country level and reported in parentheses.

Informal Survey	-3.9489a (0.2373)	-3.9681a (0.1678)	-3.9265a (0.1992)	-1.6477a (0.2838)	-1.3877a (0.2387)	-1.3577a (0.2307)	-1.0464a (0.2412)	0.3713b (0.1343)
Informal Survey and Registered	1.1202a (0.3540)	0.7732a (0.1764)	0.7754a (0.1682)	0.0627 (0.2821)	-0.1455 (0.2535)	-0.1301 (0.2387)	-0.2290 (0.2425)	0.1083 (0.1122)
Micro Survey	-3.1495a (0.2743)	-3.1298a (0.1637)	-3.1033a (0.1765)	-1.9807a (0.1908)	-1.7847a (0.2106)	-1.6211a (0.2069)	-1.3948a (0.1814)	0.3514a (0.0486)
Micro Survey and Registered	0.7682a (0.0945)	0.8279a (0.0786)	0.7794a (0.0972)	0.4588a (0.0585)	0.4130a (0.0580)	0.3911a (0.0643)	0.2974a (0.0663)	-0.0575b (0.0243)
Ln(GDP per capita)		0.7650a (0.1502)	0.7877a (0.1856)	0.5428a (0.1343)	0.5006a (0.1311)	0.4567a (0.0987)	0.4393a (0.0945)	0.0093 (0.0399)
Ln(Raw Materials / Employee)				0.7118a (0.0820)	0.5989a (0.0775)	0.5794a (0.0769)	0.5662a (0.0751)	0.2297a (0.0459)
Ln(Energy/Employee)					0.3117a (0.0538)	0.2848a (0.0494)	0.2671a (0.0515)	0.1144a (0.0284)
Ln(Expenditure Machines / Employee)						0.1032a (0.0147)	0.0973a (0.0151)	-0.0005 (0.0097)
Manager Education							0.2307a (0.0595)	-0.0224 (0.0152)
Ln(Sales)								0.8749a (0.0505)
Industry dummies	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Constant	16.7985a (0.2667)	10.8838a (1.2225)	10.4597a (1.5417)	6.1889a (1.1699)	5.6246a (1.2260)	5.8843a (1.0445)	5.5221a (1.0103)	2.0591a (0.3085)
Observations	8,564	8,564	8,564	8,564	8,564	8,564	8,564	8,564
Adjusted R <sup>2</sup>	28.95%	32.20%	34.72%	68.86%	70.06%	70.60%	70.94%	82.59%

Notes: <sup>a</sup> significant at the 1% level. <sup>b</sup> significant at the 5% level. <sup>c</sup> significant at the 10% level.

**Table XV – Manager ability and self-selection**

**Panel A: Probit regressions**

Panel A presents the marginal effects from Probit regressions for the sample of 27 countries covered by the Informal and Micro surveys. All regressions include: (1) dummy equal to 1 if the firm’s top manager completed some secondary school, (2) a dummy equal to 1 if the firm’s top manager completed some vocational school, (3) a dummy equal 1 if the firm’s top manager attended college, (4) (logarithm) GDP per capita in purchasing power terms, and (5) eight industry dummies. Standard errors are clustered at the country level. Robust standard errors are shown in parentheses. The panel also reports the F-statistics for the null hypothesis that all three top-manager education dummies are zero.

