Lying about firm performance: Evidence from a survey in Nigeria

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EVIDENCE FROM A SURVEY IN NIGERIA

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ABSTRACT

It is difficult to be sure that managers in developing countries report financial information accurately and truthfully during firm surveys. The most common concern is that managers might under-report performance to avoid attracting attention from the tax authorities or corrupt bureaucrats. Using a method developed in the literature on corruption, this paper identifies managers who appear to be reticent or deceptive and compares their answers with the answers of non-reticent managers. The paper shows that reticent managers report that their firms are more, not less, productive than non-reticent managers. The paper then assesses possible reasons for this, finding that the most likely explanation is that reticent managers exaggerate performance so that they or their firms look good. Because past studies have found that reticent managers appear to lie about other aspects of firm and manager behavior—including underreporting corruption— this suggests that it will be difficult to fully assess how these behaviors affect firm performance unless reticence is controlled for.

I. Introduction

Managers are sensitive about firm performance (Iarossi, 2006). This sensitivity might encourage them to either refuse to answer questions about firm performance or to lie when they do. The most common concern is that managers under-report firm performance (de Mel and others, 2009). If they are concerned that their firm could be identified, they might lie because they are concerned about tax liability or about becoming a target for corrupt officials.

This is not however the only reason why managers might lie. Past studies have found that some firm managers lie to interviewers so that they or their firms look good (Azfar and Murrell, 2009; Clausen and others, 2010). It therefore seems plausible that they might do the same when reporting firm performance. That is, they might over-report, rather than under-report, performance so that they look like better managers.

The results in this paper show that this appears to the case—managers identified as reticent or deceptive, using a technique developed in the literature on corruption (Azfar and Murrell, 2009), appear to over-report firm performance relative to non-reticent managers. To the extent that reticence differs across regions within a country or across countries, this could make cross-region and cross-country comparisons of firm performance difficult.

Previous studies have also found that reticent managers appear deceitful in other ways. They appear to underreport corruption (Azfar and Murrell, 2009; Clausen and others, 2010; Jensen and Rahman, 2011), over-report how honest they are (Azfar and Murrell, 2009) and over-report that they are ISO certified (Clausen and others, 2010). Because they over-report productivity, reticence could introduce a spurious correlation between firm performance and these and any other behaviors that reticent managers lie about.

The paper extends the literature on reticence in several ways. First, it focuses on a different issue than past studies, which mostly have focused on how firm managers answer questions about corruption (Azfar and Murrell, 2009; Clausen and others, 2010; Jensen and Rahman, 2011).

Second, the focus on firm productivity allows us to look at possible reasons for the different responses of reticent and non-reticent managers. We able to indirectly assess whether

differences between firms with reticent and non-reticent managers are due to reticent managers exaggerating or firms with reticent managers outperforming other firms. We do this by comparing responses of reticent and non-reticent managers who report productivity data from their firm's written records and those that report them without reference to written records. As discussed below, it is easier for reticent managers to exaggerate when financial data are not taken directly from the firm's written records. If the difference is attributable to reticent managers exaggerating, we would therefore expect to find larger differences between reticent and non-reticent managers when the manager does not refer to establishment records. If it is attributable to firms with reticent managers outperforming other firms, we would expect to see firms with reticent managers outperforming other firms irrespective of the source of the information.

Third, it proposes an instrument for reticence, based on the identity of the enumerator. This reduces concern about measurement error and reverse causation. This is useful because the approach used to identify reticent respondents, which is based on coin tossing, will randomly misidentify some respondents as reticent. It will also help to control for reverse causation—the possibility that firm performance affects reticence rather than reticence affecting managers' responses about firm performance.

II. Discussion and Hypotheses

When interviewers ask managers sensitive questions on topics such as corruption, some manager refuse to answer (Jensen and others, 2010). Even when they do answer, some might lie. Recent studies have tried to assess how important lying is for the measurement of corruption. Using randomized questions to identify reticent managers, Azfar and Murrell (2009) estimate that the prevalence of corruption in Romania would be at least a third higher if reticent respondents answered truthfully. Clausen and others (2010) and Jensen and Rahman (2011) find similar results in Nigeria and Bangladesh.

