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Corruption and Firm Performance in Africa*

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Abstract

This paper uses survey data to investigate empirically the importance of corruption in determining firm performance in Africa. We allow for the possibility of perception bias on the part of the respondents and for corruption being endogenous. We find that corruption is linked to significant adverse effects on firm performance in two ways. At the firm (or "local") level, companies that pay bribes have 20 percent lower levels of output per worker. At the economy-wide (or "global") level, firms in countries with pervasive corruption are some 70 per cent less efficient than firms in countries free of corruption. We thus provide evidence that competitive uncoordinated local corruption has substantial global effects.

* The data on which this paper are based are drawn from the *Africa Competitiveness Report 2000/2001*. We are indebted to Lisa Cook, Jeffrey Sachs, and Sara Sievers for making these data available to us.

I. INTRODUCTION

For economists, providing an explanation for Africa's history of poor economic growth remains a central theoretical and empirical challenge. Over the past decade or so, prominent studies have accounted for the continent's generally stagnant development trend by emphasising the respective roles of human capital [Barro, 1991], geography and natural resources [Sachs and Warner, 1997]; ethnic diversity [Easterly and Levine, 1997], risk [Collier and Gunning, 1999], health [Gallup and Sachs, 2001]; and social capital and institutions [Knack and Keefer, 1997; Hall and Jones, 1999; Acemoglu, Johnson and Robinson, 2001]. Among these competing explanations, those focusing on public institutions have gathered particular momentum in recent years.

A leading example of the institutions hypothesis is given by Hall and Jones [1999], which argues that social infrastructure can explain virtually all of the very large differences observed in cross-country levels of output per worker, with social infrastructure defined as "the institutions and government policies that determine the economic environment within which individuals accumulate skills, and firms accumulate capital and produce output." [p.84] They measure social infrastructure by combining an index of institutional quality with the well-known Sachs-Warner [1995] index of economic openness. Hall and Jones use this joint measure to argue that poorly performing economies are those with poor social infrastructure, and that countries' low rates of human and physical capital formation are a consequence of poor social infrastructure rather than the underlying cause of poor performance. In this paper we explore one dimension of the social infrastructure argument, the extent of corruption, as a determinant of firm performance in Africa. But unlike previous studies that typically measure corruption's links to economic performance at the national level, we use firm-level measures

of reported and perceived bribe-paying to test links between corruption and firms' actual levels of output per worker. [1]

In analysing the consequences of corruption for firm performance, an important distinction needs to be drawn between the direct effects of firm-level (what we call "local") corruption and the indirect effects of economy-wide (or "global") corruption. Shleifer and Vishny [1993] presents a formal model of how centralized corruption in a bureaucracy can have better outcomes for the availability of public goods and growth than decentralised uncoordinated corruption. Competition may increase or decrease corruption depending on whether the corruption involves theft. Bliss and Di Tella [1997] argues that the consequences of competition on corruption will depend on the structure of firm costs. Both these papers draw on persuasive examples of the importance of corruption for firm behaviour and welfare outcomes. In this paper we pose an empirical analogue to these analytical papers. Can the quantitative importance of high levels of uncoordinated local level corruption be identified and measured?

To investigate this question, proxies are required for measuring local and global corruption. This paper aims to show that such measures can be constructed and their impact on firm performance demonstrated. In doing so we can investigate the relative importance of local and global corruption and provide some evidence as to the quantitative importance of the argument advanced by Shleifer and Vishny [1993] that competitive uncoordinated corruption may have substantial global effects.

The next section presents the framework in which we assess the effects of corruption on firm performance. Section III presents the empirical strategy and data. Evidence of the effects of

corruption on productivity is set out in Section IV under the assumption that corruption is exogenous. This assumption is tested in Section V. A final section concludes.

II. Social Infrastructure as a Determinant of Firm performance

Our empirical question is whether a link can be found between firms paying bribes and their underlying efficiency. To assess this, we assume a simple Cobb-Douglas production technology with constant returns to scale:

$$(1) \qquad y_{ij} = a_{ij}\,(z_{ij}, Z_j)\,(k_{ij}^{\ a}\, l_{ij}^{\ (1-a)}) + \boldsymbol{\varsigma}' \times + \mathring{a}_{ij}$$

where y_{ij} denotes output of the ith firm in the jth country, a is the level of technology, k is the capital stock, l is the number of workers, $\boldsymbol{X}$ is a vector of firm-specific characteristics described in more detail below and $\mathring{a}_{ij}$ is an error term.