	Independent Variables							
	Top manager education			Ln(GDP/POP)	Industry Dummies	Obs	Pseudo R <sup>2</sup>	F-test
	Secondary	Vocational	College					
Firm is registered with central government	0.2064a (0.0420)	0.2090a (0.0452)	0.4096a (0.0449)	-0.0029 (0.0555)	Yes	5,478	10.07%	96.54 <sup>a</sup>
Firm has ever had a loan	-0.0250 (0.0254)	0.0115 (0.0369)	-0.0521 (0.0548)	0.0415 (0.0379)	Yes	3,763	2.75%	2.81
Main buyer are large firm	0.0361a (0.0060)	0.0349a (0.0110)	0.0323b (0.0152)	0.0037 (0.0054)	Yes	2,869	9.14%	78.08 <sup>a</sup>
Firm occupies a permanent structure	0.0397 (0.0468)	0.0954b (0.0434)	0.0778 (0.0538)	-0.0762a (0.0265)	Yes	1,429	4.22%	4.64
Firm located in owner's house	0.0561a (0.0210)	0.0868b (0.0355)	0.0076 (0.0249)	-0.0258 (0.0253)	Yes	1,439	2.31%	36.87 <sup>a</sup>
Firm own building it occupies	0.0847 (0.0527)	0.0863 (0.0691)	0.1118b (0.0542)	0.0167 (0.0466)	Yes	5,682	3.03%	4.75
Firm own the land it occupies	0.0497 (0.0453)	0.0352 (0.0539)	0.0982b (0.0490)	0.0197 (0.0369)	Yes	11,760	5.82%	6.11
Firm uses its own transportation equipment	0.0031 (0.0510)	0.1265b (0.0574)	0.1184a (0.0284)	0.0097 (0.0216)	Yes	1,438	3.33%	78.56 <sup>a</sup>
Firm owns a generator	0.1280a (0.0455)	0.1390b (0.0550)	0.3675a (0.0454)	-0.1349a (0.0464)	Yes	12,794	13.01%	75.84 <sup>a</sup>
Firm uses email to communicate with clients	0.1662a (0.0460)	0.2309a (0.0453)	0.4799a (0.0438)	0.1495b (0.0736)	Yes	11,081	21.62%	158.61 <sup>a</sup>
Firm uses website to communicate with clients	0.1159a (0.0353)	0.1676a (0.0361)	0.2574a (0.0274)	0.1358b (0.0648)	Yes	11,044	16.91%	61.46 <sup>a</sup>
Firm has electrical connection	0.1837a (0.0503)	0.1901a (0.0579)	0.2833a (0.0597)	-0.0200 (0.0517)	Yes	1,439	12.82%	33.1 <sup>a</sup>

Notes: <sup>a</sup> significant at the 1% level. <sup>b</sup> significant at the 5% level. <sup>c</sup> significant at the 10% level.

**Table XV – Manager ability and self-selection (continued)**

**Panel B: OLS regressions**

Panel B presents results for OLS regressions for the sample of 27 countries covered by the Informal and Micro surveys. All regressions include: (1) dummy equal to 1 if the firm's top manager completed some secondary school, (2) a dummy equal to 1 if the firm's top manager completed some vocational school, (3) a dummy equal 1 if the firm's top manager attended college, (4) (logarithm) GDP per capita in purchasing power terms, and (5) eight industry dummies. Standard errors are clustered at the country level. Robust standard errors are shown in parentheses. The panel also reports the F-statistics for the null hypothesis that all three top-manager education dummies are zero.

	Independent Variables					Constant	Obs	Adj R <sup>2</sup>	F-test
	Top manager education			Ln(GDP/POP)	Industry Dummies				
	Secondary	Vocational	College	Ln(GDP/POP)	Industry Dummies				
%Investment financed with internal funds	0.9852 (3.6083)	-2.9315 (1.9982)	-10.1707a (2.1024)	-5.3383b (1.9468)	Yes	111.3720a (14.7773)	13,006	5.10%	35.06 <sup>a</sup>
Expenditure on raw materials / Sales	0.0378a (0.0130)	0.0338b (0.0147)	0.0874a (0.0193)	-0.0080 (0.0154)	Yes	0.4461a (0.1340)	11,966	3.83%	11.32 <sup>a</sup>
Expenditure on energy / Sales	-0.0015 (0.0039)	-0.0040 (0.0041)	-0.0077 (0.0047)	-0.0035 (0.0040)	Yes	0.0747b (0.0302)	12,546	1.72%	1.78
Expenditure on machines / Sales	-0.0047 (0.0040)	0.0162a (0.0052)	0.0019 (0.0041)	-0.0023 (0.0046)	Yes	0.0432 (0.0361)	12,577	3.26%	7.91 <sup>a</sup>
%Capacity utilization	0.6230 (1.0430)	1.0456 (1.8476)	5.4810a (1.3208)	1.5761 (1.1737)	Yes	57.7676a (10.6062)	9,380	4.18%	7.15 <sup>a</sup>

Notes: <sup>a</sup> significant at the 1% level. <sup>b</sup> significant at the 5% level. <sup>c</sup> significant at the 10% level.