Questions about corruption are not, however, the only sensitive questions in most firm surveys. Firm managers often do not like answer questions on things such as taxes, profits, and commercial activities (Iarossi, 2006). Given the sensitivity of these questions it seems plausible that reticent respondents might also lie in response to these questions. This is especially likely to be the case when data on firm performance does not come from the firm's accounts.

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Although neither paper focuses on whether reticence is associated with reported firm performance, Clausen and others (2010) and Jensen and Rahman (2011) find evidence consistent with the idea that it might be. Clausen and others (2010) find that firms with reticent managers are more likely to claim to be ISO certified than other firms and Jensen and Rahman (2011) find that firms with reticent managers are more likely to report that they had invested in fixed assets.

There are several possible reasons why reticent managers might report better performance than other managers. One possibility is that firms with reticent managers might outperform other firms. That is, the positive correlation between reticence and firm performance might be because reticent managers have other attributes (e.g., caution, links to the authorities) that make them better managers. A second possibility, suggested by Jensen and Rahman (2011), is that managers of high-performing firms might become reticent. For example, if being successful makes managers targets for corrupt bureaucrats, they might become less willing to discuss corruption or illegal behavior with interviewers. A third possibility, suggested by Clausen and others (2010), is that reticent managers might exaggerate performance to make themselves or their firms look good. This would be consistent with results in Azfar and Murrell (2010) that suggest that reticent managers are more likely to say corruption, lying and other sensitive behaviors are never justified. That is, reticent managers might be trying to make their firms and themselves look better than they really are.

This paper looks at a simple measure of firm performance – value added per worker (i.e., labor productivity) – to see whether firms with reticent managers report better performance than other firms. We use this measure because it is relatively simple and does not rely on the firm keeping detailed accounts. As discussed below, few firms report data from their company accounts and even few keep audited accounts.

Hypothesis 1: Previous studies that have looked at different measures of firm and manager performance, have found that firms with reticent managers report better performance than other firms. We therefore expect that firms with reticent managers will report higher labor productivity than firms with less reticent managers.

If reticent managers answer questions on labor productivity differently than other firm managers, it would be useful to understand why this is. To see whether performance differences between firms with reticent and non-reticent managers are real, we compare responses from

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firms whose managers reported performance data from firm accounts or establishment records with firms whose managers reported numbers without consulting establishment records. As discussed below, only about one-quarter of managers in the survey used in this study reported performance data directly from company accounts or records.

It is easier for managers to misreport performance information when they do not report data directly from establishment records. If we find that firms with reticent managers that present data without consulting establishment records appear to outperform similar firms but that firms with reticent managers that present data from establishment records have similar levels of performance to similar firms this would suggest that reticent managers over-report their firms' performance. That is, if firms with reticent managers were outperforming other firms and the managers were reporting information truthfully, we would expect to see similar differences irrespective of the source of the data. If this were the case, this would suggest that either reticence affects performance or that high performance encourages reticent. If, in contrast, we found that firms with reticent managers only out-perform firms with non-reticent managers when they do not report performance data from establishment records, this suggests that reticent managers overstate performance when they can do so easily.

Although it is harder for firms that report numbers directly from their books to lie to interviewers, it is not impossible. For example, firms might keep two sets of company accounts (e.g., one for management and one for the tax authorities that understate performance or one for management and one for outside investors that overstate performance). The first of these seems more likely because almost all firms (92%) have a single owner—meaning that most have no outside investors to lie to. But even in this case, it is still just as easy for firms that report data without referring to their accounts to lie to the interviewers as it is for managers that report their firms' performance directly from establishment records. If we found that firms with reticent managers outperform irrespective of where the data comes from, it would be difficult to conclusively argue that any difference is due to firms with reticent managers outperforming other firms rather than that both types are lying.

> *Hypothesis 2: We expect that firms with reticent managers will only appear to outperform firms with less reticent managers when the manager reports performance data without consulting any establishment records. This would be*

consistent with the idea that reticent managers overstate their firms' performance rather than the alternative hypothesis that these firms actually outperform firms with less reticent managers.

Reticence is measured based on a procedure, described below, where recipients toss a coin before answering a question. By construction, some non-reticent respondents (i.e., those who toss heads many times) will be classified as reticent. Because of this, it is useful to use 2SLS to reduce concern about measurement error (Goldberger, 1964).

