Are Innovating Firms Victims or Perpetrators?

Tax Evasion, Bribe Payments, and the Role of External Finance in Developing Countries

Meghana Ayyagari **Asli Demirguc-Kunt** **Vojislav Maksimovic**

Abstract:

We investigate corruption and tax evasion and their firm-level determinants across 25,000 firms in 57 countries, a large fraction of which are small and medium enterprises in developing countries. Corruption acts as a tax on innovation, particularly that of small and young firms. In particular, innovating firms pay a larger percentage of their revenues in bribes to government officials than non-innovating firms. Innovating firms that pay bribes do not report receiving better services than innovating firms that do not pay bribes. They also do not pay more protection money to private parties than other firms. Firms that pay more bribes also evade more taxes. Comparing the magnitudes of bribes and taxes evaded, innovating firms and firms that use formal finance are more likely to be net victims. Our findings point to the challenges facing innovators in developing countries and the role of banks in curbing corruption and tax evasion.

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*Ayyagari: School of Business, George Washington University, ayyagari@gwu.edu; Demirgüç-Kunt: World Bank, ademirguckunt@worldbank.org; Maksimovic: Robert H. Smith School of Business at the University of Maryland, vmaksimovic@rhsmith.umd.edu. This research was supported by a grant from the National Science Foundation (NSF). We would like to thank Michael Bradley, Mihir Desai, Robert Goldstein, Ross Levine, Ron Masulis, Amit Seru, Hans Stoll, S. Vishwanathan, seminar participants at the NBER Entrepreneurship Working Group, Conference on the Role of Government Regulation in Corporate Finance at Vanderbilt University and the Annual Meetings of the Academy of International Business for their comments and suggestions. This paper's findings, interpretations, and conclusions are entirely those of the authors and do not necessarily represent the views of the World Bank, its Executive Directors, or the countries they represent.

Introduction

The adverse effects of corruption on growth and development across countries are the subject of much attention in economics and finance [1] and among policy makers.[2] It is also widely recognized that innovation and entrepreneurship are the engines of economic growth and that understanding the determinants of innovation is a crucial first step in understanding the differences in technological progress and income levels across countries.[3] However, there has been very little research exploring the link between these two key determinants of growth. While there is evidence that corruption reduces growth at the macro level, we know little about whether the effects of corruption are particularly adverse for certain types of firms such as innovators. The finance studies that investigate determinants of corruption in lending (e.g. Beck, Demirguc-Kunt and Levine, 2006; Barth, Lin, Lin and Song, 2009; and Houston, Lin, and Ma, 2010), while insightful, do not look at general public corruption or how entrepreneurs may be affected though Barth, Caprio, and Levine (2006) suggest that bank corruption is costly since poor and unconnected individuals with innovative ideas are also denied funds. Similarly, while the existing empirical literature on firm innovation in finance has focused largely on the financing of innovators/entrepreneurs (or on the characteristics of the entrepreneur and the firm, we know

[1] See Shleifer and Vishny, 1993; Mauro, 1995; and Ades and Di Tella, 1997. Svensson (2003, 2005) provides detailed reviews on this subject.

[2] Over the period 1990 to 2006, the World Bank Group approved more than $20 billion in public sector reform programs, a key component of which were anti-corruption and governance programs. In 2007, the World Bank launched the Governance and Anticorruption (GAC) Implementation plan to heighten its focus on combating corruption as an integral part of its mandate to reduce poverty and promote growth.

[3] See, for example, Schumpeter (1934,1942), Baumol (2002), Aghion and Durlauf (2005), and Michalopoulos, Laeven, and Levine (2009) on the importance of innovation for growth and development. Hall and Jones (1999) show that differences in income levels across countries can be explained by differences in their technological progress.

little about whether innovators pay more bribes because it enables them to avoid bureaucratic regulation or whether innovators are particularly targeted by corrupt officials.

In this paper, we study bribery of government officials and tax evasion and how these activities are associated with innovation and financial development. We investigate whether firms are victims, who pay more in bribes than they gain by underreporting revenues to tax authorities, or perpetrators, who gain more by avoiding taxes than they lose in paying bribes.[4] Of particular interest is the effect of corruption and tax evasion on innovative firms. Murphy, Shleifer, and Vishny (1993) argue that innovators are more vulnerable to public corruption than established firms since they have a high (and inelastic) demand for government-supplied goods such as permits and licenses.

We examine the following questions:

- Which firm characteristics, e.g. size, age, industry, and legal status are associated with bribe payments and underreporting of revenues to tax authorities?
- Is corruption a tax on innovation? Are there particular innovative activities such as introducing new products and introducing new technology, associated with greater bribe payments to government officials? Do innovative firms that bribe receive special advantages in dealing with bureaucracy and regulation?

[4] Thus, we focus on corruption that is costly to the firm rather than being a benefit to the firm and a cost to society. While both kinds of corruption exist, the literature has generally reached a consensus that corruption is a cost to entrepreneurs rather than "grease". Several papers using surveys report corruption as being an important obstacle to doing business (Beck et al., 2005; Fisman and Svensson, 2007; Johnson et al., 1998; Hellman et al., 2003). On a cross-country level, other studies show that corruption hinders growth and investment (Mauro, 1995; De Soto, 1989; Frye and Shleifer, 1997; Berkowitz and Li, 2000; Safavian, 2001; Svensson, 2003; and Ahlin and Pang, 2008)

- Do firms that pay more bribes also evade more taxes? Do firm characteristics explain whether a firm is on balance a victim or a perpetrator across countries?
- What is the role of the financial system in limiting the extent of underreporting of income? How do banks compare with informal financing channels in curbing illegal behavior?

To answer these questions, we use a rich multi-country data set, the World Bank Enterprise Surveys,[5] sampling over 25,000 firms (80% of which are small and medium enterprises) in 57 countries (50 low and middle-income countries and 7 high-income countries). The surveys provide information on firms' innovation projects, bribe payments, tax evasion, their perceptions of the government, and their sources of financing.

Our data is unique in three aspects. First, the data allows us to examine firm behavior in small and medium enterprises in developing countries, which haven't been the focus of earlier studies though such firms account for the overwhelming majority[6] of firms in developing countries. Second, the survey tracks specific activities that result in new-to-firm innovation. New-to-firm innovation consists of improvements such as new product introductions or use of new technologies, which is of more relevance for our sample of developing countries where firms are less likely to develop globally new technologies (e.g. Segerstrom, 1991; Grossman and Helpman, 1991; Acemoglu, Aghion, and Zilibotti, 2006; and Dutz, 2007). Third, for the very

[5] See Graham and Harvey (2001) and Graham, Harvey, and Rajgopal (2005) for the merits of survey data in corporate finance compared to archival data sources. The World Business Environment Surbey (WBES) which were a precursor to the World Bank Enterprise Surveys have been used by recent studies looking at corruption in bank lending (e.g. Barth, Lin, Lin and Song, 2009; and Houston, Lin, and Ma, 2010)

[6] This perspective on innovation also fits in with the claim by Murphy, Shleifer, and Vishny (1993) that "….public rent-seeking attacks innovation, since innovators need government-supplied goods such as permits, licenses, import quotas, and so on, much more so than established producers."

first time, we have consistently collected data across a large cross-section of countries on both types of firm behaviors – their role as victims proxied by the percentage of revenue that they pay as gifts or informal payments to public officials to "get things done" as well as their role as perpetrators proxied by the percentage of income that they hide from tax authorities.[7] Similar data has been used by several papers, including Svensson (2005) and Fisman and Svensson (2007) in a single country context.[8] Note that since our sample is dominated by small and medium enterprises, the corruption being measured is small scale bribe payments to government officials of different agencies to obtain business licenses and access to essential services.

We find that about 40% of the firms in our sample neither pay bribes nor underreport revenue for tax purposes, 23% do both, 14% only pay bribes, and another 23% only underreport revenue. Univariate statistics show that there is a wide variation in the distribution of firms paying and not-paying bribes across countries and firm characteristics such as size, legal status, industry composition, domestic or foreign ownership and exporting status. In particular, summary statistics show that firms in more regulated economies pay more bribes as well as evade more taxes.

When we examine firm characteristics associated with bribe payments in a multivariate setting, we find that smaller and younger firms report paying a larger percentage of their sales as bribe payments. Individual or family owned firms pay higher bribes than firms owned by another corporation, bank, investment fund, manager / employees, or the state. Controlling for country

[7] In robustness tests, we also examine the under-reporting of total workforce and the wage bill for tax purposes, which may be other measures of tax evasion in developing countries.
[8] The survey and the steps taken to induce reliable and accurate survey responses are described in the data section of the paper.

and industry fixed effects and several firm characteristics, we find that the log odds of having to pay bribes increases by 0.310 for innovators compared to non-innovators. Thus, in our sample of countries, corruption acts as a tax on innovation. However, we find no association between innovation and private protection payments to organized crime to prevent violence. This is consistent with Murphy, Shleifer, and Vishny (1993) who differentiate between private and public rent-seeking and argue that private rent-seeking attacks the productive rather than the innovative sector of the economy, whereas public rent-seeking, particularly targets innovators.

We do not find that innovating firms that pay bribes receive greater benefits in obtaining government services than firms that do not pay bribes.

We also find that there is a significant association between bribes and tax evasion. Firms that pay bribes underreport their revenue on average by 6.13% more than firms that do not pay bribes. This is consistent with theories that suggest that government corruption breaks an implicit contract between citizens and the state, causing firms to retaliate by evading taxes. In instrumental variable regressions, we use time spent dealing with government officials (other than the tax inspectorate) as an instrument for bribes, and find a significant causal association between bribe payments and tax evasion.

When we examine the net burden of corruption on innovators, we find that while some innovators do retaliate by evading taxes, overall innovators are more likely to be victims, who pay bribes and not evade taxes, than perpetrators, who do not pay bribes but evade taxes.

Finally, firms that use bank finance to finance their new investments and working capital are more likely to pay bribes and not evade taxes, whereas firms that use informal financing and

financing from family and friends and other sources are more likely to evade taxes and not have to pay bribes.

We obtain similar results after several robustness checks, including using a survey sub-sample of countries in Europe and Central Asia (BEEPS Sample) that has alternate measures of tax evasion (wage-bill and labor) and bribes and also allows us to better control for profitability.

Our paper contributes to our understanding of the relations between corruption, innovation, and formal financing in several ways. First, most cross-country corruption studies treat countries as monoliths without attention to corruption in particular firms or industries. By contrast, we focus on firms and industries, in particular innovative firms. Second, existing research takes the approach that firms in countries where corruption is rife, are victims of illegal activity by government officials, and thus most studies focus only on bribe payments and firm performance (e.g. Kaufmann and Wei, 1998; Svensson, 2001; and Fisman and Svensson, 2007). We take a broader approach in viewing firms as both victims and perpetrators and analyzing the relation of corrupt behavior with innovation and financing decisions.

We focus on the external governance environment. This is the first paper to examine tax avoidance activities in innovating firms in developing economies. The tax avoidance literature in finance (e.g. Weisbach, 2002; Desai and Dharmapala, 2006, 2008; and Desai, Dyck, and Zingales, 2007) focuses on the importance of corporate governance in reducing managerial diversion in large publicly traded firms in the US. We study smaller firms, many of them family controlled, and focus on the link between financial intermediaries as external monitors and tax avoidance. In our analysis of tax evasion, we abstract away from corporate governance

implications previously examined in the literature, that are of greater relevance to large firms in developed countries.[9]

The analysis in this paper has significant implications for anti-corruption policy reforms[10] and those geared towards improving tax collection and administration. Our results suggest that financial sector reform is integral to this debate since formal financial intermediation plays a critical role in helping curb tax evasion. The link between bank monitoring and reduced firm illegality is part of the policy debate on the role played by banks and informal institutional networks in stimulating growth. There is a large literature (reviewed in Levine, 2005) that shows that a good banking sector is critical for growth and firm innovation (e.g. Ayyagari, Demirguc-Kunt, and Maksimovic, 2010b; De Mel, McKenzie, and Woodruff, 2009). We show that informal financing channels are also associated with negative outcomes such as increased tax evasion, thus underlining the benefits of financial sector reform.

The rest of the paper is as follows: Section I discusses our motivating framework. The underlying intuition is that bribes are an illegal tax that firms need to pay to obtain public services and since innovation requires access to public goods, innovators are associated with higher bribes. In turn, bribe payments provide an adverse signal regarding the probability that taxes will be used to pay for the services that the firm needs and so bribes may lead to tax evasion. Finally, since banks do not lend against unreported revenues tax evasion adversely

[9] The principal agent framework in the Desai and Dharmapala papers analyzes agency issues between shareholders and managers. It is unclear that this is the appropriate framework in developing countries where the nature of the agency problem is very different due to the prevalence of concentrated insider ownership structures.

[10] Corruption has been at the forefront of policy reform. However, as highlighted by a recent World Bank report and profiled in a *Washington Post* editorial ("Corruption Reality Check", May 2008), much of this reform money achieved no results and what little progress that took place was in countries where it was needed the least.

impacts the availability of formal (bank) financing. Section II describes the data and empirical methodology. Section III presents firm-level summary statistics on bribes and tax evasion. In section IV, we first show that innovators pay more bribes and are victims of government corruption rather than recipients of special concessions. We then show that bribes lead to greater tax evasion. Finally we show that informal financing is associated with greater tax evasion. In Section V we present robustness checks across a smaller sample of countries with more detailed data. Section VI concludes.

I. A Framework to Study the Relation between Corruption, Tax Evasion, Financing and Innovation

Consider a simple set-up where some firms during the course of doing business, pay bribes to government officials and/or evade taxes. Some of these firms are also innovators who undertake an innovation opportunity that needs to be provided a government license or approval and financing. Below we elaborate on the corruption technology and present a framework to understand the link between corruption, tax evasion, innovation and financing.

First, consistent with Ades and Di-Tella (1999), we view bribe payments by firms as an illegal tax or fee levied by government officials who have the power to hold up a firm by denying services. This interpretation fits the type of corruption that we investigate empirically below. The firms that we analyze in our sample are relatively small and are unlikely to have

market power in the market for corruption. Moreover, as discussed below, much of the bribery is to providers of routine services.[11]

Safavian (2001) and Svensson (2003) find that bureaucrats tailor bribes to firms' ability to pay. Thus, the characteristics of firms that will be extorted by officials depend on the opportunities for extortion and the likelihood of punishment. We conjecture that firms in some industries, like construction, which are usually regulated and subject to inspection are particularly subject to extortion by government officials. Below, we use cross-country data to examine the relation between firm size, ownership structure, and industry, and bribe paying. We also investigate whether these firm characteristics predict tax underreporting.