**Table XVI -- Obstacles to doing business**

This table reports mean scores for a list of possible obstacles to doing business. All obstacles are reported on the 0-4 scale for their perceived significance, with 0 being “no obstacle”, 1 being “minor obstacle”, 2 being “moderate obstacle”, 3 being “major obstacle”, and 4 being “very severe obstacle”.

**Panel A: Informal Survey Sample**

	Informal Survey			Enterprise Survey				Differences			
	Unregistered	Registered	All	Small	Medium	Big	All	Enterprise vs Informal	Registered vs Unregistered	Small vs Unregistered	Big vs Small
<b>Obstacles (Scale from 0 to 4)</b>											
Access to or availability of markets	2.05	2.38	2.07	.	.	.	.	.	0.33	.	.
Tax rates	1.59	2.14	1.65	2.13	2.33	2.50	2.33	0.68 <sup>b</sup>	0.55	0.54	0.37
Tax administration	1.40	2.05	1.46	1.79	2.14	2.37	2.05	0.59 <sup>b</sup>	0.65 <sup>c</sup>	0.39	0.58 <sup>b</sup>
Cost of financing	2.19	2.37	2.25	1.99	2.25	2.30	2.20	-0.05	0.17	-0.20	0.31
Corruption	1.53	1.93	1.59	2.06	2.28	2.27	2.17	0.57 <sup>b</sup>	0.40	0.53	0.21
Macro-economic instability (inflation, exchange rate)	1.75	1.98	1.80	1.89	2.05	2.13	1.95	0.15	0.23	0.14	0.23
Electricity	1.74	1.70	1.74	1.85	1.94	2.12	1.92	0.18	-0.04	0.11	0.27
Anti-competitive or unfair practices by other businesses	1.74	2.16	1.78	1.74	1.98	2.11	1.94	0.16	0.42 <sup>c</sup>	0.00	0.37
Economic policy uncertainty	1.72	1.96	1.75	2.08	2.20	2.10	2.07	0.33	0.24	0.36	0.02
Customs and trade regulations	1.00	1.51	1.06	1.24	1.61	2.09	1.53	0.46 <sup>b</sup>	0.51	0.25	0.85 <sup>a</sup>
Access to financing	2.29	2.46	2.32	1.95	1.92	1.83	1.83	-0.49 <sup>b</sup>	0.17	-0.33	-0.12
Legal system, conflict resolution	1.04	1.33	1.07	1.10	1.47	1.78	1.24	0.17	0.29	0.06	0.67 <sup>b</sup>
Labor regulations	0.84	1.20	0.91	0.99	1.27	1.75	1.17	0.26	0.36	0.15	0.76 <sup>a</sup>
Crime, theft and disorder	1.48	1.61	1.49	1.59	1.76	1.71	1.57	0.07	0.12	0.11	0.12
Skills and education of available workers	1.15	1.46	1.23	1.15	1.44	1.67	1.30	0.07	0.31	-0.01	0.52 <sup>a</sup>
Transportation (road quality, road blocks, finding ways to transport)	1.37	1.47	1.36	1.16	1.38	1.57	1.33	-0.04	0.11	-0.20	0.41 <sup>b</sup>
Procedures to register firms, formalities, patents, licences, etc.	1.26	1.64	1.49	1.20	1.21	1.42	1.12	-0.37	0.37	-0.06	0.23
Telephone, fax, e-mail	1.00	0.84	0.99	0.85	0.94	1.32	0.99	0.00	-0.16	-0.15	0.47 <sup>b</sup>
Access to land	1.46	1.70	1.48	0.98	1.05	1.27	0.95	-0.53 <sup>b</sup>	0.24	-0.47 <sup>c</sup>	0.28
Postal	0.07	0.00	0.06	.	.	.	.	.	-0.07	.	.