This will also reduce concern about reverse causation. It is possible that firm performance might affect reticence rather than reticence affecting reported firm performance. For example, managers of high performing firms might become reticent if they are worried that being candid might encourage corrupt bureaucrats to seek bribes. Alternatively, managers of poorly performing firms might be concerned that their firms' poor performance reflects poorly on them and therefore might be more likely to exaggerate performance and to be reticent in other ways. In the first case, this would exaggerate performance differences between reticent and non-reticent firms. In the second case, it would have the reverse effect.

To see whether this is the case, it would be useful to have an instrument for observed reticence that was unrelated to firm performance. Although Azfar and Murrell (2009) and Clausen and others (2010) discuss the characteristics of firms with reticent managers, many things that affect reticence (e.g., manager education) might also affect firm performance.

One plausible thing that might affect reticence is the quality of the interaction between the manager and the interviewer. How cooperative the manager is during the interview is affected by how well he interacts with the interviewer. Iarossi (2006, p. 157), for example, notes "respondents are more willing to comply with requests from people who are similar to them, people who praise them, people who are familiar to them, and people with whom they like to be associated." Although this will depend on characteristics of the manager, it is also likely to depend on characteristics of the interviewer.

Although we don't have any socio-demographic information on the interviewers, it is possible to identify all of the firms that each interviewer interviewed. It is, therefore, possible to construct interviewer-level measures of reticence (i.e., the average level of reticence of all managers interviewed by the same interviewer). For the most part, we might expect successful

interviewers to have characteristics that appeal to most, or many, managers. If this is the case, we would expect interviewers that were more successful at getting truthful responses from other managers to be more successful when they interview the next manager.

To test whether this is the case, we construct a variable indicating the average reticence of other managers interviewed by the same interviewer. When we construct this for each manager, we omit the managers' own responses (i.e., it is a 'leave-one-out' average). If some interviewers are more successful than others, we would expect this variable to be positively correlated with the manager's own reticence.

> *Hypothesis 3: We expect that reticence depends on characteristics of the manager and firms involved and on characteristics of the interviewer. We expect that a manager will be more likely to be reticent if the interviewer has a high number of reticent respondents among his or her other interviewees.*

If the leave-one-out average is correlated with the manager's reticence, it seems plausible that this might be a useful instrument. Because the managers' responses are omitted from the leave-one-out average, it should depend on characteristics of the interviewer but not the manager him or herself.

III. Data

The data used in this paper comes from the 2007 and 2009 Enterprise Surveys for Nigeria, which were conducted by the World Bank. The surveys covered all manufacturing sectors (group D based upon ISIC 3.1), construction (group F), retail and wholesale services (sub-groups 52 and 51 of group G), hotels and restaurants (group H), transport, storage, and communications (group I), and computer and related activities (sub-group 72 of group K).[1] However, since the data needed to calculate labor productivity were only collected for manufacturing firms, firms from other sectors have been excluded. These surveys are used because they are the only Enterprise Surveys that include reticence data.

Performance Data

Not all performance data comes from company accounts. Many firms in Nigeria, especially small firms, do not keep detailed financial accounts meaning that figures must be

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[1] See Iarossi (2009) and Iarossi and Clarke (2011) for details on the 2007 and 2009 surveys respectively.

estimated. In other cases, the firm might have records but might not want to show them to the interviewer or the records might not be readily available at the time of the interview.

At the end of the survey, the enumerator reported whether the employment and productivity data were taken directly from establishment records; were estimates computed with some precision; or were arbitrary and unreliable numbers. Since the enumerators reported that the numbers were arbitrary and unreliable in only a tiny number of cases (2 out of 2620), the sample can be divided into those firms where the data came from establishment records and those where it does not. About 639 of the 2,618 firms in the sample reported results from establishment records. This is not atypical. Of over 60,000 firms in over 100 countries interviewed between 2006 and 2010 in the World Bank's Enterprise Survey program, only about 35 percent of managers reported financial and employment information directly from their establishment's records.