Second, to understand the effect on the innovators among our sample of firms we follow Murphy, Shleifer, and Vishny (1993) who argue that innovators are particularly vulnerable to extortion from government officials because they are not part of the entrenched lobbies; they are often credit-constrained and hence can be more easily deterred by public rent-seeking; and the nature of their projects (long-term, slow accumulation of capital, risky) offer more opportunities for rent seekers.[12] Thus, innovations that involve activities such as changing the physical layout of a factory or office space, installing telephones, acquiring motor vehicles, opening new premises, importing a new category of goods, or registering a new trademark, increase interactions with government employees who have the power to extort the firm, and thus increase the likelihood that innovating firms pay more bribes than non-innovators. Our data (to be discussed below) supports this view that the innovating firms that pay bribes are victimized

[11] We find no evidence that firms that pay bribes outperform firms that do not.
[12] We test for this link between innovation and bribes below.

by government corruption rather than benefiting through special favors from government officials compared to other firms.

The relation between innovation and corruption has several implications: First, being victimized by the government officials might affect the firm's compliance with government rules in other contexts, more specifically, the tax collection system. Thus, the firms could try to recoup some of their losses by evading taxes. Second, extorted firms might resort to informal financing channels in order to facilitate tax avoidance. We explore both these possibilities in detail below:

A. Corruption and Tax Evasion

There are several reasons to expect that firms shaken down by government officials respond by greater underreporting of income to the tax authorities. Much research on taxpayer morale in public finance[13] suggests that compliance with tax regulation rests on a belief in the legitimacy of the tax process and trust in government. This work suggests that the firm is likely to evade taxes if the implicit contract between the government and the taxpayer is broken.[14]

While much of this literature rests on behavioral notions of fairness, several authors suggest that tax evasion may be a rational response to extortion by government officials. In an asymmetric information model, extortion of a bribe provides a signal to the firm that the

[13] Taxpayers are more likely to refrain from cheating if they trust the government (Scholz and Lubell, 1998; Scholz and Pinney, 1995; Torgler, 2007) and are satisfied with government performance (Spicer and Lundstedt (1976), Smith (1992), Alm, Jackson and McKee (1992a), Pommerehne, Hart, and Frey (1994)). Therefore, if, as suggested by the trust literature, bribes demanded by public officials are a signal to the firm that the government is dishonest, it leads to loss of trust in the government and thus to tax evasion.

[14] An emerging finance literature on trust emphasizes the importance of cultural norms and trust for economic exchange (e.g. Guiso, Sapienza, and Zingales, 2008; Carlin, Dorabantu, and Viswanathan, 2009).

government is dishonest and that there is a lower probability that the taxes will be used for services that the taxpayer implicitly expects. Several papers (e.g. Alm, McClelland, and Schulze, 1992; Alm, Jackson and McKee, 1992a; 1992b; 1993; and Pommerehne, Hart, and Frey, 1994) show that this creates incentives for firms to evade taxes at the margin and use the saved funds to provide those services.[15] Below we investigate if there is an association between bribery and tax evasion by underreporting firm revenues. To explore the existence of a causal relation, we use time spent with government officials (other than the tax inspectorate) as an instrument. A greater time spent dealing with government officials is likely to be correlated with greater needs for approvals from these officials, and thus, opportunities for the officials to extort bribe payments. The bribe payments, in turn, provide a signal that government officials are not trustworthy, making these firms more likely to evade taxes.

B. Formal versus Informal Financing

A further consequence of being shaken down by public officials is that firms may resort to alternate financing channels. Firms can finance the investment and payoffs to officials required to innovate in three ways. They can self-finance using retained earnings net of taxes, or obtain external financing from either a bank or from informal sources. Firms face a trade-off in going to banks versus informal sources. On the one hand, as formal intermediaries, banks have a lower cost of capital and can make loans at a lower cost. On the other hand, banks need verifiable proof that the borrowing firm can repay the loan and thus evidence of current income

[15] Thus, for example, extortion by police might cause a firm to doubt that the state will provide adequate protection from violent crime in future years and to evade taxes, using some of the saved funds to purchase private security.

as disclosed by the firm.[16] Hence the firms are able to evade less tax if they were to raise money from formal sources.

This suggests a possible relation between financial sector development and innovation in countries with significant corruption problems. Corruption may affect the use of the formal financial system by firms. To investigate whether firms benefit or are hurt on balance, we first classify firms as being victims, who pay bribes but do not underreport revenues to tax authorities, or perpetrators, who underreport revenues to tax authorities but do not pay bribes (we assume that firms who don't pay bribes and don't evade taxes and those that bribe and evade taxes net out to zero benefit on the illegality stakes). It is then an empirical question as to whether we should expect innovators and bank financed firms to be more likely victims than perpetrators. Thus corruption by public officials may also have an adverse externality on the use of the formal financial system by innovating firms, with potentially additional implications for revenue collection and development.

To summarize, we explore four main questions in our empirical analysis below:

1. Do innovating firms pay more bribes than non-innovators?
2. Do firms that pay bribes also evade more taxes?
3. Considering the net burden of corruption, are innovating firms more likely to be victims who pay bribes but do not underreport revenue to tax authorities or are they perpetrators who don't pay bribes but underreport revenue?
4. Are bank financed firms more likely to be victims than perpetrators?

[16] We assume that the bank cannot verify the existence of income and assets not reported to the tax authorities, analogous to the assumption in corporate finance in Hart and Moore (1995) and Bolton and Scharfstein (1996).

II. Data and Empirical Methodology

We use the World Bank Enterprise Surveys (ES) that use standardized survey instruments to benchmark the investment climate of individual economies across the world and to analyze firm behavior and performance. The surveys sample from the universe of registered businesses in each country using standardized survey instruments and follow a stratified random sampling methodology.[17] All the surveys in our sample were administered during 2002-2005.

The ES surveys have two unique advantages that make them suitable for investigating the relation between innovation, corruption, and tax underreporting. First, the surveys contain information on both types of illegal activities – bribe payments by firms to public officials as well as the share of income not reported for tax purposes by the firms. The information on bribe payments helps us understand the extent to which firms are victimized and the information on tax avoidance helps us explore the role of firms as perpetrators. We focus on the variables used to measure bribe payments and tax evasion in the following sub-section.

Second, the surveys have detailed information on the extent of innovation that the firms undertake. Previously, there has been very little consistent data across countries on the nature of innovative activities undertaken by firms. Moreover, the available data typically covers only the developed countries and focuses on patents and R&D expenditures where as new-to-firm innovation (e.g. new product introductions or use of new technologies) is of more relevance for

[17] The ES surveys and their precursor, the World Business Environment Survey have been used to investigate a series of questions in developmental economics including the relation between property rights and contracting institutions (e.g. Acemoglu and Johnson, 2005; Ayyagari et al., 2008a), investment climate and business environment obstacles to growth (e.g. Beck et al., 2005; Ayyagari et al., 2008b), firm financing patterns (e.g. Beck et al., 2008; Cull and Xu, 2005, Ayyagari et al., 2010a) and dispute resolution via courts (e.g. Djankov et al., 2003).

our sample of developing countries where firms are less likely to develop globally new technologies. Murphy, Shleifer, and Vishny (1993) highlight the importance of new-to-firm innovation by arguing that innovators have a greater need for government-supplied goods such as permits and licenses than established producers and hence are subject to public rent-seeking.[18]

To capture firm innovation we use a dummy variable, **New Product Innovation,** which takes the value 1 if the firm developed a new product line and 0 otherwise. While new product innovation is our main measure of innovation, as robustness we also use seven other indicators that capture firm innovation and dynamism in a broader sense - *Upgraded an existing product line, Introduced new technology that has substantially changed the way that the main product is produced, Opened a new plant, Agreed to a new joint venture with a foreign partner, Obtained a new licensing agreement, Outsourced a major production activity that was previously conducted in-house, Brought in-house a major production activity that was previously outsourced*, and two aggregate indicators, *Core Innovation* that captures introduction of a new product, upgraded an existing product line and introduced new technology and *Dynamism Index* which includes all of the individual innovation indicators above.

We use three measures of external finance. **Bank Financing** is a dummy variable that takes the value 1 if the firm reported having a current bank loan or overdraft facility and 0 if the

[18] The ES surveys are unique in that they cover mainly developing economies and allow for a broader definition of innovation, to include not only core innovative activities such as the introduction of new products and new technologies, but also other types of activities that promote knowledge transfers such as signing joint ventures with foreign partners or obtaining new licensing agreements, and other actions that adapt the organization of the firm's business activities such as opening a new plant or outsourcing a productive activity. The definition in the ES surveys aligns closely with that in the *Oslo Manual* that articulates the OECD/Eurostat definitions of innovation. See Schumpeter (1942), Segerstrom (1991), Grossman and Helpman (1991), Acemoglu, Aghion, and Zilibotti (2006), Ayyagari, Demirguc-Kunt, and Maksimovic (2010b) for highlighting the importance of thinking about innovation broadly in developing countries.

firm said it did not currently have access to a bank loan or overdraft facility. While there is no complementary variable defined for informal finance, the survey also asks firms to report the sources of financing for their new investments and working capital. Hence we construct **Informal Financing** which is a dummy variable that takes the value 1 if the firm reported that the sum of family, informal (e.g. moneylender), and other financing of new investments or working capital is 50% or greater. Informal Financing takes the value 0 if the sum of family, informal and other financing of new investments and working capital is equal to 0 %.

As a measure of firm performance we use the firm's average **Capacity Utilization** which is defined as the amount of output actually produced relative to the maximum amount that could be produced with the firm's existing machinery and equipment and regular shifts. As a check we also present results with **Labor Productivity**, which is the ratio of labor productivity of the firm to the mean labor productivity in its country where labor productivity is defined as (Total Sales-Raw Material Costs)/Total Number of Workers in the previous year. Scaling by the country mean allows us to account for the wide heterogeneity in firm performances. Using a ratio also allows us to avoid dealing with exchange rate fluctuations in the time period. We also use **Sales Growth** over the past year as an alternate indicator of firm performance. We prefer capacity utilization as the main performance measure since labor productivity is a direct function of firm sales and hence may also be misreported and we prefer capacity utilization to sales growth since the latter is available for a much smaller sample of firms. The ES surveys also contain detailed information on firm size, age, legal status, industry sector, and ownership, all of which are used as controls in our study. The survey defines firms of different sizes on the basis of the number of

full time workers[19]- small firms have less than 20 employees, medium firms employ 20 to 99 employees, and large firms employ 100 or more employees.

For a smaller sample of 27 transition countries, the ES surveys were implemented in 2002 and 2005 (the Business Environment and Enterprise Performance Surveys (BEEPS)) as a joint initiative of the European Bank for Reconstruction and Development (EBRD) and the World Bank. The BEEPS have more detailed data on profit margins and alternate measures of corruption and tax evasion, which we use as robustness checks in section V. In addition, the BEEPS data contains a panel component, where 1,443 firms that were surveyed in 2002 were surveyed again in 2005. While we rely on the pooled 2002 and 2005 data for our main robustness checks we use the panel data for additional robustness checks to verify that the timing of the values of variables in our baseline econometric specifications does not affect our results.

A. Bribes and Tax Evasion

One of the concerns with self reported measures on corruption and tax evasion is whether reliable data can be collected on illegal activity. However, Fisman and Svensson (2007) note that with appropriate data collection techniques, surveys[20] now have been able to elicit detailed information from firm managers on corruption. With the ES surveys, given the sensitive nature

[19] Employment is typically the most reliable figure in developing countries. Hence, number of full time workers is used as a measure of firm size by the World Bank Group and other international survey teams including RPED and the Oxford Centre for the Study of African Economies.
[20] Fisman and Svensson (2007) rely on the Enterprise Survey for just one country, Uganda.

of the data, government officials are not directly involved in data collection[21] nor are they given any raw data or any information that allows them to identify the responses of individual firms. Thus, firm names and their identities are confidential information. Furthermore, the surveys are conducted by the World Bank in partnership with the local private sector such as independent chambers of commerce or business associations that the local firms have confidence in. In addition, questions on bribes and tax evasion were phrased indirectly in the ES surveys. Consistent with established and approved survey methods, the firms were asked about the behavior of a typical firm rather than the firm itself, to avoid implicating the respondent firm with illegal activity. [22]

Other established survey methods were also used to increase data accuracy. Corruption-related questions were asked at the end of the interview when the interviewers had presumably established credibility and trust with the respondent and multiple questions were asked on bribe payments. In addition, we performed survey reliability tests by examining answers to the questions across two different points in time or across an equivalent set of firms. Specifically, the BEEPS data has additional variables on bribe payments and tax evasion and responses from

[21] The World Bank does coordinate with the national statistics agencies where possible to obtain the sample frame and other information.

[22] Indirect questioning where subjects are asked about likely responses of a "typical subject" has been used extensively in other fields such as psychology, marketing, and criminology to counter social desirability bias where respondents over-report good behavior and underreport bad behavior. Fisher (1993) and Johansson-Stenman and Martinsson (2006) show that indirect questions elicit more honest responses to normative statements (those with social norms) than direct questions. Other studies show that indirect questioning yield a better reflection of what people actually did when they were not being scrutinized by an interviewer (e.g. Lusk and Norwood, 2009a; 2009b) and that people's predictions of others were a significantly more accurate predictor of actual future behavior than people's statements about themselves (Epley and Dunning, 2000). More recently, Azfar and Murrell (2009) and Clausen, Kraay, and Murrell (2010) show that respondent reticence is more of a factor in survey responses to questions that are worded in a way that implicates the respondent of personal wrongdoing.

surveys implemented in 2002 and 2005. We find the responses to be highly correlated across the two years for the various variables. Similar data has been used by several papers including Svensson (2005) and Fisman and Svensson (2007). Hallward-Driemeier and Aterido (2009) examine how well firm responses on questions related to obstacles in the business environment in the ES surveys correspond to other data sources and find a high degree of correlation between firm responses and measured objective outcomes from external data sources.