**Panel B: Micro Survey Sample**

	Micro Survey			Enterprise Survey				Differences			
	Unregistered	Registered	All	Small	Medium	Big	All	Enterprise vs Micro	Registered vs Unregistered	Small vs Unregistered	Big vs Small
<b>Obstacles (Scale from 0 to 4)</b>											
Electricity	1.96	1.99	1.98	2.24	2.43	2.69	2.30	0.32	0.03	0.27	0.45
Tax rates	1.35	1.69	1.59	1.75	1.90	1.84	1.78	0.19	0.34	0.40 <sup>c</sup>	0.09
Access to financing	2.40	2.33	2.37	2.02	1.91	1.73	1.98	-0.39 <sup>b</sup>	-0.06	-0.37	-0.29
Skills and education of available workers	0.51	0.63	0.60	0.92	1.17	1.64	1.02	0.41 <sup>a</sup>	0.12	0.41 <sup>a</sup>	0.72 <sup>a</sup>
Macro-economic instability (inflation, exchange rate)	1.38	1.67	1.63	1.47	1.51	1.53	1.50	-0.14	0.28	0.09	0.06
Tax administration	0.94	1.20	1.13	1.23	1.41	1.48	1.28	0.15	0.26	0.30 <sup>c</sup>	0.25
Anti-competitive or unfair practices by other businesses	1.54	1.43	1.47	1.40	1.46	1.48	1.41	-0.06	-0.12	-0.14	0.08
Transportation (road quality, road blocks, finding ways to transport)	1.34	1.30	1.31	1.23	1.25	1.40	1.25	-0.06	-0.04	-0.11	0.18
Corruption	1.09	1.06	1.07	1.20	1.46	1.37	1.27	0.20	-0.02	0.11	0.17
Crime, theft and disorder	1.18	1.12	1.18	1.18	1.19	1.32	1.20	0.02	-0.06	0.01	0.14
Customs and trade regulations	0.55	0.82	0.76	0.79	1.20	1.22	0.91	0.15	0.27 <sup>c</sup>	0.24 <sup>c</sup>	0.43 <sup>a</sup>
Cost of financing	.	.	.	0.99	1.02	1.12	1.01	.	.	.	0.14
Procedures to register firms, formalities, patents, licences, etc.	1.22	1.11	1.10	1.00	1.08	1.00	1.01	-0.09	-0.12	-0.23	0.01
Labor regulations	0.34	0.33	0.34	0.49	0.74	0.99	0.57	0.24 <sup>b</sup>	-0.01	0.15 <sup>c</sup>	0.50 <sup>a</sup>
Legal system, conflict resolution	0.38	0.44	0.43	0.55	0.68	0.98	0.60	0.17	0.07	0.17	0.43 <sup>a</sup>
Economic policy uncertainty	0.88	0.92	0.96	1.02	1.11	0.96	1.05	0.08	0.04	0.14	-0.05
Access to land	1.44	1.14	1.22	1.06	0.90	0.89	1.02	-0.20 <sup>c</sup>	-0.29	-0.38 <sup>b</sup>	-0.17
Telephone, fax, e-mail	0.56	0.71	0.67	0.70	0.81	0.86	0.74	0.08	0.15	0.14	0.16

**Table XVII – Costs and benefits of registering in Cape Verde**

Panel A reports the fraction of respondents in Cape Verde that rate each of the listed items as a very important advantage of operating as a registered firm. Advantages are rated on a 1 (minor advantage) through 4 (major advantage) scale. Panel B reports the fraction of respondents in Cape Verde that rate each of the listed items as either a very important obstacle or an extremely important obstacle to registering. Obstacles are rated on a 1 (unimportant) through 5 (extremely important) scale.

