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"Heard Melodies Are Sweet, but Those Unheard Are Sweeter":

Understanding Corruption Using Cross-National Firm-Level Surveys

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Abstract

Since the early 1990s, a large number of studies have been undertaken to understand the causes and consequences of corruption. Many of these studies have employed firm-level survey data from various countries. While insightful, these analyses based on firm-level surveys have largely ignored two important potential problems: *nonresponse* and *false response* by the firms. Treating firms' responses on a sensitive issue like corruption at their face value could produce incorrect inferences and erroneous policy recommendations. We argue that the data generation of nonresponse and false response is a function of the political environment in which the firms operate. In a politically repressive environment, firms use nonresponse and false response as self-protection mechanisms. Corruption is understated as a result. We test our arguments using the World Bank enterprise survey data of more than 44,000 firms in 72 countries for the period 2000-2005 and find that firms in countries with less press freedom are more likely to provide nonresponse or false response on the issue of corruption. Therefore, ignoring this systematic bias in firms' responses could result in underestimation of the severity of corruption in politically repressive countries. More important, this bias is a rich and underutilized source of information on the political constraints faced by the firms. Nonresponse and false response, like unheard melodies, could be more informative than the heard melodies in the available truthful responses in firm surveys.

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"Heard Melodies Are Sweet, but Those Unheard Are Sweeter"
Understanding Corruption Using Cross-National Firm-Level Surveys

Corruption is the use of public office for private gains, including practices such as contract kickbacks in public procurement, simple bribery, nepotism, and outright embezzlement of public property by government officials. Corruption is widely documented to undermine the quality of market and political institutions, distort investment decisions, reduce firm productivity and national economic growth, and afford undue political influence to those engaged in corruption.[1] Therefore, understanding the scope, causes, and effects of corruption is important for policy reforms that seek to build and strengthen market promoting institutions.

In order to fight corruption, scholars and policymakers have been trying to understand its causes. Early research of corruption (e.g., Mauro 1995; Ades and Di Tella 1999; Treisman 2000) was invariably at the country level and typically used the expert perception-based indicators of country-level corruption (e.g., the Transparency International Corruption Index). Since the early 1990s, many scholars have started to study corruption using firm-level survey data the World Bank collected in various countries.[2] These studies use firm-level corruption indicators that measure firms' perceptions of and their actual experiences with corruption. Instead of looking at country-level determinants, they investigate the effects of firm attributes and the firm-specific regulatory environment on corruption. Hence, these analyses provide additional insights into the causes of

[1] See, for example, Bardhan (1997), Tanzi (1998), Kaufmann (1997), Gatti (1999), Gray and Kaufmann (1998), Treisman (2000), Mauro (1998), and Wei (1999, 2000).
[2] See Recanatini, Wallsten, and Xu (2000) for discussion of the early World Bank surveys. For examples of the firm-level data-based analyses, see World Development Report (2005), Batra, Kaufmann, and Stone (2003), Gray, Hellman, and Ryterman (2004), Hellman, Jones and Kaufmann (2002), Hellman and Kaufmann (2004), Escribano and Guasch (2005), Fisman and Gatti (2006), and Svensson (2003).

corruption at a different level of analysis using new data[3]. The firm-level data also allow researchers to explore the variance in firm experiences with corruption within countries.

These firm-level data-based analyses, however, have relied on the firm responses available from the surveys as they are, assuming that firms provide truthful responses to all questions. As such, they have largely ignored two important issues associated with the firm survey data: (1) firms often deliver nonresponses on sensitive questions, and (2) firms do not necessarily provide truthful responses on these questions. By relying on available firm responses alone and treating them as if all of them are truthful, the firm-level data-based research of corruption could produce incorrect inferences and erroneous policy recommendations, to the extent that the problems are not random.[4]

More important, we argue that the data generation of nonresponse and false response is systematically related to the national political environment in which firms operate. In short, in politically less free environments, firms fear that their privacy is to be violated and that the confidentiality of their responses compromised; hence, if they state their true beliefs or actual bribery experiences, governments could punish them. Firms employ nonresponse and false response as self-protection mechanisms in politically repressive environments. Corruption is understated as a result. Therefore, nonresponse and false response could be a rich data resource that informs us of the political causes of corruption. Nonresponse and false response, like unheard melodies, could be sweeter and more informative than the heard melodies in the limited, available truthful responses. We demonstrate empirically at both the national and the firm levels that firms in politically repressive countries are more likely to give nonresponses on the corruption question and that they also are more likely to provide false responses. In light of these findings, we conclude that previous research that relies on the firm-level survey data as they are has underestimated the severity

[3] A few corruption studies triangulate between enterprise surveys, citizen surveys and public officials surveys. See, for example, World Bank (2000).

[4] As an exception, Svensson (2003) applies a selection model to the generation of firm nonresponses in a single country survey, but does not find any significant selection effect.

of corruption in the politically repressive countries, and that these nonresponses and false-responses provide important information about the political environment.

Our research makes two important contributions. The first contribution is to the literature on corruption. Scholars that use these firm-level survey data on the issue of corruption (e.g., World Bank 2004; Hellman, Jones and Kaufman 2002; Hellman and Kaufmann 2004; Fisman and Gatti 2006; Svensson 2003) have paid limited attention to the impact of nonresponse, and to the best of our knowledge, have given no attention to the issue of false response. We demonstrate that these problems are present in the firm-level survey data. We also show that cross national variations in political freedom explain variations in nonresponse, false response and truthful response in these data, even after we control for various firm attributes. Furthermore, our analysis provides some evidence against an important implication of the "greasing the wheel" hypothesis, that is, firms in more corrupt environments do not perceive corruption as a problem as bribery helps businesses get things done more quickly and enhances efficiency. Hence, it is important that policy recommendations based on these survey data take into account the effects of nonresponse and false response. Equally important, modeling these nonresponses and false responses provides information on how the political environment constrains firms.

Our second contribution is to the survey literature. In national and cross-national survey research, nonresponse is considered a nuisance problem that may contaminate statistical inferences based on the response data (e.g., Sherman 2000). There is very limited research in cross-national surveys of the data generation process of nonresponse (for an exception, see Berinsky and Tucker 2006). But a large amount of research in public opinion, health care research, economics, finance, and marketing demonstrates that the data generation process of nonresponse is not random but often systematic (e.g., Holmes and Schmitz 1996; Pickreign and Gabel 2005; Riphahn and Serfling 2005). Our research confirms that the data generation process of nonresponse on corruption in the

World Bank firm-level surveys is systematically related to cross-national institutional differences. We also consider the problem of false response which has rarely received attention in cross-national survey research. We demonstrate and alert cross-national survey researchers to the presence of the false response problem and provide insights on how this bias can be a useful source of information.