The use of self reported measures to study criminal behavior is very common in criminology. Several researchers (e.g. Chaiken and Chaiken, 1982; Mande and English, 1987; Homey and Marshall, 1991) have shown that self-reports used to estimate the prevalence and frequency of offending among incarcerated adults provide more detailed data than do police and court records and cross- validation of these self-reports with formal records indicates a reasonable degree of validity in the responses of adult inmates (Marquis with Ebener, 1981). Junger-Tas and Marshall (1999) report that despite problems related to sampling and international data collection methods, the reliability and validity of data from self-report surveys are higher than for police data collected within each particular country.

All of the above give us confidence that the ES surveys are an important first step in understanding firm's illegal activities. As a measure of bribe payments we construct the variable, **Bribes**, which are firm responses to the question – "*What percent of annual sales value does a typical firm like yours spend on gifts or informal payments to public officials to "get things done"*

with regard to customs, taxes, licenses, regulations, services etc?"[23] The variable, **Tax Evasion,** is constructed from firm responses to the following question – "*Recognizing the difficulties many enterprises face in fully complying with taxes and regulations, what percentage of total sales would you estimate the typical establishment in your area of activity reports for tax purposes?"*[24] Since this variable is not adjusted for corporate tax rates, it provides an upper bound of tax evasion. The survey has no information on the marginal tax rates for each firm that would enable us to quantify the true tax burden of each firm and the magnitude of evasion. As an alternative, we adjust the tax evasion measure using statutory corporate tax rates and 1-year effective corporate tax rates from Djankov, Ganser, McLiesh, Ramalho, and Shleifer (2010). We don't rely only on the tax adjusted measures since the data on corporate tax rates is available for only 47 countries in our sample.[25]

To capture the net burden of corruption on firms, we construct the variable **Firm Type** which takes on four values: **Abiders** if the firm reports paying no bribes and evading no taxes, i.e. they abide by the law; **Perpetrators** if the firm reports paying no bribes but does report

[23] While this is a general variable proxying for the extent of corruption in the economy, in separate questions, the survey also asks firms to report on bribes paid to specific government agencies (tax inspectorate, labor and social security, fire and building safety, sanitation, police, and environmental). All our results exploring the link between corruption and tax evasion are robust to using these alternate measures to examine a sample of firms that report paying bribes in general but not to tax officials.

[24] Since informal firms often misreport taxes, an existing economics literature on informality uses this variable as a measure of the extent of informal or unofficial activity in the economy (e.g Friedman et al., 2000; Dabla-Norris et al., 2008; Gatti and Honoratti, 2008; La Porta and Shleifer, 2008), However, since our sample consists entirely of registered firms operating in the formal economy, with no firms in the unregistered sector in our sample, the "percentage of income not reported for tax purposes" measures tax evasion rather than informality.

[25] Note that tax evasion is used as a dependent variable in our analysis so there should be no concerns about measurement error related endogeneity biases in our analysis.

evading taxes; **Victims** if the firm reports paying bribes but not evading taxes; and **Retaliators** if the firm reports paying bribes and evading taxes.

B. Empirical Methodology

In this section we proceed in the following steps to answering the empirical questions in section 2. First we examine what types of firms pay bribes, focusing in particular on innovating firms. For firm *i* in industry *j* in country *k*, we run the following regression:

$$Bribes_{i,j,k} = \alpha + \beta_1 Innovators_{i,j,k} + \beta_2 Firm\ Size\ dummies_{i,j,k} + \beta_3 Age_{i,j,k} + \beta_4 Legal\ Status\ dummies_{i,j,k} + \beta_5 Family\ Owned\ dummy_{i,j,k} + \beta_6 Capacity\ Utilization_{i,j,k} + \beta_7 Foreign\ Ownership\ dummy_{i,j,k} + \beta_8 Exporter\ dummy_{i,j,k} + \beta_9 \mathbf{I}_j + \beta_{10} \mathbf{C}_k + \beta_{11} Year\ Dummies + e_{i,j,k},$$
$$k=1,....,57; \quad j=1,...,5 \qquad (1)$$

where $\mathbf{I}_j$ and $\mathbf{C}_k$ are industry and country fixed effects respectively. We instrument for innovators using human capital since Ayyagari, Demirguc-Kunt, and Maksimovic (2010b) have shown that innovation is closely related with a more educated workforce and manager.

Next, we look at the association between Bribes and Tax Evasion by estimating the following regression:

$$Tax\ Evasion_{i,j,k} = \alpha + \beta_1 Bribes_{i,j,k} + \beta_2 Firm\ Size\ dummies_{i,j,k} + \beta_3 Age_{i,j,k} + \beta_4 Legal\ Status\ dummies_{i,j,k} + \beta_5 Family\ Owned\ dummy_{i,j,k} + \beta_6 Capacity\ Utilization_{i,j,k} + \beta_7 Foreign\ Ownership\ dummy_{i,j,k} + \beta_8 Exporter\ dummy_{i,j,k} + \beta_9 \mathbf{I}_j + \beta_{10} \mathbf{C}_k + \beta_{11} Year\ Dummies + e_{i,j,k},$$
$$k=1,....,57; \quad j=1,...,5 \qquad (2)$$

To analyze the causal relation between bribes and tax evasion we use instrumental variables, instrumenting bribes with the time spent by the firm's management in interacting with government officials (other than those in the tax inspectorate).

We next examine the burden of corruption on firms by looking at the distribution of firms as victims or perpetrators across countries. In particular we look at the effect of financing on the distribution of firms as victims or perpetrators by estimating the following regressions.

$$Abiders/Perpetrators/Victims/Retaliators_{i,j,k} = \alpha + \beta_1 Innovators_{i,j,k} + \beta_2 Financing + \beta_3 Firm\ Size\ dummies_{i,j,k} + \beta_4 Age_{i,j,k} + \beta_5 Legal\ Status\ dummies_{i,j,k} + \beta_6 Family\ Owned\ dummy_{i,j,k} + \beta_7 Capacity\ Utilization_{i,j,k} + \beta_8 Foreign\ Ownership\ dummy_{i,j,k} + \beta_9 Exporter\ dummy_{i,j,k} + \beta_{10} \mathbf{I}_j + \beta_{11} \mathbf{C}_k + \beta_{12} Year\ Dummies + e_{i,j,k} \quad k=1,....,57; \quad j=1,...,5 \quad (3)$$

Our data consists of pooled cross-sections over time since some of the countries are surveyed in multiple years but during each year a new random sample is taken from the population. As suggested by Wooldridge (2002, page 129), we use the pooled ordinary least squares estimator with country, industry and year fixed effects to account for aggregate changes over time to analyze the pooled cross-section data in (1) and (2). [26] In (3), the dependent variable is one of the four firm type variables - Abiders, Perpetrators, Victims, and Retaliators - and we use a logit specification with country, industry, and year fixed effects for our estimations. At each step we perform several robustness checks to test that our results are robust to different estimation techniques and samples.

[26] We find no material difference in our results if we were to use an expanded set of fixed effects including Country x Industry, Industry x Firm Size,Country x Firm Size and Country x Industry x Firm Size dummies. We do not report these specifications in the paper because the main effects on Size and Industry are hard to interpret in the presence of so many interactions.

III. Summary Statistics

A. Incidence of bribes and tax evasion around the world

Given the lack of firm-level evidence on corruption and tax evasion, in this section, we first present detailed statistics at the firm level across countries on bribe payments and tax avoidance. We then discuss summary statistics.

Insert Table I here

Table I reports averages of Bribes and Tax Evasion and the distribution of firms as Abiders, Perpetrators, Victims, and Retaliators across different country classifications and different firm categories.[27] In the discussion below, we first focus on the incidence of bribes and tax evasion and then on the distribution of firm types. Panel A presents statistics across different regions. Col. 2 of Panel A shows that the average bribe payments are low across all countries ranging from 1.22% of revenue in Europe and Central Asia to 3.63% of revenue in Middle East and North Africa. The tax evasion numbers present an upper bound of tax evasion in each region since they are unadjusted for tax rates and show that tax evasion is highest in East Asia Pacific (29.42%) and lowest in Europe and Central Asia (14.70%).[28] In each region the amount of underreported revenue exceeds the proportion of revenue paid out as bribes.

In unreported results across country income categories, we find that the average bribe payments range from 0.3% in OECD countries to 2.3% in low income countries. The bribe payments are statistically different from zero and also between income categories. Note that our

[27] In panels A-B, the numbers are first averaged across countries and then across different country classifications. In panels C-G, the numbers are averaged across firms in each firm classification.

[28] Both bribes and tax evasion are lower in South Asia – 0.19% and 7.40% respectively but we only have data for Sri Lanka in South Asia.

sample is dominated by developing countries so we only have seven high income countries of which six are OECD countries. Reported tax evasion is similarly lowest in OECD countries (7.1%) and highest in the low income countries (24.5%).[29]

As a validity check of the survey data on bribe payments, in unreported comparisons, we compared our results to two widely used country-level indices, Transparency International's (TI) Corruption Perception Index and the World Bank's Control of Corruption Index described in Kaufmann, Kraay, and Mastruzzi (2003). [30] We find that both the cross-country measures show similar patterns as our data. The TI measure relates to perceptions of the degree of corruption as seen by business people and country analysts and ranges between 0 (highly corrupt) and 10 (highly clean). In our sample, the TI measure ranges from 6.21 in high income countries to 2.50 in low income countries. The World Bank's Control of Corruption Index measures the degree to which corruption is perceived to exist among businesses, public officials and politicians and ranges from -2.5 (highly corrupt) to +2.5 (non-corrupt). Specifically it is meant to "capture the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests." In our sample of countries, the Control of Corruption Index ranges from 1.13 in high income countries to -0.72 in

[29] We also computed tax adjusted measures of tax avoidance, multiplying the tax evasion measure by the country's statutory and effective corporate tax rates from Djankov et al. (2009) respectively. We find similar results when we use 5-year effective corporate tax rates from Djankov et al. (2009) instead of 1-year effective corporate tax rates. Both the statutory and effective tax adjusted measures show that tax evasion is the highest in low income countries (5.49% and 3.42% respectively) and the least in high income countries (2.18% and 1.28% respectively). A t-test shows the magnitudes of the tax evasion measures to be statistically different across income group categories.

[30] Razafindrakoto and Roubaud (2010) compare population and expert opinion surveys on corruption in sub-Saharan African countries and find that population surveys fare better in capturing the real level of bureaucratic corruption. They find that experts systematically overestimate the extent of corruption and the more poorly a country scores in international databases on corruption, the greater the experts' error of assessment.

low income countries. Thus we see that the reported bribe payments by firms vary across countries in a similar fashion as other cross-country indicators do. Corresponding cross-country indicators of Tax Evasion are not available for comparison purposes.

When we look at the distribution of firm types in each region, we find that Abiders make up the largest fraction of firm types in most regions except East Asia Pacific where Retaliators are the largest fraction. Across regions, the highest percentages of Perpetrators are found in South Asia followed by Latin America and the Caribbean. The largest percentage of Victims, that is, firms that pay bribes to public officials but do not evade taxes, are found in East Asia Pacific. Interestingly the pattern of Retaliators somewhat resembles that of the Victims. Similar to that of the Victims, the largest percentage of Retaliators are found in East Asia Pacific.

In Panel B, we report summary statistics depending on the level of bureaucratic regulation in the economy. Following De Soto (1990) and Djankov et al. (2002), we use entry regulation to capture the extent of bureaucratic regulation in an economy. Specifically, we use the Number of procedures required to start a business averaged over 2004-2005 from the World Bank Doing Business Indicators, which in our sample of countries ranges from 4 (Ireland) to 18 (Uganda) with a median value of 10.7. We classify countries into high and low regulation depending on whether the number of procedures required to start a business in that country lies above or below the median value respectively. We find that the level of bribe payments and tax evasion is higher in the high regulation countries. When we look at firm types, we find that the high regulation countries have a higher percentage of Retaliators and lower percentage of

Abiders than low regulation countries. They also have higher percentages of Perpetrators and Victims though these are not significantly different from those in low regulation countries.

In Panels B-G of Table I, we show the average bribe payments, tax evasion, and firm types across different types of firms. Small firms report the highest bribe payments (1.50%) and tax evasion (18.03%) compared to medium (1.46% and 16.92% respectively) and large firms (1.03% and 14.70% respectively). Domestic firms report significantly higher bribe payments (1.39%) and tax evasion (17.52%) than foreign firms (1.30% and 12.87% respectively). Similarly, non-exporters report significantly higher bribe payments (1.43%) and tax evasion (17.13%) than exporting firms (1.17% and 16.09% respectively). Firms in the agro-industry report the highest bribe payments (2.35%) and tax evasion (32.33%) compared to manufacturing, services, construction or other sectors. Next is the manufacturing sector within which the highest average bribe payments is in the electronics industry and highest average tax evasion is in auto and auto components followed by electronics. Across legal status, average reported bribes are highest among the cooperatives (1.95%) followed by sole proprietorships (1.51%) and partnerships (1.34%). Corporations report the lowest average bribes (1.23%) after Other Legal structures (1.16%). Average tax evasion is also highest among Cooperatives. While Corporations have higher average tax evasion than partnerships, a closer look at the numbers reveals that it is the privately held, limited companies which have higher average tax evasion than partnerships while the publicly listed companies have lower average tax evasion.

To summarize, we find that the level of bribes and tax evasion is higher for firms that are small, unincorporated, domestic, non-exporting firms and in countries with high levels of bureaucratic regulation.

When we look at the distribution of firm types, as in the case of countries, the largest percentage in any category are the Abiders who report paying no bribes and evading no taxes. Within the small firms' size class, a larger proportion of firms are Perpetrators (26.9%) compared to Victims (11.6%) and Retaliators (23.8%). Medium Size firms have more Retaliators (24.3%) compared to Perpetrators (19.4%) or Victims (15.9%). Amongst the large firms, 15.8% are Perpetrators, 18.3% are Victims and 17.5% are Retaliators. Across the size classes we find that the percentage of Perpetrators is highest among small firms, Victims is highest among the large firms and Retaliators is highest among the Medium firms.