Identifying reticent respondents

We identify reticent respondents—respondents that are reluctant or unwilling to answer questions—using the methodology developed by Azfar and Murrell (2009) and used by Clausen and others (2010) and Jensen and Rahman (2011).[2] They identify reticent respondents by looking at responses to a series of 'random response' questions (see Table 1). The respondent is asked a sensitive question (e.g., related to tax evasion, misuse of power within the firm) and is asked to toss a coin out of sight of the interviewer. If the coin comes up heads, the respondent answers 'yes'. If it comes up tails, the respondent answers the question.

Random response procedures were developed to encourage truthful responses to sensitive questions.[3] The idea is that if the respondent answers 'yes' no one other than the respondent, not even the interviewer, will ever know whether the respondent is saying that they committed the sensitive act or just that the coin just showed heads. It was expected that this approach would decrease underreporting of sensitive behaviors.

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[2] The description relies heavily on the descriptions in Azfar and Murrell (2009) and Clausen and others (2010). See those papers for more detail. The data used in this paper is the same as the data used in Clausen and others (2010).

[3] See Fox and Tracy (1986) for a general discussion or Recanatini and others (2000) for a discussion that is directly linked to the Enterprise Surveys.

Although randomized questions appears to reduce underreporting, it remains a serious problem.[4] That is, even when the respondent knows that the interviewer will not know whether the respondent is answering 'yes' because the coin showed heads or because the respondent has done the activity, respondents still underreport sensitive behavior. Azfar and Murrell (2009) note that with randomized responses at least 50 percent of respondents should answer 'yes' to the sensitive questions. That is, even if no one has committed the sensitive act, the coin should show heads for half of the respondents. If some people have committed the act, more than 50 percent of people should answer 'yes'. Azfar and Murrell (2009) and Clausen and others (2010), however, find an implausible number of 'no' answers. They argue that some people whose coin comes up 'heads' must be answering 'no' anyway.

Table 2 shows the expected distribution of 'yes' responses if no one had done any of the sensitive behaviors, the expected distribution if 30 percent of respondents had actually done each sensitive behavior, and the observed distribution of 'yes' answers across the two surveys. Even if no one had done any of the sensitive behaviors (i.e., no one had ever cheated on their taxes), there are too many people with zero and one yeses (15 percent and 9 percent compared with expected amounts of 1 percent and 6 percent) and too few people with 5 or 6 yeses (13 percent and 3 percent compared with expected amounts of 16 percent and 6 percent).

The 'angel's' assumption, however, is probably not reasonable. For example, on an indirect question elsewhere on the survey, close to 75 percent of managers said that they thought a 'typical firm in their sector' underreported their sales to the tax authorities. Given this high estimate—and the possibility that this understates the true extent of tax evasion because of concern about self-incrimination even with indirect questions—it seems implausible that no firms had "ever paid less in business taxes than [they] should have under the law." Since this is one of the questions used to assess reticence, the angel's assumption seems unlikely to be valid.

If we assume that 30 percent of people have actually done each sensitive behavior, the distribution is even more skewed. That is, there are less people who responded 'yes' four, five, six or seven times and more people who responded 'yes' zero, one, two or three times than

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[4] Lensvelt-Mulders and others (2005) suggests that it reduces underreporting from about 45 percent to 38 percent.

would be expected. This would become even more skewed if we assumed a greater incidence of sensitive behaviors.

In this respect, reticence does not appear to be an all-or-nothing behavior. Because of this, we will use a measure of reticence that allows for 'more' and 'less' reticence rather than an all or nothing measure that assumes the person is reticent if they respond 'yes' zero times and otherwise as non-reticent as in Azfar and Murrell (2009). The measure we use is the number of no responses, with more no responses (or fewer yes responses) indicating greater reticence. In the robustness checks, we show results using the same dummy variable as in Azfar and Murrell (2009).

IV.   Econometric Analysis

This section looks at whether firms with reticent managers report that they are more productive than other firms. We also try to assess possible reasons for this. First, we try to assess whether this is because firms with reticent managers actually outperform firms with less reticent managers. Second, we try to control for measurement error and endogeneity.

Econometric Methodology

We estimate the following equation to see whether the evidence is consistent with the idea that reticence affects reported performance:

$$\text{Reported Performance} = \alpha + \gamma \, \text{Reticence}_i + \beta X_i + \delta \, \text{Sector}_i + \epsilon_i$$

The dependent variable is labor productivity (value-added per worker). Given that most firms do not report performance data from audited accounts (see Table 3) and that only a single year of data are available, it seems appropriate to focus on this simple measure.