. Corruption is hypothesised to affect the underlying efficiency with which firms in an economy operate. It is further hypothesized that the direct effects of firm-level (again, "local") corruption, z_{ij}, and economy-wide ("global") corruption, $Z_{j,}$ can be shown to have distinct effects on underlying firm efficiency.

In our model, local corruption, z_{ij}, is based on firms' need to access publicly regulated goods. Such access is determined by bureaucrats, whose official salaries are not linked to the distribution of that good. Each firm interacts with multiple bureaucrats in order to obtain all the publicly regulated goods it needs. Bureaucrats have the opportunity to extract extra, unofficial payments or bribes, b, from firms in return for access to the firm's desired goods.

To the extent that local corruption exists in an economy, global corruption must by definition be equal to the sum of the local bribes. We define z_{ij} as an indicator function such that it takes a value of 1 if $b>0$ and 0 if $b=0$, yielding an aggregating relationship where:

$$Z_j = \text{Ó}\, z_{ij} \qquad \forall\, i \text{ in each } j \tag{2}$$

Thus a second empirical issue exists regarding whether Z_j, the economy-wide aggregate measure of bribery, has an identifiable impact on a_{ij} in addition to the effect of z_{ij}. If the sum of local bribes gives rise to a negative productivity effect through global corruption then the bureaucrat is creating a negative externality by extracting the marginal bribe. This lowers the pool of bribe resources available to all bureaucrats from all firms. If this externality is large relative to the direct local effect of corruption, then it is possible that endemic corruption will yield small returns to a bureaucrat extracting bribes.

In measuring firm efficiency, output per worker forms our main variable of interest alongside z_{ij} and Z_j. Taking logs and rearranging equation (1) into an empirical specification we have:

$$\ln (y_{ij} / l_{ij}) = \hat{a}_0 + \hat{a}_1 \ln (k_{ij} / l_{ij}) + \hat{a}_2 z_{ij} + \hat{a}_3 Z_j + \boldsymbol{\varsigma}' \times + \mathring{a}_{ij} \tag{3}$$

One obvious concern with this approach is the possible endogeneity between corruption and productivity. Theoretically, better performing firms should provide the greatest resource base for corrupt officials to target with bribery, which would yield a positively biased estimate of $\hat{a}_2$ in OLS. On the other hand, low productivity firms might be more willing to pay bribes as a short-cut to overcoming their own inability to compete in a market, which would lead to

negatively biased estimates of $\hat{a}_2$. Slightly more formally (and dropping subscripts), it could be that we could write

(4) $$z = f\,[\,(y/l), \text{exogenous variables}]$$

where f is some *a priori* unknown function. Our ability to correctly measure the impact of corruption on efficiency depends on our ability to identify factors determining corruption that do not enter the production function. Section V discusses this issue in greater detail below.

III. THE DATA

Our data are taken from survey results collected in preparation of the *Africa Competitiveness Report 2000/2001* (ACR), an analysis of 27 African economies co-ordinated jointly by the Center for International Development at Harvard University and the Geneva-based World Economic Forum. Survey responses used in this data set were collected throughout the last six months of 1999. The survey data contain information on firms' sales and recorded value of assets, both in US dollars. These measures of output and capital enable us to create a measure of (the natural log of) firms' output per worker, LOGYL; (the natural log of) capital stock per worker, LOGKL; and (the natural log of) size of labour force, LOGLAB. Employment is measured as the total number of full-time equivalent employees, with those who work part time counted as half a full-time worker. Complete information for our variables of interest is available for 505 firms.[2]

It is important to note the nature of the firms surveyed for the ACR. The bulk of the survey questions aim to capture business managers' perceptions about how elements of their economic environment compare to elements in other economies, so the survey itself is

directed at managers who have cross-border business experience. As a result, compared to the universe of firms within each country, the sample is biased toward managers of larger firms, as well as those that are involved in the tradable sector. As Appendix B shows, 66 percent of the companies sampled are exporters, a much larger proportion than one would find in a typical African economy. The median sized firm has 155 employees, which is also much higher than the median in most African economies. Furthermore, the number of surveys with complete data in each country varies tremendously, ranging in from 45 in Zimbabwe to 2 in Burkina Faso, so this alongside the clear sampling bias places limits on the extent to which we can generalise our regression results as evidence of overall trends in African economies. Nonetheless, the data set does offer a rare opportunity to study links between corruption and firm performance across a large number of African countries.