Across firm ownership categories, 23.35% of domestic firms are Perpetrators compared to 13.2% of foreign firms, 14% of domestic firms are Victims compared to 19% of foreign firms and 22.7% of domestic firms are Retaliators compared to 20.5% of foreign firms. When we look at exporting status in panel E, we find a larger proportion of Perpetrators and Retaliators among non-exporters (23% in both cases) compared to exporters (19% and 19.9% respectively) and a smaller proportion of Victims among non-exporters (13.8%) compared to exporters (16.6%).

Across industries, the percentage of Perpetrators is highest in Agro Industry (28.1%) followed by Manufacturing (23.6%), Services (20.5%), Construction (18.6%) and Others (15.2%). By contrast, the percentage of Victims is smallest in the Agro industry (7.6%) and highest in the Other Industry sectors (21.9%). Percentage of Retaliators is also highest in Agro

Industry (33%) followed by Construction (28%), Services (23.1%), Manufacturing (20.9%) and Other (16%).

In panel G, we find that the largest percentage of Perpetrators is among Sole Proprietorships which also have the lowest percentage of Victims across different legal status categories. The largest percentage of Victims is among Partnerships and the largest percentage of Retaliators is among Cooperatives.

Insert Table II here

Panel A of Table II reports the summary statistics for the variables and Panel B shows the correlation matrix between the main variables of interest. Panel A shows that the mean bribe payments in the sample are only 1.34% where as mean tax evasion is 17.10%. Thus in economic terms, tax evasion seems to have a higher prevalence across countries than bribe payments to government officials. However note that these provide only an upper bound for tax evasion since they are unadjusted for corporate tax rates. When we adjust it according to the statutory corporate tax rates, the mean tax evasion is only 4.42%. When we look at the breakdown of firm types, we find that 41% of the sample report paying no bribes and evading no taxes (Abiders), 22% are Perpetrators in that they do not pay bribes but evade taxes, 14% are Victims in that they pay bribes but do not evade taxes and 22% of the sample are Retaliators in the sense that they pay bribes as well as evade taxes.

Table II shows that the percentage of firms with bank financing is 49% in the sample and the percentage of firms who finance 50% or more of their new investments or working capital with funds from family, informal or other sources is 14%. A large number of firms in our sample

(37%) are innovators in that they introduced or developed a new product line. The mean capacity utilization is 78.8%.

The sample is largely dominated by small and medium sized firms - small firms make up 44% of the sample, medium firms constitute 32%, and large firms constitute 24% of the overall sample. In terms of legal status, 39% of the sample is composed of corporations, 32% are sole proprietorships, 21% are partnerships, 2% are cooperatives and 6% are other legal structures. The average firm age in the sample is 15.62 years. Panel A also shows that 13% of the sample of firms is composed of foreign firms and 21% of the firms are exporters.

The correlation matrix in Panel B shows that the correlation coefficient between tax evasion and bribes is 0.14 and is highly significant at the 1% level. Bribes are significantly positively associated with greater use of informal financing and negatively associated with both the bank financing and bank access. Tax Evasion shows similar patterns – it is positively associated with informal financing and negatively associated with bank financing. The financing variables are significantly correlated with each other at the 1% level.

IV. Results

A. Are bribe payments a tax on innovation?

In this section, we investigate how innovating firms are particularly affected by bribe payments. If bribe payments are a tax on innovation we should expect to see that innovating firms have to give a higher percentage of their sales as gifts or informal payments to public officials (after controlling for general firm characteristics). Note that we are interested in

studying whether innovators are more subject to being victimized by government officials due to their greater need for public goods compared to other firms rather than examining whether the act of innovating leads to greater bribes. Table III shows the relation between innovation and bribe payments using different controls for firm performance and across different samples. In all specifications, we drop firms reporting greater than 50% state ownership.

Insert Table III

Cols. 1 and 2 of Table III present results for the full sample of firms, with and without controls for capacity utilization. In both instances we find that innovating firms on average pay 0.37% more of their sales as bribes to public officials than non-innovators. Note that the average bribe payment in the full sample of firms is 1.43% of the sales revenue. Col. 2 shows a negative association between capacity utilization and bribe payments. So assuming that the bribes are fixed relative to a firm's capacity, this implies that bribes are a lower proportion of their overall costs for firms operating efficiently.[31]

The positive association between innovation and bribe payments holds when we include additional controls for firm performance using different proxies –labor productivity ratio and sales growth – as in cols. 3 and 4. The results in the specification with sales growth are stronger – innovating firms pay 0.58% more of their sales as bribes – but the number of observations is down to 7470 firms in 31 countries. In unreported results, we find similar results when we replace past year sales growth with sales growth over the past two years or sales growth lagged by one year. In unreported specifications where we control for profit reinvestment rates, we

[31] If we re-run the specification in column 2 for firms that opened a new plant and those that did not, we find capacity utilization to be negatively associated with bribes only for firms that did not open new plants.

again find that innovation is positively associated with bribe payments where as there is no significant association between profit reinvestment rates and bribes. Thus, we find that while firm performance by itself is negatively associated with bribe payments, innovating firms in particular report having to pay higher bribes. In subsequent specifications, we rely on capacity utilization as our main performance measure.

Smaller and younger firms report paying a larger percentage of their sales as bribe payments. Individual or family owned firms pay higher bribes than if the firm was owned by another corporation, bank, investment fund, manager / employees of the firm or the state. Across industry sectors, we find that firms in the construction industry pay higher bribes than firms in the manufacturing industry. We find no variation in bribe payments across legal organization of the firm, domestic versus foreign ownership and whether the firm is an exporter or not.

In col. 5 we repeat the specification in col. 2 for a sample of only small firms. We find that small innovating firms pay a larger fraction of their sales as bribe payments than small non-innovators suggesting that small innovating firms may be particularly victimized. Col. 6 restricts the sample to manufacturing firms only and again we find a strong association between innovation and bribe payments. In col. 7 we drop agro industry firms since the summary statistics in Table II show that agro industry firms have the highest bribe payments. We continue to find a strong association between innovation and bribe payments. Our survey also has data on the bribes paid to different government agencies. Since one of the questions we focus on later in the paper is the link between different forms of illegal activity, in particular bribe payments and tax evasion, in col. 8 we restrict the sample to firms that report paying bribes to public officials

but specifically not to the tax authorities. [32] Even for this sample of firms we find that innovators pay more bribes in general to public officials than non-innovators.[33]

Ayyagari, Demirguc-Kunt, and Maksimovic (2010b) have shown that education of the workforce and the top manager in the company are associated with the innovation. While we expect human capital to be strongly associated with innovation, there is no reason why it should be correlated with bribe payments. Hence, in col. 9, we instrument for innovation using human capital (as proxied by the percentage of workforce with more than 12 years of education (university of higher)).[34] The first stage F-stat is 158.93 (>>10) indicating that the instrument is strong. This is further supported by the weak instrument robust inference tests such as the Anderson-Rubin Wald test where the null hypothesis that the coefficient of workforce education in the first stage regression is 0, is rejected.

In col. 10, we investigate if innovators are subject to bribe payments to private parties other than the government. Murphy, Shleifer, and Vishny (1993) differentiate between public rent-seeking (e.g. bribe payments to government officials) and private rent-seeking (e.g.

[32] Dropping firms that pay bribes to public officials but specifically not to tax authorities also allows to us focus on "coercive" corruption where the public official coerces the firm into paying an additional fee above the official price to gain access to the public service rather than "collusive" corruption where the firms and bureaucrats collude to share rents generated from the bribe. See Sequeira and Djankov (2010) for a discussion of collusive versus coercive corruption.

[33] All our results are robust to choice of estimator. When we use logit regressions where the dependent variable is a dummy variable that takes value 1 if firm reported paying bribes and 0 otherwise, we find that the odds of having to pay bribes are 1.36 times higher for innovators than non innovators. We do not use this for our main specification since we would lose the variation in percentage of bribe payments by dichotomizing the bribe payments variable. We also find our results unchanged when we use a two-limit tobit model. Being an innovator increases the probability that the firm pays bribes as well as the percentage of bribe payments conditional on paying bribes.

[34] We obtain similar results if we were to use education level of the top manager as an instrument for a subsample of firm for which we have this data. Note that when we enter education level of the top manager along with innovation in the bribes equation, the manager education is not significant suggesting statistically that it meets the exclusion criterion.

payments to private parties including theft, payments to mafia, etc) and argue that innovators are particularly subject to public rent-seeking since they are more in need of government-supplied services than established firms. To explore this, we regress Protection Payments, which is % of total sales that is used for protection payments to private parties such as the mafia on innovation and find no association between innovation and private payments. Consistent with Murphy, Shleifer, and Vishny's prediction, we do not find that innovators pay higher protection payments to private parties.

We conduct several robustness tests of our results. In Appendix A, we re-estimate the specification in col. 2 of Table V with a broader definition of innovation. Most firms in emerging markets are engaged in activities far from the technological frontier and entrepreneurs innovate not just through original inventions but also by adopting new means of production, new products and new forms of organization. Hence, we define the innovation process broadly by using firm responses to the survey questions on whether the firms had undertaken any of the following innovative activities in the last three years: *Upgraded an existing product line, Introduced new technology that has substantially changed the way that the main product is produced, Opened a new plant, Agreed to a new joint venture with a foreign partner, Obtained a new licensing agreement, Outsourced a major production activity that was previously conducted in-house, and Brought in-house a major production activity that was previously outsourced.* The firm responses are coded as 0-1 (No-Yes) dummy variables for each of the questions. We construct two aggregate indices of innovation from the individual indicators – *Aggregate Innovation Index* is an aggregate index obtained by summing firm responses to all the eight innovative activities in

which the firm engages and *Core Innovation* is an aggregate index obtained by summing firm responses to two activities, Developed a major new product line and Introduced new technology that has substantially changed the way that the main product is produced.

Appendix A shows that most other forms of innovation such as upgrading a product line, introducing new technology, signing new joint ventures, and new licensing agreements are associated with higher bribe payments. Core Innovation and the Aggregate Innovation Index are also positively and significantly (at the 1% level) associated with bribe payments. Very few firms in our sample engage in opening plants and changing sourcing decisions and we find that those activities are not associated with significantly higher bribe payments. Replacing the linear specification with a logit specification using a dummy variable for bribes paid as the dependent variable, we find all types of innovation including opening new plant and sourcing decisions to be significantly associated with higher probability of bribe payments.

In unreported tests, we find our results are robust to a host of concerns regarding potential omitted variable bias. We find that the strong association between innovation and bribe payments remains when we control for whether the firm is located in a large capital city or smaller town (innovators may cluster in large cities that may have more bureaucratic red tape and more bribe payments), who the firm sells its output to, that is the percentage of the firm's sales to the government, state owned enterprise, multinationals, large domestic firms or other (firms selling output to large firms are less likely to be paid in cash and so less likely to pay bribes), and the nature of its suppliers and customers (whether they are domestic private firms, foreign private firms or state owned firms).

Overall, we find strong evidence that bribe payments to government officials are tied to innovative projects confirming that innovating firms are taxed for their innovation. These firms pay off government officials across various agencies to be able to get things done and innovate. We also have evidence that smaller firms pay more when they innovate than larger firms.

A.1. Innovators and their interactions with government

In this section, we investigate the interactions between innovating firms and government officials to get a better understanding of whether innovators are victimized by corruption or if they obtain special concessions from government officials. Our surveys provide detailed information on the service interruptions experienced by firms, the delays in obtaining different licenses required for operation of their business and the time spent dealing with bureaucracy.

In Panel A of Table IV, we examine the mean number of days that firms experience service interruptions due to power outages, insufficient water supply, unavailable telephone service and transport failures. We present a test of means between innovators who pay bribes and innovators who don't pay bribes. Cols. 1 and 2 of panel A show that innovating firms that pay bribes on average lose 17.1, 10.5, and 5.43 days respectively due to power outages, insufficient water supply and unavailable telephone service which are all significantly larger than the 11.2, 6.2, and 2.6 days respectively lost by innovators that don't pay bribes.

Insert Table IV

The survey also has information on the delay experienced in obtaining a telephone line, electricity connection, water connection, construction permit, import license, and operating

license from the day the firm applied for the license to when they received the approval/service. When we look at innovators that bribe versus those that don't, we find that innovators that pay bribes experience significantly longer delays in obtaining telephone connections, electrical connections, construction permits, import licenses and operating licenses than innovators that don't pay bribes. One caveat though is that the sample sizes for firms reporting data on water connections, construction permits, import and operating licenses is less than 500. Note that while these results suggest that innovating firms that pay bribes are not benefitting through reduced service interruptions, and may be extorted by actual service interruptions, we are cautious in our interpretations since we do not have information on the timing of the bribe payments relative to that of the service interruptions.

In Panel C, we look at the average number of days innovators spend in inspections and mandatory meetings with officials of different government agencies in the context of regulation of their business. We find that innovators that pay bribes spend significantly more time dealing with officials from all agencies expect in the case of fire and building safety and environmental agencies where the differences are not significant. In regressions of each of these variables on the interactions of bribe payments and innovation, we find no evidence that bribe payments offer innovators any special advantages either in obtaining better services or in reducing the time spent dealing with specific government agencies. While we don't present these results due to endogeneity concerns associated with including both service interruptions and bribes in the same equation, the findings provide further suggestive evidence that the type of corruption we analyze serves as a tax on innovation rather than benefiting the firms in any specific way.

B. Bribe payments and tax evasion

In this section we examine the link between bribe payments and tax evasion. In col. 1 of Table V, we regress tax evasion on bribes and find that the larger the percentage of sales paid out as bribes to public officials, the larger is the underreporting of revenue to tax authorities. A 1% increase in bribe payments to public officials results in a 0.53% increase in tax evasion. We find similar results when we replace Bribes with a dummy variable in col. 2. Firms that pay bribes underreport their revenue on average by 6.13% more than firms that do not pay bribes. Therefore, both the probability of paying bribes and the amount of bribes paid are significantly associated with tax evasion.

Insert Table V

Larger firms, older firms, firms with higher capacity utilization, and foreign owned firms evade taxes less. Partnerships evade taxes less than sole proprietorships. The corporations dummy is not significantly different from sole proprietorships. We also find that family owned firms are not significantly different compared to other ownership categories in evading taxes. Across industry sectors, we find that only firms in the Other Sector, which consists predominantly of firms in mining and quarrying industries, evade significantly less taxes than those in Manufacturing.