The rest of the paper proceeds as follows. Section 2 provides a conceptualization of nonresponse and false-response problems in the firm-level surveys and presents some descriptive evidence. Section 3 offers a theory that looks into the institutional origin of these problems. Section 4 tests our theoretical argument at the national and the firm levels, and we discuss the implications of these results in Section 5.

2. Nonresponse and False Response on Corruption-Question in Firm-Level Surveys

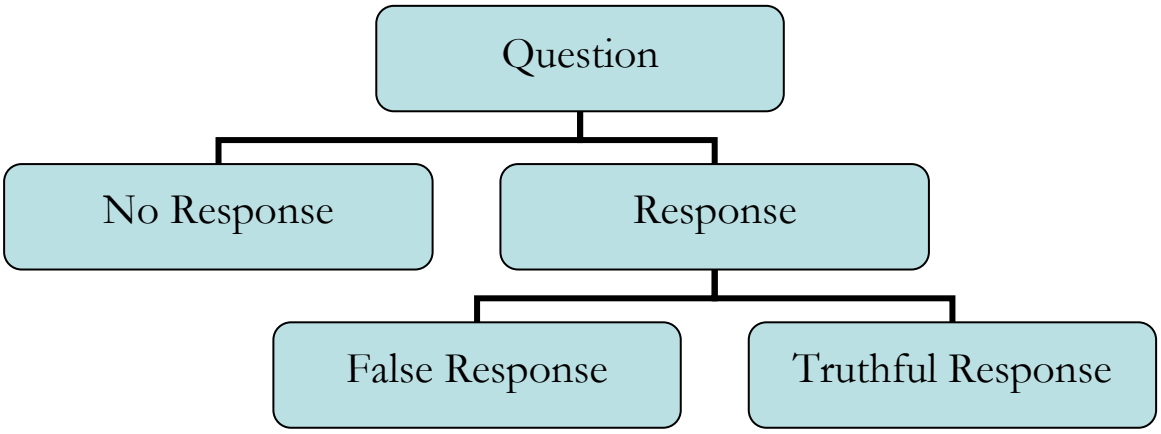
Cross-national firm-level surveys by the World Bank often involve politically sensitive questions that may pose two problems for quality data collection. First, sensitive questions in a questionnaire may elicit nonresponse from firms that intend to evade trouble from the government. The outcome is the common problem of item nonresponse in survey research. Second, some governments may be heavily involved in executing these surveys. Government involvement may arguably restrict the type of questions to be asked or require firms to fill out these surveys to generate a high response rate to look good.[5] In these cases, when a firm is compelled to deliver a response but fears possible government reprisal that may result from a truthful response, it may provide a false response.

Figure 1 provides a conceptualization of the data generation process in these cross-national firm-level surveys, assuming that the same question is asked to all firms in different countries. As

[5] See Batra et al. (2003, 51) for the specific reference to China. In this paper, we do not address the issue of whether and why a question is asked in a survey, and focus on nonresponse and false response on questions asked of all firms in different countries.

shown, the truthful response is but one of the three possible outcomes of the data generation process. Nonresponse and false response are the other two possible outcomes. When scholars model the causes of the available response data, they often assume that all responses are truthful and that the effect of nonresponse is independent of the right-hand side variables or the available responses. We will theorize in the next section why this assumption could be erroneous and problematic. Before we do so, it is useful to demonstrate that nonresponse is an empirically widespread phenomenon.

Figure 1 Conceptualization of Data Generation Process in World Bank Firm-Level Surveys



We illustrate the extent to which nonresponse has affected the data gathered for the most general question regarding the impact of corruption in the World Bank *Productivity and Investment Climate Private Enterprise Surveys* (PICS) of some 44,000 firms in about 72 countries:[6]

[6] Another general corruption question in the surveys concerns the amount of sales the firms reportedly have devoted to bribery. From both the legal and business perspectives, this question is highly problematic. As bribery is considered illegal in many countries, acknowledging the specific amount of bribery can easily be self-incriminating, causing the firm to be taken advantage of by the government or business competitors. It also reveals the firm's strategies to its potential business competitors. Finally, since bribery also is unethical, it is unrealistic to expect firm managers to report such behaviors. Other corruption-related questions in the

Question:

Please tell us if any of the following issues are a problem for the operation and growth of your business. If an issue poses a problem, please judge its severity as an obstacle on a four-point scale: 0=No obstacle, 1=Minor Obstacle, 2=Moderate Obstacle, 3=Major Obstacle, 4=Very Severe Obstacle

Among the 72 countries where this question was administered, on average, 418 firms per country were surveyed. While the overall response rate is quite high (94%), the variation in response rates across countries is quite large as well (ranging from 54%, slight above half of the firms, to 100%).

While nonresponse is directly observable from the data, demonstrating the presence of false response directly is not possible. But anecdotal evidence does exist. For example, among the firms that were surveyed and responded, 70% of the firms in China and 60% in Uzbekistan reported that corruption is not a problem for them. In Eritrea, 92% of the responding firms said that corruption isn't a problem; these reported percentages are comparable to that in Germany and Ireland, and higher than those in Greece and Spain. These reported percentages stand in sharp contrast with the high levels of corruption for these countries, perceived by external observers associated with Transparency International. This pattern is obviously consistent with the presence of false response by firms. We will test the implications of false response in our empirical analysis later in the paper.

If nonresponse and false response are random, statistical inferences using available data are valid. But if nonresponse and false response are correlated in a systematic manner with those factors that explain the response patterns, inferences based on available response data alone will be problematic. In the next section, we offer an argument for how the degree of political freedom in a country is causally related to nonresponse and false response on the corruption question.

PICs survey concern firm perceptions or their actual bribe-payments for specific services (e.g., utility service, construction permit, import license, customs clearance etc.).