To measure local corruption, z_{ij}, we draw upon ACR questions which ask if "firms like yours typically need to make extra, unofficial payments" for access to each of the following publicly-regulated goods: connection to public services (*e.g.,* electricity, phone); acquisition of licenses and permits; dealing with taxes and tax collection; gaining government contracts; and dealing with customs/imports. For each of these areas of possible bribe-paying, respondents answered on a scale from 1="always" to 6="never."[3] We interpret this question as a thinly veiled means of asking whether the respondent's firm typically needs to make such bribe payments. We then calibrated these variables to binary form such that answers ranging from 4="sometimes" through 1="always" are given a value of one while responses of 5="seldom" and 6="never" are given a value of zero. These variables were named SERVICEYES (for the public services question), LICENSEYES (for the licenses and permits question), TAXYES (for the tax collection question), GOVYES (for the government contract question), and CUSTOMSYES (for the customs and imports question). From these five

measures we in turn constructed our main measure of z_{ij}, LOCAL, which takes a value of 1 if any of these firm-level corruption variables takes a value of 1.

To measure global corruption, Z_j, we follow three parallel approaches. The first uses an ACR survey question that asks about firm managers' broad perceptions of corruption in their country: "In your country, irregular, additional payments connected with import and export permits, business licenses, exchange controls, tax assessments, police protection or loan applications," and then lists a scale of responses between 1 and 6, where 1 represents "are required for effective business," and 6 indicates "are rare in the business community." From this question we created the binary variable GLOBAL, which takes the value of 1 when respondents answered 1, 2 or 3 on the six-point scale. The second approach is of the bottom-up variety. It takes the average LOCAL score in each country to create a variable named AVLOCAL, or the average frequency of reported firm-level corruption in each economy in the sample. The third approach is similar to the second, in that it calculates the average GLOBAL score in each country to create AVGLOBAL. Thus while AVLOCAL measures Z_j as the average *reported* level of local corruption, AVGLOBAL measures Z_j as the average *perceived* level of global corruption.

One possible concern with the use of these measures of corruption is that they might be capturing the labour productivity effects of some other omitted variable, such as the overall level of public infrastructure or public services. To test for this possibility, we used other survey questions to create an overall index of public infrastructure. Survey question I.15 asks respondents, "Please rate the overall quality, integrity and efficiency of services delivered by the following public agencies or services," and then lists thirteen judicial, infrastructure, social, security and legislative services. Possible answers range from 1= "very good" to 6=

"very bad." We calculated a weighted average of responses within each of the five public institution sub-categories to construct an overall measure of public services, PUBLIC.

One might also be concerned that any survey-based results could be driven by the perception bias of people who consistently overestimate (or underestimate) the quality of their environment. Stated otherwise, any negative productivity results linked to corruption might be driven by inefficient habitual complainers. Here we draw upon the work of Kaufman and Wei [1999], who constructed a "kvetch" variable to test whether any of their own measured effects of corruption were driven by respondents being overly pessimistic on everything. We constructed our own WHINGE variable similar to "kvetch" by calculating each respondent's deviation from the country mean for a very broad survey question that asks about the national business environment. The specific question we used for this variable asked, "'I have full confidence in the ability of my country's financial system to provide financing to private firms like mine.' To what degree do you agree with this statement?" Possible answers range from 1 (=Fully agree) to 6 (= Strongly disagree) and WHINGE scores were thus calculated as deviations from the country mean. WHINGE scores could, of course, be capturing a wide range of effects, including a firm's genuinely limited access to financing, but it nonetheless provides a useful test for whether $\hat{a}_2$ and $\hat{a}_3$ are sensitive to the inclusion of such a control.