The main variable of interest is the measure of reticence. For the main part of the analysis, we use the number of no answers to the seven sensitive questions. Firms that have a greater number of 'no' answers (fewer 'yes' answers) are more reticent. As noted above, this is slightly different from the measures used in earlier papers. As a robustness check, we also present the main results for the dummy variable proposed in Azfar and Murrell (2009).

The reticence variable is interacted in some specifications with a dummy variable indicating whether the manager reported financial information from the firm's written records. As noted above, we would expect misreporting to be easier when the information does not come from written records. If we found that reticent managers only report better performance when they do not report information from written records, this might suggest that they are exaggerating (see Hypothesis 2 above)

The control variables include other firm characteristics that might affect firm performance. The variables are similar to those used in Clausen and others (2010). The variables include a set of dummy variables indicating the age, gender and educational attainment of the manager. Previous studies using enterprise level data for Sub-Saharan Africa have found that firms are better performing when the manager is better educated (Biggs and others, 1998). Similarly, firms with older managers would be expected to perform better to the extent that manager age is a reasonable proxy for experience. They also include a variable representing the size of the firm and a full set of sub-sector dummies.[5] The sub-sector dummies are included because labor productivity differs across sub-sectors within manufacturing. Finally, as in Clausen and others (2010), we include dummies indicating that the firm was interviewed in 2009 rather than 2007 to allow for changes over time and a regional dummy indicating that the firm is in the South.

As discussed above, measurement error is a concern. Firm managers that randomly toss long sequences of heads will be mislabeled as reticent. Because OLS coefficients are biased towards zero when independent variables are mismeasured, 2SLS coefficients might be preferred.

A 2SLS analysis also potentially controls for reverse causation. Although reticent managers might report higher productivity because they are reticent, it is also possible that performance affects reticence. For example, managers of firms that are performing well might

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[5] Clausen and others (2010) used slightly different controls variables for firm size and sector—three dummies indicating size and broad sector of operation (e.g., retail, manufacturing, and other services). As noted there are large differences in labor productivity across sub-sectors of manufacturing (e.g., garments and chemicals), so including additional dummies seems useful.

be more wary about reporting illegal or unethical behavior because they are concerned that the tax authorities will target them.

The instrument we use is the average number of 'no' responses from the other firms interviewed by the same interviewer. If, as discussed above (see hypothesis 3), some interviewers are better at getting truthful answers than other interviewers, this leave-one-out average might be correlated with the likelihood that the manager is reticence. The results are consistent with this. In the first stage regression, the coefficient on average reticence is positive and statistically significant (F-stat=231.8, p-value=0.00). Moreover, the 'leave one out' average does not include the manager's own responses and therefore should capture characteristics of the interviewer rather than the manager.

Econometric results

Value-added per worker.   In the base regression, the coefficient on the variable indicating reticence is positive and statistically significant at a 10 percent significance level (see Column 1 in Table 4). This suggests, consistent with hypothesis 1, that firms with reticent managers report that they are more productive than other managers do. The point estimate suggests that reported labor productivity is about 1.6 percent higher for firms that respond 'no' to an additional question.

The positive coefficient could suggest that firms with reticent managers are more productive than firms with non-reticent managers. However, it is also possible that reticent managers might exaggerate their firms' performance. To look at this more carefully, we interact the variable indicating reticence with a dummy variable indicating that the accounting information came from establishment records. If reticent managers exaggerate performance by giving enumerators inaccurate numbers, we would expect this effect to be less when the manager reports numbers from establishment records (see hypothesis 2).

For managers that reported numbers from establishment records, the coefficient on the dummy indicating the manager is reticent is statistically insignificant and small. This suggests that when the numbers are taken from establishment records, there appears to be little difference in reported performance between firms with more and less reticent managers.

In contrast, the coefficient on the dummy variable is statistically significant and positive when the manager estimated the numbers without consulting establishment records. The point estimate suggests that reported labor productivity is about 2.3 percent higher for firms that respond 'no' to an additional question. These results are consistent with the idea that reticent managers overstate performance when their data does not come from establishment records. That is, firms with reticent managers only appear to be more productive when the manager estimates the productivity numbers rather than reports them from establishment records.