3. Theoretical Argument

In firm-level surveys, managers are asked both subjective and objective questions on how corruption influences the firm and other similar firms. Scholars in mass public opinion have laid the foundation for how individuals respond to surveys.[7] Zaller and Feldman (1992) argue that individuals are sometime inconsistent across surveys or even questions within a survey. This isn't a violation of rationality; rather, Zaller and Feldman argue, individuals' answers are drawn from an underlying distribution of beliefs. For simple and straightforward questions, individuals answer questions in a consistent manner. For "hard" questions which either require recalling very specific knowledge or effortful cognitive behavior, individuals may give inaccurate responses or choose not to answer a question (Carmines and Stimson 1980). In this project, we are not addressing these issues, and our focus on *elite*-level surveys of firm managers mitigates many of the problems associated with poorly informed respondents.

We argue that a key determinant of nonresponse and false response on corruption questions is the degree of political freedom in the host country. Firms in some countries fear that survey responses, although formally anonymous, could be monitored by an agent of the government. The governments may retaliate against firms that provide answers that are damaging to its reputation.[8] In some countries this is relatively obvious, where the government controls information flows and represses outspoken private citizens. Where political freedom is low in degree, businesses may be penalized for responses that conflict with the preferences of the governments. In contrast, where political freedom is high, the rights of citizens to speak their mind tend to be better respected and

[7] See Berinsky (2004) for a review.

[8] One may contend that these Bank surveys typically have confidentiality agreements that protect the identity of the respondent from being revealed to the government. The confidentiality protection may not work out as desired and designed, especially when the Bank survey team needs the collaboration of the relevant government bureaucracy to provide industry census data to generate the representative stratified sample. Also, there is often data sharing arrangement between the Bank and the national government. Hence, it is quite plausible that an unconstrained autocratic government would be able to get hold of the identity of the respondents.

protected by law. When citizens have more freedom in information flows and in expressing their opinions, they could afford to be outspoken without fearing possible reprisal from the government. Such cross-national variations in information censorship explain patterns in nonresponse and false response.

Why will a firm expect reprisal for truthful responses on politically sensitive questions like corruption? We argue that there are plausible reasons for the firm to expect certain governments to penalize the firm whose responses conflict with the government's agenda. Because the World Bank survey results often are used and publicized widely, they affect the reputation of the governments both among domestic constituencies and international investors. Unfavorable findings on sensitive issues like corruption thus have both political and economic implications, as they undermine political legitimacy of the government and reduce the attractiveness of a country to foreign investors.

The autocratic government is more likely to try to prevent unfavorable survey results than the democratic one. Democratic leaders constantly face the possibility of being removed from office by voters. Being held accountable, they may want to manipulate information, but repressing information flows is often not a readily available policy option, particularly on issues like corruption. In contrast, because the stake of losing office is high, the autocratic leader seeks to have a firm grip on power for as long as possible. To the extent that any legitimacy threat is perceived to be serious, the autocratic government may resort to repressive tactics and information censorship. In a nondemocratic environment, firms anticipate the outcome of the government exercising repressive tactics. Therefore, due to the fear of possible reprisal, nonresponse is more likely to be chosen by the firms in the nondemocratic country than those in the democratic one.[9]

[9] One may argue that contracts for enterprise surveys demand absolute confidentiality about the identities of responding firms, implying that absolute confidentiality has not only been maintained but also credible to respondents in surveys. This assumption is not directly testable. But if it is true, the data generation of nonresponse ought to be random such that we should not expect to find any systematic relationship linking nonresponse to political freedom. This is a directly testable implication.

One may contend that the World Bank surveys provide little benefit to the individual participating firms. While they often provide feedback (a public good) on the investment environment to government officials, World Bank staff, and other potential investors, the individual impact of each firm's response is low, and the collective action problem makes it unlikely that these small net benefits will induce high response rates. Many firms will probably be more motivated to deliver nonresponses. This important *disincentive* should apply to firms in general, regardless of the level of political freedom. Our argument is that other than this disincentive that causes nonresponse, a low level of political freedom gives an additional disincentive for firms to deliver nonresponse on politically sensitive corruption questions.[10]

Since the potential cost of giving truthful response on corruption questions could be high in autocratic countries, instead of nonresponse, firms may use yet another evasive strategy. That is to provide false responses. Recanatini, Wallsten, and Xu (2000) have some discussion of this problem and offer some technical suggestions for how to avoid this problem. Our position is different. We argue that since cross-national differences in the degree of political freedom are given at the time of survey, the qualitative distinction in the underlying incentive structure between autocratic and democratic governments is not mutable through survey techniques. The fear of reprisal could be a dominant concern in politically repressive countries. Nonresponse as an evasion strategy may not be available in countries that require firms to participate in these surveys. Or even in countries where survey participation is voluntary but political freedom is low, firms may still want to voice their views on technical questions, but choose to offer false response on politically sensitive ones. Regardless of which one of these scenarios applies to a firm, it is clear that the lack of political

[10] It is important to note that firms that find these disincentives to be so large will be unlikely to answer any question at all. And these firms are typically replaced in surveys by those that are willing to respond to at least some questions. To the extent that the inclusion of politically sensitive questions deters firm participation in autocratic countries, we should expect to see higher replacement rates than in democratic countries. But this implication can not be tested empirically because the replacement data are not available.

freedom is an important factor that leads to false response. Firms in this environment will provide very positive (and insincere) evaluations of the impact of corruption. These firms are minimizing the expected costs that can be imposed by the government on the firm.

The above theoretical discussion leads to the following testable hypotheses.

Hypothesis 1: Firms are more likely to provide nonresponse to the corruption question in politically repressive countries.

Hypothesis 2: Firms are more likely to offer false response to the corruption question in politically repressive countries.

4. Empirical Analysis

We test the two hypotheses in two different analyses, one at the country level and the other at the firm level. Our general empirical strategy is to explore patterns of nonresponse and false response in the PICs survey. It is important to note two issues in our empirical analysis. First, some questions in the PICs survey are subjective and opinion-based while others are factual. These two types of questions involve different types of problems for our analysis. The subjective questions may be affected by the respondent's overall perception, influenced by what they read or know about others' experiences. The factual question requires the respondent to have informed knowledge about the corruption practices of the firm. Also if the factual question concerns behaviors that are illegal and unethical, truthful responses could be incriminating and psychologically undesirable. All firm managers may refrain from responding at all or in any truthful manner. It is theoretically unclear which types of firms will have an incentive to provide truthful responses. Second, some of the survey questions concern what the World Bank considers as grand graft/corruption questions while others are considered as petty graft questions. The former are more general, while the latter concerns specific aspects of government behaviors or particular issues such as taxation or sanitation

inspection. In this paper, we will focus on the data generation process of the subjective grand corruption question, and leave the analysis of other questions for future research.