One of the concerns with using a general bribes variable is that our results on tax evasion may be being driven by firms that bribe tax authorities. Hence in col. 3 of Table V, we drop firms that report bribing tax authorities. Since a detailed breakdown of the types of bribes paid is not available for many firms, sample size is reduced from 25,426 to 17,938. Even with this

smaller sample, we find that bribes to public officials (excluding those to the tax inspectorate) are significantly associated with increased tax evasion. [35]

In Col. 4 we examine if there is a causal link between bribes and tax evasion by instrumenting bribe payments with the interactions with government officials. Specifically, the instrument is the percentage of senior management's time in a typical week that is spent dealing with requirements imposed by government regulations including dealing with officials, completing forms, etc. In estimating the regression, we explicitly drop firms who report spending any days in inspections and mandatory meetings with officials of the tax inspectorate. Thus we expect the instrument to be correlated with bribe payments (the endogenous regressor), but uncorrelated with tax evasion (the outcome variable) for reasons beyond its effect on the endogenous regressor. It could be that firms that spend more time with government officials and bribe them are doing so for personal gain and hence also evade taxes since they are particularly prone to illegal behavior. However we find our results to hold even when we drop firms that report bribing the tax authorities. The instrumental variable regressions results in col. 4 show that for the sub-population of firms whose bribe paying behavior is influenced by their interactions with government officials other than those in the tax inspectorate, we find bribes to be significantly causally associated with tax evasion. The first stage F-stats reported in the table reject the hypothesis that the time spent with government officials is a weak instrument for bribe

[35] All our results are robust to choice of estimator. We get a significant and strong association between bribes and tax evasion using Logit regressions where the dependent variable is a dummy variable that takes value 1 if firm reported taxes and 0 otherwise as well as two-limit Tobit regressions to account for Tax Evasion taking on zero values with positive probability and being a continuous random variable over strictly positive values. As an alternative to tobit, we use a two stage hurdle model (Cameron and Trivedi (1998), Mullahy (1986)) and find that the level of bribe payments is associated with both the probability and extent of tax evasion.

payments. We also use the LIML estimator in the IV regression which is most robust to the weak instrument case. The Anderson-Rubin statistic tests the null hypothesis that the coefficient of the endogenous regressor in the main equation is 0 and is rejected indicating that the instrument is a good instrument.

B.1 Innovation and Tax Evasion

In section I, while we predict innovating firms to be particular targets for bribery and indeed find an empirical association between innovation and bribes above, we don't expect there to be an association between innovation and tax evasion. In a rational economic model, there is no reason why innovating firms would evade more or less taxes. To investigate this further, we examine the association between innovation and tax evasion in Table VI. In col. 1, we find innovation to be weakly associated with tax evasion at the 10% level. However this result is very weak and disappears when we include bribes as a control variable in col.2 and/or drop firms that report bribing tax authorities as shown in cols. 3 and 4. This suggests that the only significant effect of innovation on tax evasion is through the bribes variable. In other words, innovating firms that pay more bribes also evade more taxes. [36]

C. Distribution of firms as victims vs. perpetrators: role of finance

In addition to firms whose tax reporting is directly affected by bribe paying, examined in the previous section, there are firms who may underreport taxes independently of their bribe

[36] Since we do not find an association between innovation and tax evasion, we do not report IV specifications exploring causality.

paying (who we call Perpetrators), and other firms which pay bribes and do not underreport income (who we call Victims). We next examine whether innovation and bank financing predict which of these categories the firms fall into and the net gains from bribery and tax evasion.

Insert Table VII

Cols. 1 to 4 of Panel A in Table VII show that controlling for country fixed effects and various firm characteristics, innovating firms are more likely to be Victims or Retaliators and less likely to be Abiders and Perpetrators. Thus, being an innovator is not associated with a higher probability of avoiding taxes in the absence of corruption by government officials.

In Panel B of Table VII, we look at the effect of financing in addition to innovation. Cols. 1 to 4 of Panel B show that innovating firms and those dependent on Bank Financing are more likely to be Victims or Retaliators. There is no evidence that innovating firms or those that are bank financed are significantly associated with being Perpetrators. Since the number of observations in this model is reduced to 7400 due to the availability of the bank finance variable, in cols 5 to 8, we replace the bank financing variable with a firm's dependence on informal financing. It may be noted that Informal Financing is a dummy variable that takes the value 1 if the firm reported that the sum of Family, Informal (e.g. moneylender), and Other financing of new investments or working capital is 50% or greater. Informal Financing takes the value 0 if the sum of family, informal and other financing of new investments and working capital is equal to 0 %. Interestingly while innovators are more likely to be Victims as before, we find that informally financed firms, that is firms whose financing of new investments is sourced 50% or more from informal, family, and other sources are more likely to be Perpetrators.

As robustness, in Appendix B, we replicate the above results using multinomial regressions. Since we are primarily interested in the classification of firms as Victims and Perpetrators, the omitted category in all our specifications is Abiders and Retaliators. Multinomial logit specifications require strong assumptions about the independence of the four categories (Independence of Irrelevant Alternatives) which may not hold for the entire sample of firms and hence we only present these results in the Appendix.

The results from the multinomial logits confirm the proportions in Table VII. We find that in our sample, innovating firms are more likely to be Victims. There is no evidence that innovating firms are Perpetrators. Thus, being an innovator is not associated with a higher probability of avoiding taxes in the absence of corruption by government officials.[37]

In Panel B we look at the effect of financing in addition to innovation. Models 1 and 2 of Panel B shows that innovating firms and those dependent on bank financing are more likely to be Victims where as informally financed firms are more likely to be Perpetrators. In unreported results, when we restrict the sample to low and lower-middle income countries, we again find that informal financing is associated with being Perpetrators.

[37] Our regression results are also borne out by sample summary statistics. A two sample test of proportions shows that the proportions of Victims among innovating firms (16.36%) is significantly higher than the proportion of Victims among non-innovators (13.36%) at the 1% level and the proportions of Perpetrators among innovating firms (19.32%) is significantly lower than that among non-innovators (23.13%). The proportion of Abiders is lower among innovators (41.31%) compared to non-innovators (42.81%) where as the proportion of Retaliators is higher among innovators (23.01%) compared to non-innovators (20.70%). In addition, we find that the proportions of Perpetrators and Retaliators among informally financed firms (25.36% and 28.71% respectively) is significantly higher than the corresponding proportions of Perpetrators and Retaliators among firms that are not informally financed (21.13% and 20.57% respectively). In contrast, the proportion of Abiders and Victims among informally financed firms (31.86% and 14.08% respectively) is smaller than the proportions of Abiders and Victims among firms that are not informally financed (43.71% and 14.58% respectively) though only the difference in proportions of Abiders is significantly different at the 1% level where as that of Victims is not.

Overall, the results from Table VII and Appendix B show that, informal financing is associated with greater tax evasion, especially. By contrast, bank financed firms are subject to more scrutiny and thus are less likely to evade taxes.

It must be noted though that we are unable to fully address endogeneity concerns. We can make partial progress, so that, for example, if we were to instrument for just Innovator in panel A using time spent with government officials other than those in the tax inspectorate, we find significant results that Innovators are more likely to be Victims and Retaliators and less likely to be Abiders and Perpetrators. However, the complexity of the relations between the multiple endogenous variables – innovation and financing and the categorical dependent variable – makes it tough to find multiple instruments at the firm-level in our survey data that affect innovation and financing but not firm participation in illegal behavior. Hence we leave the identification issues in this area for future work.

V. Robustness

A. Bribe Payments and Tax Evasion - Robustness Checks using BEEPS

In this section we perform robustness checks of our main results using the BEEPS surveys that surveyed 27 transition countries across Europe and Central Asia in 2005. The data from the smaller sub-sample of countries have the following additional features that make it very attractive for robustness checks: First, as noted earlier, we have data on profit margins for about

6700 firms, where profit margin is defined as the margin by which sales price exceeds operating costs. We also have a dummy variable indicating whether or not the firm was profitable in 2003.

Second, in developing countries, firms may try to evade taxes in ways other than under-reporting income. In addition to the raw measure of tax evasion that is used in the previous tables, we have information on **Tax Evasion (Wagebill)** and **Tax Evasion (Labor)**. Tax Evasion (Wagebill) is constructed as 100 - firm responses to the survey question "Recognizing the difficulties that many firms face in fully complying with labor regulations, what percentage of the actual wage bill would you estimate the typical firm in your area of business reports for tax purposes?" Tax Evasion (Labor) is constructed as 100 - firm responses to the survey question "Recognizing the difficulties that many firms face in fully complying with labor regulations, what percentage of total workforce would you estimate the typical firm in your area of business reports for tax purposes?"

In Table VIII, we perform additional robustness tests of our regressions in Table III using the two new dependent variables. In addition to the usual set of control variables we also control for Profit Margin in cols. 1, 3, 5, and 7 and for Profitability Dummy in cols. 2, 4, 6, and 8. Specifically, in the OLS regressions in cols. 1-4, we regress the different measures of Tax Evasion on bribes paid to public officials. The results show that greater the bribes paid to public officials, firms under report their wage bill and labor for tax purposes. In cols. 5-8, we report instrumental variable specifications where we instrument for bribes using time spent with the government. Time spent with the government is the percent of senior management's time over the last 12 months that was spent in dealing with public officials about the application and

interpretation of laws and regulations and to get or to maintain access to public services? The IV regressions show that but for one specification in col. 7 where we control for profit margin in the Tax Evasion (Labor) regression, bribe payments influence the extent of tax evasion. The firms whose bribe paying behavior is altered by the time their managers spend dealing with public officials evade more taxes by reporting a lower wage bill and lower total workforce. [38]

Insert Table VIII

B. Are Bribe Payments a Tax on Innovation? Robustness Checks

In this section, we undertake several robustness checks to confirm that innovative firms are indeed victimized by corruption. In unreported regressions, we perform the following robustness tests: First when we re-estimate our regressions controlling for profit margin in the BEEPS sample, we find that profit margin is not significant and innovating firms still pay more bribes than non-innovators. For the same set of countries, we have surveys in 2002 which also have data on profit margin and we again find that profit margin by itself is not significantly associated with bribe payments whereas innovation is. The 2002 surveys also have data on past profit/sales ratio in 2001 and 1999. Past profitability, both in 1999 and 2001 is significantly associated with bribe payments but controlling for past profitability, innovation is still significantly associated with increased bribe payments.

[38] The same sample of countries was surveyed in 2002. The firms surveyed in 2002 and 2005 were randomly chosen each year and hence we have panel data on less than 1500 firms that were surveyed by coincidence in both years. We do not run pooled regressions across both datasets since the profitability measures were defined differently in the two surveys and the 2002 survey does not have the variables Tax Evasion (Wagebill) and Tax Evasion (Labor). However, the 2002 survey has the main tax evasion variable and controlling for profitability, we again find that bribe payments are associated with tax evasion.

Second, we check whether our results are robust to the use of alternate bribe variables. The 2002 and 2005 BEEPS surveys have two other questions on bribes that could serve as alternate dependent variables. Firms were asked to report on a scale of 1 to 6 whether it is common for firms in their line of business to have to pay some irregular "additional payments/gifts" to get things done " with regard to customs, taxes, licenses, regulations, services etc, with 1 being Never and 6 being Always. In addition, firms were asked to report on a scale of 1 to 6 whether firms in their line of business usually know in advance about how much this 'additional payment/gifts' with 1 being Never and 6 being Always. Using either of these alternate dependent variables, **Bribes_Common** and **Bribes_Known,** in a linear regression model,[39] we find our results unchanged – Innovating firms are more likely to say that it is common to pay bribes and to also report knowing how much this additional bribe payment is. This is consistent with our interpretation that, in our sample, corruption is a fee imposed on firms by government employees.

VI. Conclusion

A key policy issue in development finance is to design institutions that promote innovation and economic growth. In many countries there is considerable illegality in the

[39] We treat the Likert-scale measures as ordinal data and use OLS since Menard (1995) suggests that a linear regression is appropriate with ordinal dependent variables that have a large number of categories if we treat the variables as though they were measured on an interval scale. In the sociology and marketing literature, where use of ordinal variables from survey data is ubiquitous, it is common practice to treat ordinal variables as being continuous and to use ordinary least squares (OLS) estimation when the number of outcomes for the categorical dependent variable is greater than four. The assumption behind this is that when the number of cut-off points is greater than four, they may be considered to be approximately the same distance from each other.

relations between government officials and firms. The very institutions designed to promote commerce and ensure a level playing field become platforms that permit state employees to hold up firms opportunistically. On their part, many firms underreport revenues to the state. In this paper, we use a sample of 25,000 firms in 57 countries to study how the corruption by public employees affects innovation and firms' own dealings with the state's revenue authorities. We have four major findings:

First, we find that innovating firms are more likely to pay bribes to government officials than firms that do not innovate. We find no evidence that firms that pay bribes receive better services from officials than firms that do not pay bribes. Executives of innovating firms spend more time with government officials and the time they spend with officials predicts the amount of bribes that they pay. Thus, government corruption affects innovating firms disproportionately. We also find that small, young, and individual or family owned firms pay more bribes than larger, older firms, and firms with other ownership structures. Innovating firms that pay bribes do not report receiving better services from government services than innovating firms that do not pay for bribes.

Second, we find an association between bribes paid and tax evasion. More specifically, we find that firms that spend a lot of time dealing with non-tax government officials and regulations and pay bribes to government officials also evade more taxes.

Third, while some innovators do retaliate when extorted by evading more taxes, when we examine the net burden of corruption and tax evasion across firms, we find that being an innovator increases the probability that the firm pays bribes but does not evade taxes. Thus,

innovating firms are more likely to be victims of corruption and less likely to be perpetrators who cheat on their taxes without having to pay any bribes. By contrast, innovative firms are not more likely to pay protection money to criminals. Thus, our results are consistent with the Murphy, Shleifer and Vishny (1993) hypothesis that government officials' predation, as opposed to private predation is more costly to innovators.