IV. THE DETERMINANTS OF PRODUCTIVITY

In order to test for the effects of corruption on productivity we estimate equation (3) using both the local and global measures of corruption. Our baseline ordinary least squares specification is written as:

$$\text{(5) LOGYL} = \textit{CONSTANT} + \hat{a}_1 * \textit{LOGKL} + \hat{a}_2 * \textit{LOCAL} + \hat{a}_3 * \textit{GLOBAL} + \varsigma_1' * \textit{INDUSTRY CONTROLS} + \varsigma_2' * \textit{COUNTRY CONTROLS} + \varsigma_3' * \textit{FIRM CHARACTERISTICS} + \mathring{a}_{ij}$$

Building on this specification, the empirical strategy proceeds in four steps. The first is presented in columns [1] through [4] of Table I, which controls for country fixed effects on labour productivity. This allows us to test for the effects of z_{ij}, or LOCAL. The inherent limitation in this step is that, when country fixed effects are included, one cannot test whether the country dummy is picking up the effect of global corruption. The second step addresses this by dropping the country fixed effects in columns [5] through [9] of Table I. In doing so we are open to the objection that we bias the coefficients on the regressors. This is addressed in the third step, shown in Tables II and III, where we examine whether the estimated country differences in productivity can be explained by aggregate corruption. Both Tables I and III assume corruption to be exogenous. This assumption is tested in the fourth step, presented in Tables IV through VI, which investigate our ability to identify the determinants as well as effects of local and global corruption.

Column [1] of Table I shows results for the baseline productivity specification, where the reference firm for the equation is a domestically-owned South African manufacturer that sells only in the domestic market. Standard errors are corrected for clustering at the country-level.

As noted in the bottom section of the table, the baseline regression controls for industry and country dummies, although coefficients on those dummies are not reported here in order to conserve space. Looking at the coefficient on LOGKL in regression 1, we see it is equal to 0.64 with high significance. This result is repeated throughout Table I, where we find coefficients on this variable consistently in the range between 0.62 and 0.66. The coefficient on LOGLAB is small and insignificant, supporting our assumption of constant returns to scale.

The subsequent coefficient on EXPORTER, a dummy variable that takes a value of 1 if a firm has any exports, is positive and significant just short of the five percent level. This evidence is in line with other studies that link exporting with higher productivity, see Bigsten *et al*. [2001]. Meanwhile, the measure of monopoly (MONOPOLY) suggests a large adverse effect on underlying efficiency.[4] FOREIGN, another dummy variable that takes a value of 1 if firms are at least 50 percent owned by foreigners, shows a highly significant positive link to productivity.

Table I, column [2] introduces our first measure of global corruption, GLOBAL. Since we control for country fixed effects in this regression we would anticipate that this variable, if properly capturing global corruption, would be insignificant. This is indeed the case. Column [3] then presents results for when the local measure of corruption, LOCAL, is added to the productivity equation. Quite different from the result for the GLOBAL measure of corruption, the coefficient on LOCAL is negative and significant. The point estimate implies that firms engaging in any form of direct bribery to government bureaucrats are on average 18 percent less efficient than their counterparts that do not pay bribes.[5]

Column [4] of Table I introduces two additional controls, one for omitted variable bias, PUBLIC – i.e., in case LOCAL is capturing a broader dynamic of poor public infrastructure rather than just corruption – and one for perception bias, WHINGE. At first glance the positive sign on PUBLIC may be puzzling, since it suggests that firms with worse assessments of overall public infrastructure have higher productivity.[6] We interpret this result as showing that more productive firms simply have higher standards for quality of services and thus assess government services more harshly. This interpretation is supported by the fact that the average PUBLIC score in South Africa of 3.29 (see Appendix B for the full list of country averages) is very similar to that of Uganda (3.52) and Burkina Faso (3.52), suggesting that managers in different countries compare their public infrastructures to different international reference points.

It is important to note that there appears to be a good reason why the interpretation of the survey-based measure of PUBLIC is less clear than the survey-based measure of LOCAL. One needs to remember that the underlying survey question for PUBLIC frames possible answers on the dimension of "very good" versus "very bad." This line of questioning lends itself much more to perception bias than do the underlying corruption questions that ask about corruption on a much less (although admittedly still) subjective scale ranging from "never" to "always." The core corruption variables are indeed quite modest in their measurement aspirations, since their dummy variable structure seeks only to capture whether bribes are paid rather than the overall frequency or amount of payments on a firm-by-firm basis. In any event, regardless of the precise meaning of the PUBLIC variable, what is more important for the purposes of this paper is that the coefficient on LOCAL increases rather than decreases in size and significance when PUBLIC is included.

The regressions presented so far include country dummies, so any global corruption effect on productivity should be hidden by their inclusion. In Column 5, we test this hypothesis by running the same specification as in column [4], but this time removing the country dummies. GLOBAL is now significant at the 5 per cent level with a point estimate of –0.25, suggesting a strong negative effect of global corruption *in addition to* the negative effect of local corruption. The coefficient on LOCAL more than doubles from column [4] to column [5].