Nonresponse is quite obvious in this context, but coding a "false response" requires an indirect approach. To identify cases when we believe a survey respondent has answered falsely, we employ two strategies. First, we utilize the widely-publicized Kaufmann et al. (2007) measure of "control of corruption" as a proxy for the true measure of corruption within a country.[11] We argue that the Kaufmann measure is closer to the true level of corruption of a country than the firm-level data based country measures. This is so because the Kaufmann measure is based on the experiences of foreign investors and country experts, which are less likely to be contaminated by the possibility of false response. Second, we also include an objective measure of corruption from Fishman and Miguel (2006). This measure, the number of unpaid parking tickets by diplomats in New York City from 1997-2002, is highly correlated with existing measures of corruption, but has two distinct advantages. It is an objective measure of corruption based on an observable act, unpaid parking tickets. And as argued by Fishman and Miguel (2006), this measure of corruption captures how individuals from different countries act in the same institutional environment. As our theory outlined in the previous section implies, the firms in politically less free countries are more likely to report low levels of corruption, even though these countries are considered highly corrupt by other corruption measures. Therefore, the distance between our proxy for the "true" measure of corruption and the individual firm's reported evaluation provides an empirical indicator of the extent of false response. The larger the distance, the more likely the firms have lied.

Control variables are required for the empirical analysis. Previous firm-level data based analyses have several findings that are useful for which control variables should be included. In

[11] This is a continuous aggregate measure of corruption ranging from -2.5 (lowest level of corruption) to 2.5 (highest level of corruption). Data available at www.govindicators.org.

several studies (e.g., Gray et al., 2004; World Bank, 2004; Batra et al., 2003) find that relative to state-owned enterprises, private firms pay more of their revenues for bribery, pay bribes more often, and perceive corruption as more of an obstacle. Also, relative to large firms, small firms pay bribes in greater amount and frequency. Relative to older firms, younger firms pay more bribes and do so more often. Relative to domestic firms, foreign firms pay less bribes and less often. Relative to firms in the rural areas, firms in cities pay bribes more often and with greater frequency. To avoid spurious regression, these firm-level variables should be controlled for both at the national and the firm level. Finally, we control for a country's level of development using logged per capita GDP.

Country-Level Analysis

For the country-level analysis of nonresponse, the dependent variable is the percentage of firms in a country answered the corruption question. The key independent variable is the national level of civil liberties and information censorship. We use the Freedom House civil liberties indicator and press freedom indicator to capture the cross national variations in the possibility of repression and reprisal. The results for using these two measures were similar in all regressions, thus we present the results using the measure that most closely matches our theory: press freedom. The continuous measure of press freedom from the Freedom House data ranges from 0 to 100, with higher values indicating less freedom, and these raw scores are used to classify countries as Free, Partially Free, and Not Free. We utilize two operationalizations of this key independent variable: 1) the inverse of the continuous Freedom House measure (0-100) where higher scores imply more press freedom, and 2) a measure of a "not free" press coded as 1 if a country is classified as "Not Free" (in the Freedom House categorical classification countries into press "not free", "partially free" and "free") and zero otherwise.

The control variables include log of GDP per capita, the percentage of firms that have less than 20 employees (proportion of small firms), the percentage of firms with between 20 and 99 employees (proportion of medium firms), percentage of firms with foreign ownership (proportion of foreign firms), the percentage of firms that are wholly or partially government owned (proportion of state owned firms) and proportion of firms in each sector (manufacturing, services, agro-industry, and construction). We also utilize a standard "control of corruption" measure from Kaufmann et. al. (2007). The control of corruption variable indicates 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 (for further details, see Kaufmann et. al. 2007).

In Tables 1 and 2 we present the empirical results of an OLS regression with the country nonresponse rate to the corruption question, the manager's subjective evaluation of the severity of corruption. Table 1 utilizes the continuous measure of press freedom and Table 2 uses the dichotomous measure of press freedom ("not free" = 1). In both tables, the empirical results are consistent with Hypothesis 1. Firms have lower response rates in countries with lower levels of press freedom or without press freedom. In models 2-4 and 9-11, we include controls for the level of GDP per capita and the controls on the composition of firms in the country. The results are robust to the inclusion of these controls. In models 5-7 and 12-14, we include controls for the level of corruption in the country including the Kaufman measure of corruption and the Fishman-Miguel measure of the average unpaid parking tickets per diplomat.

The impact of press freedom on nonresponse rates is substantial. As noted earlier, the mean nonresponse rate at the country level is 5.46% ranging from 0% to 46%. A movement from a country with the lowest level of press freedom (14) to the highest level of press freedom (86) in the sample is predicted to have a 7% lower nonresponse rate. It is important to note that these

Table 1: Response Rate and Press Freedom (continuous measure) across Countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent Variable: Response rate of the corruption question						
press freedom, 1-100, high=more free	0.101***	0.119***	0.109***	0.103**	0.146*	0.096**	0.144**
	[0.036]	[0.040]	[0.036]	[0.044]	[0.076]	[0.043]	[0.071]
gross national income per capita, logged		-0.458	0.189	0.335	1.425	1.301	2.540
		[0.489]	[0.657]	[0.890]	[1.575]	[1.072]	[1.865]
proportion of small firms			-0.036	-0.015	-0.014	0.084	0.083
			[0.056]	[0.074]	[0.072]	[0.094]	[0.087]
proportion of medium firms			0.175*	0.192	0.194	0.320**	0.317*
			[0.097]	[0.127]	[0.131]	[0.157]	[0.163]
proportion of foreign firms			0.185	0.194	0.198	0.283	0.284
			[0.153]	[0.184]	[0.170]	[0.218]	[0.194]
proportion of state owned firms			-0.167**	-0.151	-0.134	0.020	0.052
			[0.074]	[0.097]	[0.109]	[0.121]	[0.136]
proportion of manufacturing sector firms				-0.224	-0.275	-0.237	-0.313
				[0.451]	[0.488]	[0.431]	[0.468]
proportion of service sector firms				-0.218	-0.283	-0.266	-0.361
				[0.502]	[0.543]	[0.481]	[0.522]
proportion of agroindustry sector firms				-0.228	-0.283	-0.276	-0.362
				[0.560]	[0.590]	[0.539]	[0.570]
proportion of construction sector firms				-0.341	-0.376	-0.404	-0.461
				[0.370]	[0.414]	[0.363]	[0.402]
average unpaid annual NYC parking violations per diplomat,11/1997-11/2002						0.024	0.027
						[0.015]	[0.017]
Kaufmann corruption index, high=more corrupt					3.482		3.804
					[3.705]		[3.572]
Constant	89.458***	91.878***	82.725***	103.137**	96.879*	87.235*	82.415
	[2.422]	[3.734]	[10.777]	[49.069]	[49.489]	[48.242]	[50.701]
Observations	104	104	104	104	104	100	100
R-squared	0.10	0.09	0.25	0.22	0.25	0.25	0.29

Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

estimates are the average country-level nonresponse rates. We address how press freedom affects individual firms' responses in the next section.