Fourth, the firm's financing source predicts how the firm deals with the government. Bank financing increases the probability that the firm pays bribes but does not underreport income for tax purposes. By contrast, informal financing increases the probability that the firm misreports revenue without paying bribes.

All our results are robust to estimating on a sub-sample of countries in Europe and Central Asia (BEEPS Sample) using alternate measures of tax evasion (wage-bill and labor) and bribes. The BEEPS sample also allows us to better control for firm profit margins. Taken together, these results point to the costs of corruption imposed on firms though some firms respond by evading taxes. Innovators in particular are hurt by corruption. Innovating firms and firms that rely on formal bank financing are more likely to be victims who pay bribes and not evade taxes and less likely to be perpetrators who don't pay bribes but evade taxes. Thus, corruption is likely to have an indirect effect on innovation and the viability of the financial sector by indirectly subsidizing informal finance. More broadly, our results suggest that bribery of government officials has more complex consequences beyond that of a simple transaction between a corrupt official and a firm. On the one hand, some firms recoup the cost of the bribes by underreporting revenues. The economic cost of corruption for those firms might be

much lower than the cost of bribes would suggest. On the other hand, the uneven incidence of bribes between innovating and non-innovating firms, and firms that use the formal financial system and firms that do not, may have an additional distortionary effect.

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Table I: Bribes and Tax Evasion across Countries and Firms

This table presents the average bribe payments and tax evasion across different country classifications and different types of firms. The variables are described as follows: Bribes is the percentage of annual sales value that a typical firm spends on gifts or informal payments to public officials to "get things done" with regard to customs, taxes, licenses, regulations, services etc. Tax Evasion is the percentage of total sales the typical establishment does not report for tax purposes. To capture the net burden of corruption on firms, we construct a Firm Type variable which takes on four values: Abiders if the firm reports paying no bribes and evading no taxes, Perpetrators if the firm reports paying no bribes but does report evading taxes, Victims if the firm reports paying bribes but not evading taxes, and Retaliators if the firm reports paying bribes and evading taxes. Level of Bureaucratic Regulation is the Number of procedures required to start a business averaged over 2004-2005 from the World Bank Doing Business Indicators.

Across Countries

	# of Countries	Bribes	Tax Evasion	Abiders Tax Evasion=0, Bribes=0	Perpetrators Tax Evasion >0, Bribes=0	Victims Tax Evasion =0, Bribes>0	Retaliators Tax Evasion >0, Bribes>0
Panel A: Geographic Regions							
Africa	12	2.09	23.57	39.27%	25.84%	11.90%	22.98%
East Asia Pacific	6	1.90	29.42	26.60%	21.11%	16.55%	35.74%
Europe and Central Asia	35	1.22	14.70	41.87%	22.51%	13.66%	21.97%
Latin America and the Caribbean	8	2.58	23.20	33.82%	30.31%	10.19%	25.69%
Middle East and North Africa	3	3.63	26.29	30.76%	22.54%	16.29%	30.41%
South Asia (Sri Lanka)	1	0.19	7.40	49.23%	35.08%	9.23%	6.46%
Total	65						
Panel B: Level of Bureaucratic Regulation							
Low Regulation	31	1.14	15.91	44.82%	23.85%	12.52%	18.81%
High Regulation	34	2.22	22.13	32.91%	24.42%	13.87%	28.80%
Total	65						

Across Firms

	# of Firms	Bribes	Tax Evasion	Abiders Tax Evasion=0, Bribes=0	Perpetrators Tax Evasion >0, Bribes=0	Victims Tax Evasion =0, Bribes>0	Retaliators Tax Evasion >0, Bribes>0
Panel C: Firm Sizes							
Small (<20)	13559	1.50	18.03	37.78%	26.91%	11.55%	23.76%
Medium (20-99)	9107	1.46	16.92	40.40%	19.41%	15.90%	24.29%
Large (100 and over)	6870	1.03	14.70	48.46%	15.81%	18.28%	17.45%

	# of Firms	Bribes	Tax Evasion	Abiders Tax Evasion=0, Bribes=0	Perpetrators Tax Evasion >0, Bribes=0	Victims Tax Evasion =0, Bribes>0	Retaliators Tax Evasion >0, Bribes>0
Total	29,536						
Panel D: Ownership							
Domestic	25845	1.39	17.52	40.15%	23.35%	13.78%	22.72%
Foreign	3818	1.30	12.87	47.15%	13.20%	19.17%	20.48%
Total	29663						
Panel E: Exporter Status							
Non-exporter	23312	1.43	17.13	40.23%	22.83%	13.84%	23.10%
Exporter	6215	1.17	16.09	44.44%	19.07%	16.59%	19.90%
Total	29527						
Panel F: Industry Sector							
Agro Industry	448	2.35	32.33	31.25%	28.13%	7.59%	33.04%
Construction	2361	1.68	14.46	35.24%	18.64%	18.17%	27.95%
Other	237	1.08	10.08	46.84%	15.19%	21.94%	16.03%
Services	10950	1.15	14.32	41.97%	20.49%	14.44%	23.10%
Manufacturing	15657	1.47	18.78	41.43%	23.58%	14.05%	20.94%
Total	29653						
Panel G: Legal Status							
Cooperative	645	1.95	23.93	34.73%	20.47%	13.18%	31.63%
Corporations	11683	1.23	15.42	45.64%	19.44%	14.91%	20.01%
Sole Proprietorship	8430	1.51	18.86	36.11%	28.59%	11.44%	23.87%
Partnership	5408	1.34	14.58	37.76%	20.34%	16.96%	24.94%
Other	2926	1.16	19.64	46.62%	17.40%	15.96%	20.03%
Total	29092						

Table II: Summary Statistics and Correlations

Panel A presents summary statistics and panel B presents the correlation matrix between the main variables of interest. The variables are described as follows: Bribes is the percentage of annual sales value that a typical firm spends on gifts or informal payments to public officials to "get things done" with regard to customs, taxes, licenses, regulations, services etc. Tax Evasion is the percentage of total sales the typical establishment does not report for tax purposes. Abiders takes the value 1 for Bribes=0 and Tax Evasion=0 and 0 otherwise. Retaliators takes the value 1 for Bribes>0 and Tax Evasion>0 and 0 otherwise. Perpetrators takes the value 1 for Bribes=0 and Tax Evasion>0. Victims takes the value 1 for Bribes>0 and Tax Evasion=0 and 0 otherwise. Informal Financing is a dummy variable that takes the value 1 if the firm reported that the sum of Family, Informal (e.g. moneylender), and Other financing of new investments or working capital is 50% or greater. Bank Financing is a dummy variable that takes the value 1 if the firm reported having a current bank loan or overdraft facility and 0 if the firm said it did not currently have access to a bank loan or overdraft facility. Innovator is a dummy variable which takes the value 1 if the firm developed a new product line and 0 otherwise. Capacity Utilization is defined as the amount of output actually produced relative to the maximum amount that could be produced with the firm's existing machinery and equipment and regular shifts. Firm Size dummies take values 1 to 3 for Small firms (1-19 employees), Medium firms (20-99 employees), and Large firms (>=100 employees). Corporation, Partnership, Cooperative, Sole Proprietorship, and Other Legal Status are all dummy variables that take the value 1 if the firm is of the corresponding legal form and 0 otherwise. Firm age is the year of the survey - year established. Sector Dummies are 5 industry sector dummies for Agroindustry, Manufacturing, Construction, Services, and Other. Foreign Ownership is a dummy variable that takes the value 1 if the firm is foreign owned and 0 otherwise. Exporter is a dummy variable that takes the value 1 if the firm is an exporter and 0 is it is a non-exporter.

Panel A: Summary Statistics

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Bribes	25761	1.34	4.53	0	100
Tax Evasion	28375	17.10	25.73	0	100
Abiders	24179	0.41	0.49	0	1
Perpetrators	24179	0.22	0.42	0	1
Victims	24179	0.14	0.35	0	1
Retaliators	24179	0.22	0.42	0	1
Informal Financing	21384	0.14	0.35	0	1
Bank Financing	14143	0.49	0.50	0	1
Innovator	25761	0.37	0.48	0	1
Capacity Utilization	25761	78.80	20.40	1	106
Firm Size Dummies	25761	1.71	0.78	1	3
Corporation	25761	0.39	0.49	0	1
Partnership	25761	0.21	0.41	0	1
Cooperative	25761	0.02	0.14	0	1
Sole Proprietorship	25761	0.32	0.47	0	1
Other Legal Status	25761	0.06	0.24	0	1
Age	25761	15.62	15.96	0	202
Sector Dummies	25761	1.66	0.89	1	5
Foreign Ownership Dummies	25761	0.13	0.34	0	1
Exporter Dummy	25761	0.21	0.41	0	1

Panel B: Correlation Matrix

	Bribes	Tax Evasion	Informal Financing
Tax Evasion	0.14[a]		
Informal Financing	0.06[a]	0.13[a]	
Bank Financing	-0.05[a]	-0.09[a]	-0.22[a]

[a], [b], and [c] represent significance at 1%, 5%, and 10% respectively

Table III: Corruption as a tax on Innovation

The regression model in cols. 1-8 and col.10 is Bribes / Protection Payments = α +β_1 Innovator +β_2 Capacity Utilization + β_3 Sales Growth + β_4 Labor Productivity + β_5 Firm Size dummies + β_6 Family Owned dummy + β_7Legal Status dummies + β_8Age + β_9Foreign Ownership dummy+ β_{10} Exporter dummy + β_{11} Industry Sector Dummies + β_{12}Year Dummies + β_{13}Country Dummies + e. In col. 9 we estimate two stage instrumental variable regressions. The first stage regression is: Innovator = α +β_1 Human Capital +β_2 Capacity Utilization + β_3 Firm Size dummies + β_4 Family Owned dummy + β_5Legal Status dummies + β_6Age + β_7Foreign Ownership dummy+ β_8 Exporter dummy + β_9 Industry Sector Dummies + β_{10}Year Dummies + β_{11}Country Dummies + e. The second stage regression is the same as in col. 2 except that innovator is the predicted value from the first stage regression. Bribes is the percent of annual sales value that a typical firm spends on gifts or informal payments to public officials to "get things done" with regard to customs, taxes, licenses, regulations, services etc. Protection Payments is the percent of total sales used to buy protection (e.g. to organized crime to prevent violence). Innovator is a dummy variable which takes the value 1 if the firm developed a new product line and 0 otherwise. Human Capital is the percentage of workforce that have more than 12 years of education (university or higher). Capacity Utilization is defined as the amount of output actually produced relative to the maximum amount that could be produced with the firm's existing machinery and equipment and regular shifts. Sales Growth is defined as the percentage increase in sales over the past year. Labor Productivity is the ratio of ratio of labor productivity of the firm to the mean labor productivity in its country where labor productivity is defined as (Total Sales-Raw Material Costs)/Total Number of Workers in the previous year. Firm Size dummies take values 1 to 3 for Small firms (1-19 employees), Medium firms (20-99 employees), and Large firms (>=100 employees).Family Owned dummy takes the value 1 if the largest shareholder is an individual or family. Legal Status Dummies consist of dummy variables for the following legal forms - Corporation, Partnership, Cooperative, Sole Proprietorship (omitted category), and Other Legal Status. Firm age is the year of the survey -year established. Foreign Ownership is a dummy variable that takes the value 1 if the firm is foreign owned and 0 otherwise. Exporter is a dummy variable that takes the value 1 if the firm is an exporter and 0 is it is a non-exporter. The regressions in cols. 1-8 are estimated using ordinary least squares with standard errors clustered at the country level. In col. 9 we report IV regressions with robust standard errors.

	1	2	3	4	5	6	7	8	9	10
	OLS								IV	OLS
	Full Sample	Full Sample	Full Sample	Full Sample	Only Small Firms	Only Manufacturing	Drop Agro Industry	Drop firms that bribe tax authorities	Full Sample	Full Sample
	Bribes	Bribes	Bribes	Bribes	Bribes	Bribes	Bribes	Bribes	Bribes	Protection Payments
Innovator	0.367[a]	0.366[a]	0.377[a]	0.576[a]	0.605[a]	0.412[a]	0.370[a]	0.315[a]	2.121[a]	0.043
	(0.072)	(0.072)	(0.099)	(0.194)	(0.129)	(0.117)	(0.074)	(0.089)	(0.608)	(0.040)
Capacity Utilization		-0.008[a]	-0.007[a]	-0.010[b]	-0.012[a]	-0.005[b]	-0.008[a]	-0.007[a]	-0.008[a]	-0.001
		(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Labor Productivity			-0.019							
			(0.011)							
Sales Growth				-0.019						
				(0.091)						
Medium	-0.114	-0.101	-0.068	-0.124		-0.215	-0.116	-0.188[c]	-0.281[a]	-0.008
	(0.077)	(0.076)	(0.105)	(0.257)		(0.134)	(0.074)	(0.104)	(0.094)	(0.040)
Large	-0.342[a]	-0.301[a]	-0.285[b]	-0.331		-0.410[b]	-0.308[a]	-0.374[a]	-0.544[a]	-0.035
	(0.100)	(0.102)	(0.135)	(0.291)		(0.157)	(0.101)	(0.111)	(0.134)	(0.043)
Age	-0.006[a]	-0.007[a]	-0.006[a]	-0.011[b]	-0.012[b]	-0.007[a]	-0.007[a]	-0.005[b]	-0.005[a]	-0.002[a]
	(0.002)	(0.002)	(0.002)	(0.004)	(0.005)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Family Owned	0.311[a]	0.313[a]	0.338[a]	0.500[b]	0.212	0.310[a]	0.314[a]	0.212[b]	0.252[a]	0.039
	(0.069)	(0.070)	(0.107)	(0.207)	(0.193)	(0.107)	(0.070)	(0.082)	(0.070)	(0.039)
Corporation	0.074	0.063	0.075	0.158	0.157	0.237	0.083	0.091	-0.046	-0.036