**Panel A: Benefits of registering in Cape Verde**

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Better access to markets	44%
Better access to services	39%
Better access to financing	39%
Better access to raw materials	34%
Easier to bargain with formal enterprises	25%
Easier to reduce theft by employees or others	23%
Better access to government subsidies	20%
More solid legal basis for property rights regarding real estate	20%
Less turnover of employees or better product market competition	18%
Less need to pay bribes	15%

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**Panel B: Obstacles to registering in Cape Verde**

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Financial burden of taxes applicable to registered firms	43%
Cost of registering	38%
Difficulties in obtaining information about how to register	36%
Minimum capital legally required to register	32%
Administrative burden of complying with tax laws	32%
Time necessary to register	19%
Labor regulations that are applicable to registered firms	19%
Other administrative burdens (e.g. inspections and meetings with government bureaucrats)	18%

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## Appendix – Correlation Table

The table presents the correlations among the main variables in the paper.

	Informal (World Econ Forum)	Tax evasion	Self employment	Informal (Electricity)	Informal (multiple indicators)	Registered firms	Procedures to start business	Tax rate	Time to comply with tax	Management time	Hiring index	Firing index	Nonwage costs	Court formalism	Case A Efficiency	Road density	Corruption	Rule of law	Private Credit/GDP	Market Cap/GDP	
Tax evasion	0.25 <sup>b</sup>																				
Self employment	0.70 <sup>a</sup>	0.25 <sup>b</sup>																			
Informal (Electricity)	0.61 <sup>a</sup>	0.35 <sup>b</sup>	0.61 <sup>a</sup>																		
Informal (multiple indicators)	0.70 <sup>a</sup>	0.17	0.47 <sup>a</sup>	0.71 <sup>a</sup>																	
Registered firms	-0.43 <sup>a</sup>	-0.16	-0.46 <sup>a</sup>	-0.21	-0.38 <sup>a</sup>																
Procedures to start business	0.48 <sup>a</sup>	0.32 <sup>a</sup>	0.37 <sup>a</sup>	0.30 <sup>b</sup>	0.37 <sup>a</sup>	-0.50 <sup>a</sup>															
Tax rate	0.16 <sup>c</sup>	0.17 <sup>c</sup>	-0.04	-0.13	0.16 <sup>c</sup>	-0.19 <sup>c</sup>	0.15 <sup>c</sup>														
Time to comply with tax	0.50 <sup>a</sup>	-0.02	0.34 <sup>a</sup>	0.42 <sup>a</sup>	0.37 <sup>a</sup>	-0.42 <sup>a</sup>	0.38 <sup>a</sup>	0.22 <sup>a</sup>													
Management time	0.43 <sup>a</sup>	0.14	0.26 <sup>b</sup>	0.24	0.20 <sup>c</sup>	-0.06	0.15	0.00	0.20 <sup>c</sup>												
Hiring index	0.32 <sup>a</sup>	0.05	0.10	0.13	0.34 <sup>a</sup>	-0.10	0.26 <sup>a</sup>	0.11	0.26 <sup>a</sup>	0.24 <sup>b</sup>											