These country-level results raise some concerns about studies utilizing this firm-level data. Nonresponse rates are not random, where the level of political freedom is associated with nonresponse by managers. The implication is that these firm-level measures will understate the true level of corruption in countries that lack political freedom. Those that do not respond to the

corruption question are likely to have responded with more severe corruption. If they responded, the level of corruption reported would have been higher.

Table 2: Response Rate and Press Freedom (categorical measure) across Countries

	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Dependent Variable: Response rate of the corruption question						
Press not free dummy	-4.418**	-4.160**	-3.257**	-2.909	-2.955	-3.832*	-3.956*
	[1.890]	[1.786]	[1.454]	[1.997]	[2.031]	[2.157]	[2.216]
gross national income per capita, logged		0.203	0.790	1.107	1.880	1.959*	2.972
		[0.416]	[0.672]	[0.856]	[1.826]	[1.000]	[2.104]
proportion of small firms			-0.029	-0.008	-0.001	0.098	0.109
			[0.061]	[0.078]	[0.084]	[0.090]	[0.099]
proportion of medium firms			0.157	0.164	0.165	0.307*	0.308*
			[0.105]	[0.139]	[0.142]	[0.158]	[0.164]
proportion of foreign firms			0.199	0.198	0.211	0.277	0.294
			[0.152]	[0.178]	[0.194]	[0.202]	[0.214]
proportion of state owned firms			-0.202***	-0.152	-0.144	0.061	0.082
			[0.075]	[0.107]	[0.114]	[0.133]	[0.149]
proportion of firms in the manufacturing sector				-0.287	-0.273	-0.434	-0.429
				[0.524]	[0.507]	[0.521]	[0.503]
proportion of firms in the service sector				-0.293	-0.286	-0.486	-0.493
				[0.582]	[0.569]	[0.580]	[0.567]
proportion of firms in the agroindustry sector				-0.259	-0.235	-0.462	-0.448
				[0.639]	[0.605]	[0.634]	[0.602]
proportion of firms in the construction sector				-0.410	-0.409	-0.585	-0.595
				[0.415]	[0.420]	[0.426]	[0.425]
Average Unpaid Annual NYCity Parking Violations per Diplomat,11/1997-11/2002						0.025	0.027
						[0.016]	[0.017]
Kaufmann corruption index, high=more corrupt					1.617		2.056
					[3.128]		[3.054]
Constant	96.107***	94.530***	85.456***	110.845*	103.074*	108.191*	99.275*
	[0.416]	[3.323]	[10.816]	[57.853]	[53.269]	[55.995]	[53.952]
Observations	104	104	104	104	104	100	100
Adjusted R-squared	0.08	0.07	0.22	0.20	0.20	0.25	0.26

Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Hypothesis 2 concerns the effect of political freedom on false response. Based on the logic noted earlier, we compute the percentage of firms in each country that report that corruption is a major or very severe problem.[12] This self-reported corruption percentage is then regressed on the

[12] This includes cases where the response to the corruption question is coded as 3 (major) or 4 (very severe).

Kaufmann et al. measure of corruption in one model and on both the Kaufmann et al. measure and the Fishman-Miguel measure of unpaid parking tickets in a second model. The residuals from these two different models reflect the distance between our proxy for the "true" measure of corruption and the individual firm's reported evaluation and measure the extent of false response. The larger the residuals, the more likely firms have lied. To sharpen our analysis, we generate two false response dummies based on the two residual series of the two models. Each false response dummy is coded one indicating false response if the residual is one standard deviation below the mean (that is, the firm self-reported corruption is significantly lower and out in the tail), and zero otherwise. These two false response dummies are then used as the dependent variables, regressed on press freedom and other controls using probit model. If press freedom is correlated with false response, we should find press freedom to have a statistically significant positive impact on the under-reporting category. The statistical results for these two probit models are reported in Tables 3 and 4, respectively.

Both sets of regressions find similar results, as presented in Table 3 and Table 4. Firms in countries that have low press freedom or completely lack press freedom are more likely to under-report the corruption problem. This result is robust across both the continuous measure of press freedom (Models 15-17, 21-23) and the dichotomous "not free" press variable (Models 18-20, 24-26). The finding also is not sensitive to how the false response dummy is generated, using either the Kaufmann measure of corruption (Table 3) or both the Kaufmann measure and the Fishman-Miguel unpaid parking tickets measure (Table 4).

Table 3: Under-reporting of Corruption (based on deviation between firms' responses on the severity of corruption and the Kaufmann Measure) and Press Freedom across Countries

	(15)	(16)	(17)	(18)	(19)	(20)
	Dependent Variable: Under-reporting of Corruption (based on deviation of the responses on severity of corruption from the Kaufmann Measure					
press freedom, 1-100, high=more free	-0.084***	-0.077***	-0.071***			
	[0.020]	[0.021]	[0.022]			
Press not free dummy				1.323***	1.242***	1.010*
				[0.417]	[0.479]	[0.592]
gross national income per capita, logged	-0.037	0.059	0.064	-0.181	-0.114	-0.186
	[0.224]	[0.237]	[0.278]	[0.147]	[0.170]	[0.223]
proportion of small firms		0.034	0.035		0.035	0.034
		[0.027]	[0.036]		[0.022]	[0.031]
proportion of medium firms		0.025	0.027		0.048	0.048
		[0.040]	[0.045]		[0.032]	[0.038]
proportion of foreign firms		-0.022	-0.022		-0.019	-0.020
		[0.041]	[0.049]		[0.037]	[0.047]
proportion of state owned firms		0.064	0.069		0.084***	0.083*
		[0.040]	[0.048]		[0.031]	[0.044]
proportion of firms in the manufacturing sector			0.045			0.138
			[0.189]			[0.176]
proportion of firms in the service sector			0.041			0.131
			[0.192]			[0.180]
proportion of firms in the agroindustry sector			0.001			0.021
			[0.206]			[0.231]
proportion of firms in the construction sector			0.056			0.181
			[0.214]			[0.191]
Constant	2.124	-1.595	-6.323	-0.559	-4.936*	-17.854
	[1.602]	[3.001]	[20.237]	[1.150]	[2.557]	[18.891]
Observations	104	104	104	104	104	104

Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4: Under-reporting of Corruption (based on deviation of firms' responses on the severity of corruption from the Kaufmann Measure and the measure based on Parking Ticket Violation) and Press Freedom across Countries

	(21)	(22)	(23)	(24)	(25)	(26)
	Dependent Variable: Under-reporting of Corruption (based on deviation of the responses on severity of corruption from the Kaufmann Measure and Parking Ticket Violation Measure					
press freedom, 1-100, high=more free	-0.051**	-0.050***	-0.053**			
	[0.020]	[0.020]	[0.023]			
Press not free dummy				1.596***	1.662***	2.065***
				[0.499]	[0.602]	[0.678]
gross national income per capita, logged	0.183	0.257	0.250	0.023	0.108	0.108
	[0.200]	[0.225]	[0.257]	[0.159]	[0.180]	[0.239]
proportion of small firms		0.033	0.041		0.038	0.063
		[0.025]	[0.036]		[0.026]	[0.040]
proportion of medium firms		0.020	0.044		0.032	0.087*
		[0.041]	[0.046]		[0.038]	[0.049]
proportion of foreign firms		-0.016	-0.015		-0.001	0.005
		[0.042]	[0.047]		[0.043]	[0.052]
proportion of state owned firms		0.054*	0.049		0.063**	0.061
		[0.033]	[0.042]		[0.029]	[0.046]
proportion of firms in the manufacturing sector			0.170			0.341*
			[0.176]			[0.188]
proportion of firms in the service sector			0.180			0.360*
			[0.179]			[0.193]
proportion of firms in the agroindustry sector			0.175			0.305
			[0.179]			[0.232]
proportion of firms in the construction sector			0.165			0.323
			[0.193]			[0.201]
Constant	-0.574	-3.737	-21.842	-2.370*	-6.594**	-44.113**
	[1.399]	[2.994]	[18.876]	[1.288]	[3.143]	[20.651]
Observations	100	100	100	100	100	100

Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

The impact of press freedom on false response is huge.[13] The probability of observing a country underreporting corruption by one standard deviation is 11.4% greater in countries lacking press freedom in Model 20 and 47.9% in Model 23. The descriptive statistics are equally striking. Of the 13 observations of countries coded as "false response" in Model 20, 11 of these countries do

[13] Substantive effects were calculated using Clarify command in Stata. See King et al (2000) and Tomz et al (2003).

not have any free press.[14] Thus, although only 30% of countries in our sample have "not free" presses, 84.6% of the false responses occurred in countries that lack press freedom.

Firm-Level Analyses

In the previous section we show that nonresponse rates for the corruption question are related to the political environment, and that firms in politically repressive countries are more likely to both avoid responding to the corruption question and report corruption as being low relative to other measures of corruption.

Table 5: Response Rate and Press Freedom (continuous measure), Firm-Level Analysis across Countries

	(27)	(28)	(29)	(30)
	Dependent Variable: Dummy for Firm's Response, 1 if the firm responds to the corruption question, 0 otherwise			
press freedom, 1-100, high=more free	0.009**	0.008*	0.009**	0.008*
	[0.003]	[0.004]	[0.003]	[0.004]
gross national income per capita, logged	-0.030	-0.059	-0.001	-0.015
	[0.048]	[0.063]	[0.052]	[0.067]
dummy for the small firm	-0.190***	-0.190***	-0.185**	-0.184**
	[0.072]	[0.072]	[0.075]	[0.075]
dummy for the medium firm	-0.025	-0.025	-0.022	-0.022
	[0.047]	[0.046]	[0.048]	[0.047]
dummy for the government owned firm	-0.284***	-0.285***	-0.227***	-0.229***
	[0.051]	[0.051]	[0.045]	[0.046]
dummy for the foreign owned firm	0.009	0.009	0.034	0.033
	[0.048]	[0.048]	[0.046]	[0.046]
manufacturing sector dummy	0.109	0.102	0.114	0.111
	[0.182]	[0.182]	[0.178]	[0.178]
services sector dummy	-0.127	-0.127	-0.097	-0.097
	[0.163]	[0.161]	[0.164]	[0.163]
agroindustry sector dummy	0.164	0.152	0.086	0.082
	[0.236]	[0.235]	[0.218]	[0.217]
construction sector dummy	-0.166	-0.165	-0.126	-0.125
	[0.174]	[0.174]	[0.174]	[0.173]
Kaufmann corruption index, high=more corrupt		-0.085		-0.042
		[0.154]		[0.154]
average unpaid annual NYC parking violations per diplomat,11/1997-11/2002			0.005**	0.004**
			[0.002]	[0.002]
Constant	1.690***	1.975***	1.376***	1.518**
	[0.405]	[0.668]	[0.419]	[0.683]
Observations	44553	44553	42696	42696

Robust standard errors in brackets clustered for observations in a given country. * significant at 10%; ** significant at 5%; *** significant at 1%.

[14] For model 23, 9 of the 10 false response occurred in countries coded as having a not free press.

Those analyses, however, are based on country-level aggregates. In this section we utilize the firm-level responses to the corruption question to model the impact of political freedom on nonresponse and false response.

We model the likelihood that an individual firm will skip a question (nonresponse), using probit with robust standard errors clustered by country. In Tables 5 and 6, we present the empirical results using the continuous and dichotomous measures of press freedom, respectively.