	1	2	3	4	5	6	7	8	9	10
	OLS								IV	OLS
	Full Sample	Full Sample	Full Sample	Full Sample	Only Small Firms	Only Manufacturing	Drop Agro Industry	Drop firms that bribe tax authorities	Full Sample	Full Sample
	Bribes	Bribes	Bribes	Bribes	Bribes	Bribes	Bribes	Bribes	Bribes	Protection Payments
	(0.095)	(0.095)	(0.110)	(0.288)	(0.145)	(0.155)	(0.092)	(0.114)	(0.074)	(0.044)
Partnership	-0.002	-0.011	-0.014	0.226	-0.032	0.053	0.002	0.033	-0.080	0.021
	(0.073)	(0.072)	(0.087)	(0.274)	(0.121)	(0.125)	(0.071)	(0.112)	(0.076)	(0.055)
Cooperatives	0.215	0.184	-0.063	0.474	0.408	0.428	0.237	0.092	0.212	-0.048
	(0.278)	(0.267)	(0.164)	(0.645)	(0.438)	(0.320)	(0.269)	(0.138)	(0.180)	(0.060)
Other Legal Status	-0.059	-0.072	0.029	0.004	0.101	0.062	-0.044	-0.076	-0.111	0.029
	(0.177)	(0.176)	(0.219)	(0.221)	(0.298)	(0.206)	(0.180)	(0.180)	(0.158)	(0.065)
Foreign	0.003	0.015	0.145	0.302	0.157	-0.042	0.020	0.114	-0.048	0.067
	(0.102)	(0.103)	(0.122)	(0.243)	(0.269)	(0.137)	(0.103)	(0.110)	(0.086)	(0.059)
Exporter	-0.007	-0.001	-0.034	-0.108	0.359[c]	-0.093	0.009	-0.028	-0.129	0.067[c]
	(0.082)	(0.083)	(0.101)	(0.179)	(0.195)	(0.112)	(0.083)	(0.090)	(0.088)	(0.036)
Services	0.059	0.095	0.104	0.568	0.152[c]		0.095	0.102	0.310[a]	0.083[c]
	(0.062)	(0.063)	(0.091)	(0.613)	(0.087)		(0.063)	(0.076)	(0.099)	(0.045)
Agro Industry	-0.005	0.010	0.339	0.527	0.477			0.269	0.172	-0.168
	(0.283)	(0.263)	(0.418)	(0.509)	(0.585)			(0.351)	(0.568)	(0.187)
Construction	0.693[a]	0.716[a]	0.600[a]	0.405	0.735[a]		0.719[a]	0.582[a]	1.024[a]	0.054
	(0.096)	(0.096)	(0.130)	(0.858)	(0.141)		(0.097)	(0.116)	(0.135)	(0.045)
Other Sector	0.350	0.352	0.603	-0.629	-0.286		0.327	0.181	0.646[b]	0.040
	(0.258)	(0.255)	(0.378)	(0.521)	(0.533)		(0.264)	(0.182)	(0.264)	(0.085)
Constant	2.482[a]	3.107[a]	1.509[a]	1.596[a]	3.202[a]	2.343[a]	3.064[a]	2.025[a]	2.392[a]	1.980[a]
	(0.132)	(0.166)	(0.280)	(0.476)	(0.263)	(0.220)	(0.168)	(0.194)	(0.345)	(0.230)
# of Firms	25761	25761	16978	7470	12745	13594	25482	18178	23564	17417
# of Countries	57	57	53	31	57	57	57	57	55	50
Adjusted R-sq	0.055	0.056	0.047	0.033	0.062	0.041	0.057	0.055		0.128
First Stage F-Stat									158.93	
Anderson-Rubin									12.96	
Wald Test									(0.000)	

[a], [b], and [c] represent significance at 1%, 5%, and 10% respectively

Table IV: Innovators and their interactions with Bureaucracy

This table shows interactions between innovators and the government. Cols. 1 and 2 in each panel presents mean comparison tests between innovators that pay bribes and innovators that don't pay bribes. Innovators that pay bribes are firms who report new product innovation and paying a percentage of their sales as gifts or informal payments to public officials. Innovators that don't pay bribes are firms who report new product innovation and report paying no bribes to public officials. In Panel A, power outages, insufficient water supply, unavailable telephone service and transport failures are the number of days the firm experienced the corresponding service interruption in the last year. In Panel B, telephone connection, electrical connection, water connection, construction permit, import license, and operating license are the actual delay or wait in number of days in obtaining the corresponding service or approval from the day the firm applied for the service. In Panel C, Tax Inspectorate, Labor and Social Security, Fire and Building Safety, Sanitation/Epidemiology, Municipal Police, Environmental and All Agencies are the number of days spent in inspections and mandatory meetings with officials of each of the corresponding agencies.

	1	2
	Innovators that don't pay bribes	Innovators that pay bribes
Panel A. Service Interruptions		
Power Outages	11.21	17.09 [a]
Insufficient Water Supply	6.24	10.52 [a]
Unavailable Tele Service	2.59	5.43 [a]
Transport Failures	2.69	3.21
Panel B: Delays in obtaining licenses and permits		
Telephone Connection	19.3	29.19 [a]
Electrical Connection	12.23	16.29 [a]
Water Connection	21.98	25.88
Construction Permit	38.5	61.99 [a]
Import License	9.67	12.87 [c]
Operating License	24.14	37.72 [c]
Panel C: Days spent interacting with different government agencies		
Tax Inspectorate	3.57	5.27 [a]
Labor & Social Security	2.19	2.88 [a]
Fire & Building Safety	1.6	1.72
Sanitation/Epidemiology	2.59	3.06 [b]
Municipal Police	1.55	2.09 [a]
Environmental	1.63	1.87
All Agencies	11.08	15.39 [a]

[a], [b], and [c] represent significance at 1%, 5%, and 10% respectively

Table V: Bribe Payments and Tax Evasion

The regression model in cols. 1-3 is Tax Evasion = α_0 + β_1 Bribes + β_2 Capacity Utilization + β_3 Firm Size dummies + β_4 Family Owned dummy + β_5Legal Status dummies + β_6Age + β_7Foreign Ownership dummy+ β_8 Exporter dummy + β_9 Industry Sector Dummies + β_{10}Year Dummies + β_{11}Country Dummies + e. Col. 4 reports two stage instrumental variable regressions where the first stage regression is Bribes = α_0 +β_1 Time Spent with Government Officials +β_2 Capacity Utilization + β_3 Firm Size dummies + β_4 Family Owned dummy + β_5Legal Status dummies + β_6Age + β_7Foreign Ownership dummy+ β_8 Exporter dummy + β_9 Industry Sector Dummies + β_{10}Year Dummies + β_{11}Country Dummies + e. The second stage regression is the same as in col. 1 except that the Bribes variable is the predicted value of bribes from the first stage regression. Tax Evasion is the percent of annual sales that a typical firm under-reports for tax purposes. Bribes is the percent of annual sales value that a typical firm spends on gifts or informal payments to public officials to "get things done" with regard to customs, taxes, licenses, regulations, services etc. Bribes Dummy is a dummy variable that takes the value 1 if Bribes>0 and 0 if Bribes=0. Time spent with government officials is the percentage of senior management's time in a typical week that is spent dealing with requirements imposed by government regulations including dealing with officials, completing forms, etc. Innovator is a dummy variable which takes the value 1 if the firm developed a new product line and 0 otherwise. Capacity Utilization is defined as the amount of output actually produced relative to the maximum amount that could be produced with the firm's existing machinery and equipment and regular shifts. Firm Size dummies take values 1 to 3 for Small firms (1-19 employees), Medium firms (20-99 employees), and Large firms (>=100 employees).Family Owned dummy takes the value 1 if the largest shareholder is an individual or family. Legal Status Dummies consist of dummy variables for the following legal forms - Corporation, Partnership, Cooperative, Sole Proprietorship (omitted category), and Other Legal Status. Firm age is the year of the survey -year established. Foreign Ownership is a dummy variable that takes the value 1 if the firm is foreign owned and 0 otherwise. Exporter is a dummy variable that takes the value 1 if the firm is an exporter and 0 is it is a non-exporter. The regressions in cols. 1-3 are estimated using ordinary least squares with standard errors clustered at the country level. In col. 4 we report IV regressions with robust standard errors.

	1	2	3	4
	Tax Evasion	Tax Evasion	Tax Evasion	Tax Evasion
	OLS	OLS	OLS	IV
			Drop firms that bribe tax authorities	Drop firms that spent any time with tax authorities
Bribes	0.532[a]		0.389[a]	2.370[a]
	(0.084)		(0.077)	(0.690)
Bribes Dummy		6.133[a]		
		(1.360)		
Capacity Utilization	-0.037[a]	-0.035[a]	-0.030[a]	-0.014
	(0.010)	(0.010)	(0.011)	(0.013)
Medium	-1.878[a]	-2.168[a]	-1.434[b]	-1.652[a]
	(0.408)	(0.430)	(0.601)	(0.530)
Large	-3.395[a]	-3.619[a]	-2.750[a]	-2.402[a]
	(0.921)	(0.944)	(1.019)	(0.748)
Age	-0.030[c]	-0.029[c]	-0.025	-0.049[a]
	(0.016)	(0.017)	(0.017)	(0.013)
Family Owned	0.805	0.629	0.124	0.548
	(0.792)	(0.803)	(0.825)	(0.655)
Corporation	-1.305	-1.458	-1.960	-0.640
	(1.751)	(1.880)	(1.657)	(0.587)
Partnership	-1.567[b]	-1.905[b]	-1.988[c]	-2.209[a]
	(0.736)	(0.723)	(1.017)	(0.574)
Cooperatives	-1.289	-1.296	-0.623	-1.575
	(1.391)	(1.388)	(1.687)	(1.627)
Other Legal Status	-3.032	-3.170	-2.002	-1.864
	(2.014)	(2.016)	(2.107)	(1.317)
Foreign Ownership	-3.721[a]	-3.792[a]	-3.474[a]	-3.946[a]
	(1.040)	(1.067)	(1.059)	(0.696)
Exporter	0.384	0.210	0.381	0.608
	(0.570)	(0.577)	(0.578)	(0.652)

	1	2	3	4
	Tax Evasion	Tax Evasion	Tax Evasion	Tax Evasion
	OLS	OLS	OLS	IV
			Drop firms that bribe tax authorities	Drop firms that spent any time with tax authorities
Services	-1.501	-1.857	-2.245	-1.625[a]
	(1.631)	(1.671)	(1.813)	(0.499)
Agro Industry	1.382	1.541	0.459	4.089
	(2.786)	(2.909)	(2.744)	(4.063)
Construction	-0.541	-1.106	-1.183	-1.564[c]
	(1.327)	(1.264)	(1.663)	(0.861)
Other Sector	-3.429[b]	-3.509[a]	-3.010[c]	-2.261
	(1.358)	(1.314)	(1.615)	(2.075)
Constant	30.551[a]	27.805[a]	21.915 [a]	21.726[a]
	(1.720)	(1.531)	(2.421)	(3.492)
# of Firms	25426	25426	17938	12394
# of Countries	64	64	64	60
Adjusted R-sq	0.225	0.228	0.259	
First Stage F-Stat				39.73 (0.000)
Anderson-Rubin Wald Test				14.96 (0.000)

[a], [b], and [c] represent significance at 1%, 5%, and 10% respectively

Table VI: Innovation, Bribe Payments, and Tax Evasion

The regression model in cols. 1-4 is Tax Evasion = α_0 +β_1 Bribes +β_2 Innovator + β_3 Capacity Utilization + β_4 Firm Size dummies + β_5 Family Owned dummy + β_6Legal Status dummies + β_7Age + β_8Foreign Ownership dummy+ β_9 Exporter dummy + β_{10} Industry Sector Dummies + β_{11}Year Dummies + β_{12}Country Dummies + e. Tax Evasion is the percent of annual sales that a typical firm under-reports for tax purposes. Bribes is the percent of annual sales value that a typical firm spends on gifts or informal payments to public officials to "get things done" with regard to customs, taxes, licenses, regulations, services etc. Innovator is a dummy variable which takes the value 1 if the firm developed a new product line and 0 otherwise. Innovator is a dummy variable which takes the value 1 if the firm developed a new product line and 0 otherwise. Capacity Utilization is defined as the amount of output actually produced relative to the maximum amount that could be produced with the firm's existing machinery and equipment and regular shifts. Firm Size dummies take values 1 to 3 for Small firms (1-19 employees), Medium firms (20-99 employees), and Large firms (>=100 employees).Family Owned dummy takes the value 1 if the largest shareholder is an individual or family. Legal Status Dummies consist of dummy variables for the following legal forms - Corporation, Partnership, Cooperative, Sole Proprietorship (omitted category), and Other Legal Status. Firm age is the year of the survey -year established. Foreign Ownership is a dummy variable that takes the value 1 if the firm is foreign owned and 0 otherwise. Exporter is a dummy variable that takes the value 1 if the firm is an exporter and 0 is it is a non-exporter. The regressions in cols. 1-4 are estimated using ordinary least squares with standard errors clustered at the country level.

	1	2	3	4
	Tax Evasion	Tax Evasion	Tax Evasion	Tax Evasion
			Drop firms that bribe tax authorities	
Innovator	0.973[c]	0.764	0.820	0.447
	(0.496)	(0.495)	(0.655)	(0.675)
Bribes		0.516[a]		0.355[a]
		(0.086)		(0.074)
# of Firms	28375	24179		16878
# of Countries	59	57	59	57
Adjusted R-sq	0.197	0.188	0.238	0.230

[a], [b], and [c] represent significance at 1%, 5%, and 10% respectively

Table VII: Firms as Victims and Perpetrators: Role of Informal Finance

The regression model estimated is Abiders/Victims/Perpetrators/Retaliators = $\alpha + \beta_1$ Innovator $+ \beta_2$ Bank Financing or Informal Financing $+ \beta_3$ Capacity Utilization $+ \beta_4$ Firm Size dummies $+ \beta_5$ Family Owned dummy $+ \beta_6$Legal Status dummies $+ \beta_7$Age $+ \beta_8$Foreign Ownership dummy$+ \beta_9$ Exporter dummy $+ \beta_{10}$Industry Sector Dummies $+ \beta_{11}$Year Dummies $+ \beta_{12}$Country Dummies + e. Abiders takes the value 1 for Bribes=0 and Tax Evasion=0 and 0 otherwise; Retaliators takes the value 1 for Bribes>0 and Tax Evasion>0 and 0 otherwise; Perpetrators takes the value 1 for Bribes=0 and Tax Evasion>0 and Victims takes the value 1 for Bribes>0 and Tax Evasion=0 and 0 otherwise. Innovator is a dummy variable which takes the value 1 if the firm developed a new product line and 0 otherwise. Bank Financing takes the value 1 if the firm reported having access to an overdraft facility or line of credit and 0 otherwise. Informal Financing takes the value 1 if the sum of informal financing, family financing, and other financing of new investments was 50% or greater OR the sum of informal financing, family financing, and other financing of working capital was 50% or greater. Informal Financing takes the value 0 if the sum of informal financing, family financing and other financing of new investments AND working capital is equal to 0 %. Capacity Utilization is defined as the amount of output actually produced relative to the maximum amount that could be produced with the firm's existing machinery and equipment and regular shifts. Firm Size dummies take values 1 to 3 for Small firms (1-19 employees), Medium firms (20-99 employees), and Large firms (>=100 employees).Family Owned dummy takes the value 1 if the largest shareholder is an individual or family. Legal Status Dummies consist of dummy variables for the following legal forms - Corporation, Partnership, Cooperative, Sole Proprietorship (omitted category), and Other Legal Status. Firm age is the year of the survey -year established. Foreign Ownership is a dummy variable that takes the value 1 if the firm is foreign owned and 0 otherwise. Exporter is a dummy variable that takes the value 1 if the firm is an exporter and 0 is it is a non-exporter. The regressions are estimated using logits with standard errors clustered at the country level.