As discussed above, measurement error is a concern because reticence is likely to be poorly measured. That is, some people will get long sequences of heads and these people will be falsely identified as reticent. Because OLS coefficients tend to biased towards zero when the dependent variable is poorly measured, 2SLS might be preferable. In addition to controlling for measurement error, this approach might also lessen concerns about reverse causation.

The coefficient on the variable indicating reticence remains positive and is statistically significant at a 1 percent level (see column 3) in the 2SLS regressions. The coefficient from the 2SLS regression is, however, much larger. This would be consistent with the idea that measurement error is biasing the OLS coefficient downwards or that managers of poorly performing firms are more reticent. The point estimate suggests that reported labor productivity is about 20 percent higher for firms that respond 'no' to an additional question. As before, the effect is only positive and statistically significant when the manager did not get employment and performance data from the firms' written records (see column 4).

Robustness Checks: Audited accounts

Not all firms that reported employment and performance data from establishment records reported information from detailed and audited company accounts. It seems plausible that firms that rely on informal records might report less reliable data than firms that have detailed audited accounts. We therefore divide the sample into three groups: firms that did not report data directly from establishment records, firms that reported data from establishment records but that do not have audited accounts, and firms that reported data from establishment records and have audited accounts. We interact the reticence dummies with dummy variables indicating which group the firm is in.

The coefficient on the interaction term remains positive and statistically significant for firms that did not rely on establishment records (see Table 5). In contrast, it is small and statistically insignificant for the other two groups. This suggests that there is no difference between firms with reticent and non reticent managers that relied on establishment records irrespective of whether they have audited accounts or not.

Robustness Checks: Alternate measure of reticence

Previous papers, including Azfar and Murrell (2009), use a different measure of reticence than the measure used in this paper. Rather than using the number of no responses, which allows for more and less reticence, they use a simple dummy variable indicating that the respondent said 'no' in response to all questions. To check the robustness of the main results, we re-run the 2SLS regressions using the measure that they use in their analysis.

The coefficient on the dummy variable remains positive and statistically significant for firms that do not rely on establishment records. That is, reticent firm managers report higher labor productivity when they do not report their employment and performance data from establishment accounts. The coefficient on the dummy variable indicating reticence remains statistically insignificant for firm managers that report employment and performance data from establishment records.

V. Conclusions

Reticent managers report that their firms are more productive than other managers. This is consistent with results in Clausen and others (2010) and Jensen and Rahman (2011) that suggests that reticent managers report better performance in other ways (ISO certification and investment).

To assess why this is, the paper exploits that while some managers report performance data directly from establishment records, others do not. Because it is harder to exaggerate when the data come from establishment records, if reticent managers are exaggerating we would expect greater performance differences between firms with reticent and non-reticent managers when the data do not come directly from establishment records. The results are consistent with

this. There is a significant difference between firms with reticent managers and other firms only when performance data does not come from written records.

To reduce concern about measurement error and reverse causation, we also present results from a 2SLS analysis. The instrument is the average count of 'no' responses of other managers interviewed by the same interviewer (that is, a 'leave-one-out' average). If some interviewers are better at gaining the confidence of reticent managers, responses might be affected by the interviewer. Consistent with this, the instrument is a good predictor of whether a manager is reticent or not. The results from the 2SLS analysis suggests that reticence affects reported firm performance more strongly than the OLS results do. This is consistent with either measurement error biasing the coefficient toward zero or poor performance increasing reticence.

Reticent managers appear to exaggerate, not underreport, firm performance relative to other managers. If managers routinely under-report firm performance in firm surveys because they are concerned about becoming targets for tax inspectors or corrupt bureaucrats (de Mel and others, 2009), reticent managers might actually report more reliable information than non-reticent managers.

The results also support a different interpretation for previous results that show that reticent managers under-report corruption. If the main reason that reticent managers lie to survey takers is that they are worried that the tax authorities or corrupt bureaucrats might use the survey to identify and target successful firms, we would expect them to under-report performance. That they exaggerate suggests that they have a different motive. That is, they appear to be boastful—they answer questions so that they and their firms look good. If their reason for underreporting corruption is similar, this suggests that they might not lie about corruption because they are concerned about any repercussions associated with doing so. Rather they might not want admit to corrupt acts because they are concerned about how it would reflect on them or their firms.