Table 6: Response Rate and Press Freedom (categorical measure), Firm-Level Analysis across Countries

	(31)	(32)	(33)	(34)
	Dependent Variable: Dummy for Firm's Response, 1 if the firm responds to the corruption question, 0 otherwise			
Press not free dummy	-0.309***	-0.283**	-0.375***	-0.352***
	[0.115]	[0.118]	[0.114]	[0.120]
gross national income per capita, logged	0.017	-0.061	0.039	-0.015
	[0.047]	[0.066]	[0.047]	[0.066]
dummy for the small firm	-0.182**	-0.187**	-0.171**	-0.174**
	[0.074]	[0.073]	[0.077]	[0.076]
dummy for the medium firm	-0.029	-0.029	-0.018	-0.017
	[0.047]	[0.047]	[0.048]	[0.048]
dummy for the government owned firm	-0.295***	-0.292***	-0.216***	-0.217***
	[0.056]	[0.055]	[0.046]	[0.046]
dummy for the foreign owned firm	0.007	0.006	0.038	0.037
	[0.048]	[0.049]	[0.045]	[0.045]
manufacturing sector dummy	0.107	0.086	0.097	0.084
	[0.185]	[0.183]	[0.181]	[0.179]
services sector dummy	-0.141	-0.141	-0.119	-0.119
	[0.159]	[0.159]	[0.161]	[0.160]
agroindustry sector dummy	0.242	0.184	0.119	0.082
	[0.252]	[0.248]	[0.230]	[0.226]
construction sector dummy	-0.168	-0.167	-0.131	-0.131
	[0.173]	[0.173]	[0.172]	[0.172]
Kaufmann corruption index, high=more corrupt		-0.176		-0.121
		[0.125]		[0.125]
average unpaid annual NYC parking violations per diplomat,11/1997-11/2002			0.005**	0.005**
			[0.002]	[0.002]
Constant	1.881***	2.515***	1.637***	2.075***
	[0.445]	[0.562]	[0.452]	[0.578]
Observations	44553	44553	42696	42696

Robust standard errors in brackets clustered for observations in a given country. * significant at 10%; ** significant at 5%; *** significant at 1%.

Consistent with our expectation, firms are more likely to give nonresponse to corruption question in an environment of less or no press freedom. These findings at the firm level are consistent with our country-level results discussed in the previous section.

We model false response at the firm level using the following strategy. We code responses of "Major" or "Severe" for the corruption question as 1 and 0 otherwise. We regress the dichotomous corruption variable on the press freedom indicator and other control variables, using probit.

Table 7 reports the results of the probit models of managers' evaluations of corruption. Models 35-38 are based on the continuous measure of press freedom and models 39-42 the dichotomous measure.

Table 7: Under-reporting of Corruption and Press Freedom (categorical measure), Firm-Level Analysis across Countries

	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)
	Dummy Dependent Variable: 1 if the firm responses that corruption is a major or severe problem, 0 otherwise							
press freedom, 1-100, high=more free	0.003	0.007*	0.004	0.008**				
	[0.004]	[0.004]	[0.003]	[0.004]				
Press not free dummy					-0.264**	-0.290**	-0.357***	-0.392***
					[0.132]	[0.133]	[0.122]	[0.125]
gross national income per capita, logged	-0.229***	-0.124*	-0.198***	-0.077	-0.238***	-0.135**	-0.208***	-0.085
	[0.057]	[0.067]	[0.053]	[0.065]	[0.044]	[0.061]	[0.043]	[0.058]
dummy for the small firm	0.035	0.040	0.063	0.064	0.026	0.039	0.061	0.075
	[0.062]	[0.063]	[0.059]	[0.063]	[0.068]	[0.068]	[0.063]	[0.066]
dummy for the medium firm	0.076	0.079	0.101**	0.100**	0.068	0.071	0.100**	0.103**
	[0.048]	[0.048]	[0.045]	[0.046]	[0.051]	[0.051]	[0.046]	[0.047]
dummy for the government owned firm	-0.465***	-0.450***	-0.422***	-0.401***	-0.453***	-0.453***	-0.380***	-0.375***
	[0.071]	[0.072]	[0.070]	[0.071]	[0.071]	[0.073]	[0.064]	[0.064]
dummy for the foreign owned firm	-0.109**	-0.105*	-0.093	-0.089	-0.112**	-0.108*	-0.088	-0.082
	[0.055]	[0.057]	[0.059]	[0.060]	[0.057]	[0.057]	[0.057]	[0.058]
manufacturing sector dummy	0.350**	0.369**	0.355**	0.377**	0.308**	0.332**	0.291**	0.318**
	[0.151]	[0.150]	[0.152]	[0.152]	[0.148]	[0.150]	[0.148]	[0.150]
services sector dummy	-0.031	-0.035	-0.045	-0.044	-0.058	-0.062	-0.086	-0.091
	[0.125]	[0.128]	[0.129]	[0.134]	[0.130]	[0.133]	[0.136]	[0.141]
agroindustry sector dummy	0.177	0.220	0.169	0.208	0.139	0.217	0.086	0.177
	[0.163]	[0.163]	[0.169]	[0.170]	[0.159]	[0.159]	[0.162]	[0.163]
construction sector dummy	0.092	0.088	0.102	0.103	0.076	0.075	0.078	0.078
	[0.115]	[0.115]	[0.116]	[0.115]	[0.119]	[0.121]	[0.121]	[0.123]
Kaufmann corruption index, high=more corrupt		0.327***		0.368***		0.242**		0.281***
		[0.123]		[0.118]		[0.103]		[0.100]
average unpaid annual NYC parking violations per diplomat,11/1997-11/2002			0.003*	0.003**			0.003*	0.004**
			[0.002]	[0.002]			[0.002]	[0.002]
Constant	0.761**	-0.308	0.420	-0.820	1.124***	0.279	0.824**	-0.184
	[0.382]	[0.556]	[0.376]	[0.555]	[0.370]	[0.500]	[0.358]	[0.472]
Observations	42894	42894	41094	41094	42894	42894	41094	41094

Robust standard errors in brackets clustered for observations in a given country. * significant at 10%; ** significant at 5%; *** significant at 1%.

In models 35 and 39 we include firm-level attributes, while in models 36-38 and 40-42 we include controls for Kaufmann and Fishman-Miguel measures of corruption.

According to our results presented in models 35-38, firms in countries with more press freedom are more likely to report corruption as a severe problem. The effect is largest in the fully specified model 38 among the models based on the continuous press freedom measure. This conflicts with the widely documented pattern that corruption is lower in politically more free countries. The finding in models 35-38 is consistent with our anticipated false response pattern. To the extent that firms in politically less free countries are more likely to provide false response on politically sensitive questions, it will produce the finding observed in models 35-38.

Models 39-42, based on the dichotomous measure of press freedom, produce robust findings consistent with those in model 38. Firms in countries lacking press freedom are less likely to report corruption as a severe problem. This pattern is consistent with our expectation that the data generation of false response is a function of the level of political freedom in a country. It is also worth noting that these firm level findings are consistent with the country level false response result.