Panel A: Innovation and Firm Type

	1	2	3	4
	Bribes=0, Evasion=0 (Abiders)	Bribes=0, Evasion>0 (Perpetrators)	Bribes>0, Evasion=0 (Victims)	Bribes>0, Evasion>0 (Retaliators)
Innovator	-0.221[a]	-0.108[b]	0.173[a]	0.268[a]
	(0.038)	(0.043)	(0.051)	(0.037)
# of Firms	24179	24179	24155	24179
# of Countries	57	57	56	57

[a], [b], and [c] represent significance at 1%, 5%, and 10% respectively

Panel B: Innovation, Financing and Firm Type

	1	2	3	4	5	6	7	8
	Bribes=0, Evasion=0 (Abiders)	Bribes=0, Evasion>0 (Perpetrators)	Bribes>0, Evasion=0 (Victims)	Bribes>0, Evasion>0 (Retaliators)	Bribes=0, Evasion=0 (Abiders)	Bribes=0, Evasion>0 (Perpetrators)	Bribes>0, Evasion=0 (Victims)	Bribes>0, Evasion>0 (Retaliators)
Innovator	-0.208[a]	-0.149[c]	0.202[a]	0.288[a]	-0.225[a]	-0.086	0.265[a]	0.185[a]
	(0.076)	(0.082)	(0.066)	(0.070)	(0.053)	(0.054)	(0.069)	(0.052)
Bank Financing	-0.175[b]	-0.225[a]	0.232[b]	0.317[a]				
	(0.068)	(0.069)	(0.097)	(0.086)				
Informal Financing					-0.239[a]	0.141[b]	-0.060	0.138[b]
					(0.061)	(0.067)	(0.092)	(0.069)
# of Firms	7391	7400	7391	7400	15176	15176	15162	15176
# of Countries	24.000	25.000	24.000	25.000	57.000	57.000	56.000	57.000

[a], [b], and [c] represent significance at 1%, 5%, and 10% respectively

Table VIII: Bribe Payments and Tax Evasion – Robustness using BEEPS Sample

The regression model estimated in cols. 1-4 is is Tax Evasion (Wage Bill)/Tax Evasion (Labor) = α +β_1 Bribes + β_2 Sales Growth + β_3 Capacity Utilization + β_4 Profit Margin or Profitability Dummy + β_5 Firm Size dummies + β_6 Family Owned dummy + β_7Legal Status dummies + β_8Age + β_9Foreign Ownership+ β_{10} Exporter dummy + β_{11}Industry Sector Dummies + β_{12}Country Dummies + e. In cols. 5-8 we estimate two stage variable regressions where the second stage regression is the same as those in cols. 1-4 respectively except that the Bribes variable is replaced with its predicted value from the following first stage regression: Bribes = α +β_1 Time spent with government officials + β_2 Sales Growth + β_3 Capacity Utilization + β_4 Profit Margin or Profitability Dummy + β_5 Firm Size dummies + β_6 Family Owned dummy + β_7Legal Status dummies + β_8Age + β_9Foreign Ownership+ β_{10} Exporter dummy + β_{11}Industry Sector Dummies + β_{12}Country Dummies + e. Tax Evasion (Wagebill) is constructed from firm responses to the survey question "Recognizing the difficulties that many firms face in fully complying with labor regulations, what percentage of the actual wage bill would you estimate the typical firm in your area of business reports for tax purposes?" Tax Evasion (Labor) is constructed from firm responses to the survey question "Recognizing the difficulties that many firms face in fully complying with labor regulations, what percentage of total workforce would you estimate the typical firm in your area of business reports for tax purposes? Bribes is the percent of annual sales value that a typical firm spends on gifts or informal payments to public officials to "get things done" with regard to customs, taxes, licenses, regulations, services etc. Time spent with government officials is the percent of senior management's time over the last 12 months spent in dealing with public officials about the application and interpretation of laws and regulations and to get or to maintain access to public services. Profit Margin is the margin by which sales price exceeds operating costs. Profitability Dummy takes the value 1 if the firm is profitable in 2003 and 0 otherwise. Capacity Utilization is defined as the amount of output actually produced relative to the maximum amount that could be produced with the firm's existing machinery and equipment and regular shifts. Sales Growth is defined as the percentage change in sales over the past 36 months. Firm Size dummies take values 1 to 3 for Small firms (1-19 employees), Medium firms (20-99 employees), and Large firms (>=100 employees).Family Owned dummy takes the value 1 if the largest shareholder is an individual or family. Legal Status Dummies consist of dummy variables for the following legal forms - Corporation, Partnership, Cooperative, Sole Proprietorship (omitted category), and Other Legal Status. Firm age is the year of the survey -year established. Foreign Ownership is the percentage owned by the foreign private sector. Exporter is a dummy variable that takes the value 1 if the firm is an exporter and 0 is it is a non-exporter.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Tax Evasion (Wagebill)	Tax Evasion (Wagebill)	Tax Evasion (Labor)	Tax Evasion (Labor)	Tax Evasion (Wagebill)	Tax Evasion (Wagebill)	Tax Evasion (Labor)	Tax Evasion (Labor)
	OLS				IV			
Bribes	1.913***	1.933***	1.487***	1.485***	2.798**	3.168***	1.474	1.756*
	(0.175)	(0.170)	(0.165)	(0.155)	(1.104)	(1.063)	(1.004)	(0.954)
Profit Margin	0.117***		0.081***		0.109***		0.076***	
	(0.028)		(0.028)		(0.022)		(0.019)	
Profitability Dummy		2.912***		2.010***		2.563***		1.921***
		(0.837)		(0.680)		(0.767)		(0.632)
# of Firms	5186	5771	5207	5799	5038	5603	5061	5633
# of Countries	27	27	27	27	27	27	27	27
Adjusted R-Sq	0.162	0.159	0.145	0.144	0.150	0.138	0.140	0.137
First stage F-stat					45.79	50.77	44.76	49.69
Anderson-Rubin Wald test					6.11 (0.0135)	8.50 (0.0036)	2.05 (0.1520)	3.22 (0.0728)

[a], [b], and [c] represent significance at 1%, 5%, and 10% respectively

Appendix A: Corruption as a tax on Innovation - Robustness

The regression model estimated is the same as in Col. 2 of Table III. Bribes = α +β_1 Innovator +β_2 Capacity Utilization + β_3 Firm Size dummies + β_4 Family Owned dummy + β_5Legal Status dummies + β_6Age + β_7Foreign Ownership dummy+ β_8 Exporter dummy + β_9 Industry Sector Dummies + β_{10}Year Dummies + β_{11}Country Dummies + e. Bribes is the percent of annual sales value that a typical firm spends on gifts or informal payments to public officials to "get things done" with regard to customs, taxes, licenses, regulations, services etc. Innovation is one of the following variables: *Developed a major new product line, Upgraded an existing product line, Introduced new technology that has substantially changed the way that the main product is produced, Opened a new plant, Agreed to a new joint venture with foreign partner, Obtained a new licensing agreement, Outsourced a major production activity that was previously conducted in-house and Brought in-house a major production activity that was previously outsourced* are all dummy variables that take the value 1 if the firm undertook the corresponding innovation and 0 otherwise; Aggregate Innovation Index is an aggregate measure that is formed by adding 1 if the firm has undertaken any of the eight different innovative activities described above; Core Innovation is an aggregate measure of innovation that is formed by adding 1 if the firm has *Developed a new product line, Upgraded an existing product line,* or *Introduced a new technology*. Capacity Utilization is defined as the amount of output actually produced relative to the maximum amount that could be produced with the firm's existing machinery and equipment and regular shifts. Firm Size dummies take values 1 to 3 for Small firms (1-19 employees), Medium firms (20-99 employees), and Large firms (>=100 employees).Family Owned dummy takes the value 1 if the largest shareholder is an individual or family. Legal Status Dummies consist of dummy variables for the following legal forms - Corporation, Partnership, Cooperative, Sole Proprietorship (omitted category), and Other Legal Status. Firm age is the year of the survey -year established. Foreign Ownership is a dummy variable that takes the value 1 if the firm is foreign owned and 0 otherwise. Exporter is a dummy variable that takes the value 1 if the firm is an exporter and 0 is it is a non-exporter. The regressions are estimated using ordinary least squares with standard errors clustered at the country level

	1	2	3	4	5	6	7	8	9	10
	Bribes	Bribes	Bribes	Bribes	Bribes	Bribes	Bribes	Bribes	Bribes	Bribes
New Product Innovation	0.366[a]									
	(0.072)									
Upgraded Product Line		0.323[a]								
		(0.070)								
New Technology			0.205[a]							
			(0.058)							
Opened new plant				0.209						
				(0.153)						
New Joint Ventures					0.309[c]					
					(0.171)					
New Licensing						0.402[a]				
						(0.079)				
Outsourced							0.159			
							(0.111)			
Bring in-house a previously								0.233		
								(0.196)		
Core Innovation									0.185[a]	
									(0.028)	
Aggregate Innovation Index										0.143[a]
										(0.020)
# of Firms	25761	26084	26098	9497	25226	24155	25231	21361	26243	26254
# of Countries	57	58	59	43	54	55	54	50	59	59
Adjusted R-Sq	0.056	0.056	0.055	0.056	0.057	0.061	0.057	0.078	0.056	0.056

[a], [b], and [c] represent significance at 1%, 5%, and 10% respectively

Appendix B: Firms as Victims and Perpetrators: Role of Informal Finance - Robustness

The regression model estimated is Firm Type = α +β_1 Innovator + β_2 Bank Financing or Self Financing + β_3 Capacity Utilization + β_4 Firm Size dummies + β_5 Family Owned dummy + β_6Legal Status dummies + β_7Age + β_8Foreign Ownership dummy+ β_9 Exporter dummy + β_{10}Industry Sector Dummies + β_{11}Year Dummies + β_{12}Country Dummies + e. Firm Type takes values 1 to 3, 1 for Bribes=0 and Tax Evasion=0 or Bribes>0 and Tax Evasion>0; 2 for Bribes=0 and Tax Evasion>0(Perpetrators) and3 for Bribes>0 and Tax Evasion=0 (Victims). Innovator is a dummy variable which takes the value 1 if the firm developed a new product line and 0 otherwise. Bank Financing takes the value 1 if the firm reported having access to an overdraft facility or line of credit and 0 otherwise. Informal Financing takes the value 1 if the sum of informal financing, family financing, and other financing of new investments was 50% or greater OR the sum of informal financing, family financing, and other financing of working capital was 50% or greater. Informal Financing takes the value 0 if the sum of informal financing, family financing and other financing of new investments AND working capital is equal to 0 %. Capacity Utilization is defined as the amount of output actually produced relative to the maximum amount that could be produced with the firm's existing machinery and equipment and regular shifts. Firm Size dummies take values 1 to 3 for Small firms (1-19 employees), Medium firms (20-99 employees), and Large firms (>=100 employees).Family Owned dummy takes the value 1 if the largest shareholder is an individual or family. Legal Status Dummies consist of dummy variables for the following legal forms - Corporation, Partnership, Cooperative, Sole Proprietorship (omitted category), and Other Legal Status. Firm age is the year of the survey -year established. Foreign Ownership is a dummy variable that takes the value 1 if the firm is foreign owned and 0 otherwise. Exporter is a dummy variable that takes the value 1 if the firm is an exporter and 0 is it is a non-exporter. The regressions are estimated using multinomial logits where the omitted category is Firm Type=1. The coefficients reported below are relative risk ratios.

Panel A: Innovation and Firm Type

	1	
	Firm Type (Omitted Category: Bribes=0, Evasion=0; Bribes>0, Evasion>0)	
	Bribes=0, Evasion>0 (Perpetrators)	Bribes>0, Evasion=0 (Victims)
Innovator	0.920[c]	1.167[a]
	(0.039)	(0.061)
# of Firms	24179	
# of Countries	57	
Log Likelihood	-2.02e+04	

[a], [b], and [c] represent significance at 1%, 5%, and 10% respectively.

Panel B: Innovation, Financing and Firm Type

	(1)		(2)	
	Firm Type (Omitted Category: Bribes=0, Evasion=0; Bribes>0, Evasion>0)		Firm Type (Omitted Category: Bribes=0, Evasion=0; Bribes>0, Evasion>0)	
	Bribes=0, Evasion>0 (Perpetrators)	Bribes>0, Evasion=0 (Victims)	Bribes=0, Evasion>0 (Perpetrators)	Bribes>0, Evasion=0 (Victims)
Innovator	0.885	1.186[b]	0.958	1.289[a]
	(0.078)	(0.090)	(0.050)	(0.089)
Bank Financing	0.821[a]	1.194[b]		
	(0.055)	(0.107)		
Informal Financing			1.147[b]	0.973
			(0.072)	(0.084)
# of Firms	7400		15176	
# of Countries	25.000		57.000	
Log Likelihood	-6019.683		-1.26e+04	

[a], [b], and [c] represent significance at 1%, 5%, and 10% respectively