These results have several implications for survey design. First, at least in cases where productivity data do not come directly from establishment records, it is important to collect information on reticence. Measures of reticence will serve as useful control in regressions for firm performance, corruption and other sensitive behaviors. Second, it is useful to provide

researchers ways to identify the specific interviewers involved in each interview (that is, interviewer numbers). Reticence appears to depend, at least in part, on the identity of the interviewer and so this information is useful as a control and potentially to construct instruments.

The results suggest that mangers only over-report firm performance when they do not report them directly from establishment records—something that is true for close to two thirds of firms in the World Bank's *Enterprise Surveys*. This suggests that putting more emphasis on getting data from written accounts would be useful.

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VII. Tables

Table 1: Sensitive questions used to identify reticent respondents

Question	Random response questions
1	Have you ever paid less in personal taxes than you should have under the law?
2	Have you ever paid less in business taxes than you should have under the law?
3	Have you ever made a misstatement on a job application?
	Have you ever used the office telephone for personal businesses?
4	Have you ever inappropriately promoted an employee for personal reasons?
5	Have you ever deliberately not given your suppliers or clients what was due to them?
	Have you ever lied in your self-interest?
6	Have you ever inappropriately hired a staff member for personal reasons?
	Have you ever been purposely late for work?
7	Have you ever unfairly dismissed an employee for personal reasons

Source: Questionnaire for World Bank's Enterprise Survey for Nigeria (2007 and 2009).
Note: The three bolded questions are less sensitive questions that were included to allow sophisticated reticent respondents to not have to give large numbers of 'no's consecutively if they realized that this would be very unlikely

Table 2: Expected and actual distribution of 'yes' responses

Number of Yeses	Expected if all are angels	Expected % if 30% have done each behavior	Actual % of respondents in survey
0	0.8%	0.1%	15.2%
1	5.5%	0.8%	9.9%
2	16.4%	4.7%	13.6%
3	27.3%	14.4%	22.2%
4	27.3%	26.8%	21.8%
5	16.4%	29.8%	12.8%
6	5.5%	18.5%	3.4%
7	0.8%	4.9%	1.2%

Source: Author's calculation based upon data from the World Bank's Enterprise Survey for Nigeria (2007 and 2009).
Note: Counts are unweighted. The 'angels' assumption assumes that no one has done any sensitive behavior. The '30% assumption' assumes 30 percent of respondents actually have done each sensitive behavior.

Table 3: Accounts and Establishment Records

	Figures from establishment records	Are estimates computed with precision	Total
Does not have audited accounts	497	1,729	2,226
Has audited accounts	142	250	392
Total	639	1,979	2,618

Source: Author's calculation based upon data from the World Bank's Enterprise Survey for Nigeria (2007 and 2009).
Note: Counts are unweighted

Table 4: Base Regressions controlling for reticent

Dependent Variable	Labor productivity (value-added per worker)			
Estimation Technique	OLS	OLS	2SLS	2SLS
Observations	2123	2121	2115	2113
Sector Dummies	Included			
Reticence				
Number of no responses	0.016*		0.183***	
[high numbers mean more likely to be reticent]	(1.84)		(6.21)	
Number of no responses --data not from establishment records		0.023**		0.218***
[high numbers mean more likely to be reticent]		(2.43)		(6.63)
Number of no responses --data from establishment records		-0.021		0.046
[high numbers mean more likely to be reticent]		(-1.20)		(0.88)
Firm Size				
Number of workers	0.121***	0.116***	0.117***	0.112***
[Natural log]	(6.10)	(5.80)	(5.44)	(5.17)
Manager age and gender [a]				
Manager is male	-0.058	-0.065	-0.043	-0.034
[Dummy]	(-1.18)	(-1.32)	(-0.81)	(-0.64)
Manager is 30 or younger	-0.167***	-0.169***	-0.144***	-0.142***
[Dummy]	(-3.53)	(-3.60)	(-2.82)	(-2.76)
Manager is between 31 and 45	-0.182***	-0.190***	-0.137***	-0.142***
[Dummy]	(-5.26)	(-5.48)	(-3.60)	(-3.68)
Manager is over 56	0.116**	0.121**	0.114*	0.120*
[Dummy]	(2.05)	(2.14)	(1.87)	(1.95)
Manager education [b]				
Manager has secondary education	0.152***	0.164***	0.127***	0.139***
[Dummy]	(4.02)	(4.32)	(3.09)	(3.36)
Manager has tertiary education	0.380***	0.385***	0.351***	0.359***
[Dummy]	(7.65)	(7.77)	(6.52)	(6.62)
Other Controls				
Interview in Wave 2	0.235***	0.231***	0.188***	0.181***
[Dummy]	(7.14)	(7.02)	(5.14)	(4.91)
Southern state	-0.011	-0.004	-0.100***	-0.084**
[Dummy]	(-0.35)	(-0.15)	(-2.79)	(-2.32)
Firm presented data from establishment records		0.297***		0.780***
[Dummy]		(3.24)		(3.19)
R-squared	0.18	0.19	0.04	0.03