The impact of press freedom at the firm-level is similar to the country-level analysis. We find that moving from the minimum level to the maximum level of press freedom in models 27 and 31 leads to a decrease in the probability of an individual firm not responding to the corruption question by 4.9% and 2.6%, respectively. These seemingly small probabilities are for each individual firm surveyed in the country. While nonresponse is relatively rare (average nonresponse rate on the corruption question at the country level is 4.6%), firms are much more likely to provide nonresponses in countries lacking press freedom.

The impact of press freedom on false response, however, is even greater. An increase in press freedom from the minimum to the maximum in models 38 and 42 leads to an estimated decrease in the probability of a firm providing a false response by 18% and 12.2% respectively.

5. Conclusion

In order to fight corruption, scholars and policymakers have been trying to understand its causes. Since early 1990s, many analyses have focused on firms' experiences with corruption, using firm-level survey data the World Bank collected from various countries. While these firm-level analyses provide additional insights into the causes of corruption, they have largely ignored the presence and impact of nonresponse and false response. By relying on available firm responses alone and treating them as if all of them are truthful, the firm-level data-based research of corruption could produce incorrect inferences and lead to erroneous policy recommendations.

More important, we argue that the data generation of nonresponse and false response is a function of the political environment in which firms operate. In short, in politically repressive environments, firms use nonresponse and false response as self-protection mechanisms. Corruption is thus likely to be understated as a result.

We test our arguments both at the country-level and firm-level using data of more than 44,000 firms in 72 countries in the period of 2000-2005. Our empirical findings show that press freedom is an important determinant of how firms report on corruption as a problem in their countries. At the aggregate level, countries lacking political freedom are associated with higher levels of firm nonresponse and with firms under-reporting the severity of corruption relative to the other measures of corruption. At the individual level, firms are more likely to provide nonresponse in countries lacking press freedom, and when they do respond, they are less likely to report corruption as a problem in such countries. In light of these findings, we argue that previous research relying on the firm survey data at face value has underestimated the severity of corruption in politically repressive countries.

One potential criticism of this research design is that these subjective measures of corruption can be subject to bias. This is an important consideration, one that we share, but our analysis explores the determinants of this bias. We find that the lack of press freedom is associated with nonresponse and under-reporting of the extent and depth of corruption. We argue that this evidence is consistent with firms' fear of reprisals from the government.

Obviously there are potentially other alternative interpretations of our empirical results. For example, one could argue that in societies that lack press freedom, citizens are bombarded with messages about the lack of corruption, producing citizen evaluations that are consistent with our results on, but not a function of, false response. Yet we believe that this argument would be inconsistent with our results on the determinants of nonresponse bias. If a political regime that controls information in a way that biases all citizens on their views of corruption, why would firms systematically fail to respond to corruption questions in societies without free press? We believe that our results on nonresponse and false response, taken together, provide strong evidence of firms' fears of reprisals and are inconsistent with other arguments on how subjective measures of corruption may be capturing other factors related to the perceptions of corruption.

One also may argue against our argument on false response by employing two alternative but related interpretations of our findings. According to one alternative argument, if people do not identify corruption as a constraint on their firms in a country where corruption is common, that does not imply they have responded falsely. It may mean that they do not find it problematic and they accept corruption as a fact of life. A second related alternative argument would go even further as to suggest that in such an environment, many firms may find the corrupt system one they understand and from which they may benefit in terms of getting things done more promptly (the widely-known "greasing the wheel" hypothesis). Under both alternative interpretations, firms in corrupt countries that don't identify corruption as constraining may be responding truthfully from

their own private perspective, and may even regard the existence of corruption as a source of competitive advantage. While political competition and transparency reduce the benefits to corruption, firms in more authoritarian societies may find corruption more beneficial. Hence, in analyzing the question of corruption as a constraint on business, one cannot start from the premise that all firms find corruption problematic.

These alternative explanations are refuted by the evidence from the firm-level analysis of false response in Table 7. Recall that the models in Table 7 include two indicators of country-level corruption, one objective and one subjective, which measure corruption in the general environment. As shown in Table 7, both indicators have a statistically significant and positive effect on the likelihood that firms consider corruption as a serious business constraint. These results indicate that firms in more corrupt countries do consider corruption as affecting their business negatively. These findings directly contradict the premise that firms consider corruption as beneficial. As an additional test of the alternative arguments, we estimate model 42 in Table 7, but for politically repressive countries only. If the alternative argument is correct, we should not find the Kaufmann and unpaid parking violations indicators of corruption to have any statistically significant and positive impact. The additional test results, available from the authors, indicate that both country-level corruption indicators have positive coefficients, but only the objective indicator of country corruption has a statistically significant effect. Still, more corruption is more likely to seriously constrain business even in politically repressive countries.

These findings complement the noted effect of press freedom in Table 7 and they should further enhance confidence in our argument. Taken together, they suggest that firms do report corruption as a business constraint in countries with more corruption, but they are much less likely to do so in environments that lack political freedom. This is consistent with our expectation that firms are more likely to provide false response in politically not free environments.

Our findings suggest that corruption is more severe in politically repressive countries than the firm-level analyses relying on available responses will lead one to believe. This has broad implications for how to interpret the findings and inferences of previous firm-level data based analyses. For example, in a study of the impact of investment climate on productivity using firm-level data for Guatemala, Honduras and Nicaragua, Escribano and Guasch (2005) find that firms that pay 1% of sales to speed up bureaucratic issues experience an increase in productivity by 1.3%-3.3%. To the extent that these estimates do not take into account the existence of false response and nonresponse, the effect of bribery is likely to be underestimated.

We hope that this project also makes a substantive contribution to the literature on political institutions and the business environment. Our empirical results point to the lack of political freedom as being associated with firms either failing to respond to questions, or filling out surveys consistent with false response. These results provide indirect evidence of firms fearing reprisals from the government. We believe that this fear of reprisals is an important, and understudied, element of the business environment. This analysis provides some insights into this issue.

Our research also has implications for future firm-level surveys. In politically repressive countries, to reduce the problems of false response and nonresponse would require quality control in survey implementation. Good training, rigorous oversight, skilled enumeration, combined with a well-designed questionnaire, probably could produce higher response rates and more accurate responses from firms in such difficult environments. People administering surveys in politically not free countries have to make extra efforts to combat potential problems of false response and nonresponse. Rigorous screening and training of enumerators, exclusion of government participation in interviews, proper selection of the local survey consultant, proper safeguards of firm confidentiality, and communication of those safeguards to respondents -- all can contribute to higher quality responses.

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