Firing index	0.23 <sup>b</sup>	0.01	0.14	0.08	0.20 <sup>b</sup>	-0.25 <sup>b</sup>	0.27 <sup>a</sup>	0.20 <sup>b</sup>	0.32 <sup>a</sup>	0.28 <sup>a</sup>	0.36 <sup>a</sup>										
Nonwage costs	-0.10	-0.16	-0.26 <sup>a</sup>	-0.20	-0.08	0.05	-0.01	0.18 <sup>b</sup>	0.27 <sup>a</sup>	0.02	0.21 <sup>a</sup>	0.22 <sup>a</sup>									
Court formalism	0.36 <sup>a</sup>	0.09	0.25 <sup>b</sup>	0.30 <sup>b</sup>	0.39 <sup>a</sup>	-0.18	0.45 <sup>a</sup>	0.27 <sup>a</sup>	0.36 <sup>a</sup>	0.46 <sup>a</sup>	0.47 <sup>a</sup>	0.38 <sup>a</sup>	0.21 <sup>c</sup>								
Case A Efficiency	-0.64 <sup>a</sup>	-0.32 <sup>b</sup>	-0.59 <sup>a</sup>	-0.46 <sup>a</sup>	-0.57 <sup>a</sup>	0.35 <sup>a</sup>	-0.54 <sup>a</sup>	-0.15	-0.37 <sup>a</sup>	-0.35 <sup>a</sup>	-0.37 <sup>a</sup>	-0.15	-0.10	-0.56 <sup>a</sup>							
Road density	-0.28 <sup>a</sup>	-0.11	-0.24 <sup>a</sup>	-0.22 <sup>c</sup>	-0.20 <sup>b</sup>	0.29 <sup>a</sup>	-0.18 <sup>b</sup>	-0.09	-0.33 <sup>a</sup>	-0.03	-0.12	-0.15 <sup>c</sup>	-0.13	-0.26 <sup>c</sup>	0.29 <sup>a</sup>						
Corruption	-0.84 <sup>a</sup>	-0.32 <sup>a</sup>	-0.67 <sup>a</sup>	-0.58 <sup>a</sup>	-0.71 <sup>a</sup>	0.48 <sup>a</sup>	-0.57 <sup>a</sup>	-0.23 <sup>a</sup>	-0.43 <sup>a</sup>	-0.26 <sup>c</sup>	-0.23 <sup>a</sup>	-0.21 <sup>a</sup>	0.08	-0.37 <sup>a</sup>	0.76 <sup>a</sup>	0.29 <sup>a</sup>					
Rule of law	-0.85 <sup>a</sup>	-0.29 <sup>a</sup>	-0.68 <sup>a</sup>	-0.58 <sup>a</sup>	-0.72 <sup>a</sup>	0.49 <sup>a</sup>	-0.59 <sup>a</sup>	-0.26 <sup>a</sup>	-0.44 <sup>a</sup>	-0.29 <sup>a</sup>	-0.25 <sup>a</sup>	-0.25 <sup>a</sup>	0.08	-0.39 <sup>a</sup>	0.76 <sup>a</sup>	0.31 <sup>a</sup>	0.96 <sup>a</sup>				
Private Credit/GDP	-0.67 <sup>a</sup>	-0.28 <sup>a</sup>	-0.49 <sup>a</sup>	-0.38 <sup>a</sup>	-0.60 <sup>a</sup>	0.43 <sup>a</sup>	-0.43 <sup>a</sup>	-0.18 <sup>c</sup>	-0.31 <sup>a</sup>	-0.25 <sup>c</sup>	-0.26 <sup>a</sup>	-0.21 <sup>a</sup>	-0.03	-0.39 <sup>a</sup>	0.61 <sup>a</sup>	0.27 <sup>a</sup>	0.74 <sup>a</sup>	0.75 <sup>a</sup>			
Market Cap/GDP	-0.54 <sup>a</sup>	-0.16	-0.39 <sup>a</sup>	-0.37 <sup>a</sup>	-0.51 <sup>a</sup>	0.21 <sup>c</sup>	-0.38 <sup>a</sup>	-0.09	-0.36 <sup>a</sup>	-0.19	-0.24 <sup>c</sup>	-0.17 <sup>c</sup>	-0.08	-0.51 <sup>a</sup>	0.52 <sup>a</sup>	0.46 <sup>a</sup>	0.62 <sup>a</sup>	0.59 <sup>a</sup>	0.71 <sup>a</sup>		
Ln(GDP/POP)	-0.77 <sup>a</sup>	-0.34 <sup>a</sup>	-0.77 <sup>a</sup>	-0.66 <sup>a</sup>	-0.66 <sup>a</sup>	0.52 <sup>a</sup>	-0.45 <sup>a</sup>	-0.27 <sup>a</sup>	-0.30 <sup>a</sup>	-0.13	-0.25 <sup>a</sup>	-0.22 <sup>a</sup>	0.21 <sup>a</sup>	-0.22 <sup>b</sup>	0.73 <sup>a</sup>	0.27 <sup>a</sup>	0.83 <sup>a</sup>	0.84 <sup>a</sup>	0.70 <sup>a</sup>	0.52 <sup>a</sup>	

Notes: <sup>a</sup> significant at the 1% level. <sup>b</sup> significant at the 5% level. <sup>c</sup> significant at the 10% level.