Source: Author's calculation based upon data from the World Bank's Enterprise Survey for Nigeria (2007 and 2009)
[a] Omitted age category is 46-55. [b] Omitted education category is primary ***, **, * Statistically Significant at 1%, 5% and 10% significance levels
Note: T-statistics in parentheses. Sector dummies are included for: garment manufacturers; textile manufacturers; food and beverage manufacturers; chemical and pharmaceutical manufacturers; construction material manufacturers; furniture and wood manufacturers; metal and metal product manufacturers; paper, printing and publishing manufacturers; plastic manufacturers; electric equipment manufacturers; motor vehicle manufacturers; other manufacturing; retail and wholesale trade; hotels and restaurants; construction; transportation; and other services. Outliers more than three standard deviations from mean values are dropped.

Table 5: Additional Regressions controlling for reticence

Column	(1)	(3)
Estimation Technique	2SLS	2SLS
Dependent Variable	Labor productivity	Labor productivity
Observations	2112	2113
Sector Dummies	Yes	Yes
Reticence		
Number of no responses --not from establishment records	0.218***	
[high numbers mean more likely to be reticent]	(6.65)	
Number of no responses --from establishment audited records	0.041	
[high numbers mean more likely to be reticent]	(0.70)	
Number of no responses --from establishment unaudited records	0.048	
[high numbers mean more likely to be reticent]	(0.92)	
Firm answered 'no' to all question -- not from establishment records		1.593***
[Dummy equal to 1 for reticent firms]		(6.31)
Firm answered 'no' to all question -- from establishment records		-0.042
[Dummy equal to 1 for reticent firms]		(-0.20)
Firm Size		
Number of workers	0.096***	0.117***
[Natural log]	(4.24)	(5.00)
Manager age and gender [a]		
Manager is male	-0.040	-0.023
[Dummy]	(-0.74)	(-0.40)
Manager is 30 or younger	-0.131**	-0.111**
[Dummy]	(-2.54)	(-1.97)
Manager is between 31 and 45	-0.136***	-0.154***
[Dummy]	(-3.50)	(-3.71)
Manager is over 56	0.120*	0.094
[Dummy]	(1.95)	(1.40)
Manager education [b]		
Manager has secondary education	0.135***	0.125***
[Dummy]	(3.24)	(2.77)
Manager has tertiary education	0.340***	0.362***
[Dummy]	(6.19)	(6.18)
Other Controls		
Interview in Wave 2	0.186***	0.104**
[Dummy]	(5.04)	(2.31)
Southern state	-0.086**	-0.098**
[Dummy]	(-2.37)	(-2.48)
Firm presented data from establishment records	0.776***	0.310***
[Dummy]	(3.19)	(5.35)
Firm has audited accounts	0.139**	
[Dummy]	(2.26)	
R-squared	0.03	0.03

Source: Author's calculation based upon data from the World Bank's Enterprise Survey for Nigeria (2007 and 2009)
[a] Omitted age category is 46-55. [b] Omitted education category is primary.   ***, **, * Statistically Significant at 1%, 5% and 10% significance levels
Note: T-statistics in parentheses. See Table 4 for additional notes.