In column [6] we test our second measure of global corruption, AVLOCAL. Here we introduce country-level averages of all the firm-level control variables that are significant in regression [5]. Notably, AVLOCAL is significant at better than one percent levels, now with a coefficient of –1.16. It is the *only* country-level average that is significant in equation [6]. This result implies that the average firm in an entirely corrupt economy is 69 per cent ($1-e^{-1.16}$) less productive than a similar firm in an entirely corruption-free economy. Notably, even when we include AVLOCAL, the original coefficients on the firm-level controls, including LOCAL, are essentially unchanged from column [4]. The regression appears to be capturing distinct productivity effects of global and local corruption and the latter is more than twice as important as the former.

As a robustness test for the result in column [6], column [7] presents the same specification, but includes our third measure of Z_j, AVGLOBAL, in place of AVLOCAL. These two variables have a simple correlation of 0.86 across the 505 firms and Figure I shows graphically the close relationship between AVLOCAL and AVGLOBAL. The average *reported* level of economy-wide corruption is closely linked to the average *perceived* level. Given the high degree of correlation between AVGLOBAL and AVLOCAL, it is not surprising that the results in column [7] are so similar to those in column [6]. Columns [8] and

[9] confirm that similar results for global corruption can be obtained either from the average level of local corruption, AVLOCAL or the average level of our global measure, AVGLOBAL.

It is possible that the results in columns [5] through [9] of Table I are driven by the bias in the coefficients that occurs when dropping the country fixed effects. To test whether this is the case we ran regressions with the country-level fixed effects of column [4] of Table I as the dependent variable in an equation. The coefficients for these country fixed effects are presented in Table II and the regression results are displayed in Table III. Here we use the country-level averages of EXPORTER, MONOPOLY, FOREIGN, PUBLIC, GLOBAL and LOCAL to attempt to explain the country-level differences in productivity.

Table III reports results for all the variables that were found to affect firm-level productivity in Table I. It is clear that the results of columns [5] through [9] in Table I are confirmed in that the level of global corruption is found to have large and statistically significant effects on the country-level productivity fixed effects, regardless of whether AVLOCAL or AVGLOBAL is used as the regressor. The small sample size in this regression clearly limits our room for interpretation, but the strength of the result is nonetheless notable. Indeed, the strong negative relationship between AVLOCAL and the country fixed effects is clearly visible in Figure II.

The R-squared in Table III also deserves some mention. In the most parsimonious specifications of columns [4] and [5], the R-squared is less than 0.4. While it is striking that there is such a high degree of correlation between AVLOCAL and country-level differences in productivity, it is also clear that AVLOCAL is far from the only factor affecting output per worker.

V. IS CORRUPTION ENDOGENOUS?

It is possible that poorly performing firms attempt to circumvent market competition by seeking short-cuts through bribe payments so that causation is running from low-productivity to corruption. In this section we report on some tests for the endogeneity of our corruption measures. We do this by performing a Durbin-Wu-Hausman (DWH) test, following Davidson and MacKinnon [1993].

The results are reported in Table IV, which includes estimates obtained from both the first and second stage of the test. The first stage entails an estimation of LOCAL as the dependent variable, with the exogenous variables on the right hand side. We found firm size (LOGLAB), WHINGE, and one other survey question, FAIR, to be significant when assessed as independent variables against LOCAL as a dependent variable. FAIR is based on a firm-level question that asks "In resolving business disputes, do you believe your country's court system to be fair and impartial?" with possible answers again ranging from 1= "Always" to 6= "Never." Unreported regressions found that smaller firms are more likely on average to encounter corruption, as are those with higher WHINGE scores, and those who find their country's court system to be less fair. Table V shows the average LOCAL score across a range of firm sizes.

The DWH test is performed by obtaining the residuals from the first stage regression and then testing whether those residuals are significant in the original OLS equation of interest. If they are significant, then endogeneity cannot be rejected. We perform this test two ways, once with the first stage as an OLS and a second time with the first stage as a logit equation. The bottom panel of Table IV shows the results from the first stage regression, and the top panel presents

results for the second stage. As Table IV shows, the DWH test rejects the endogeneity of LOCAL in the main productivity specification. When LOCAL is estimated by both OLS and logit in the first stage, the ensuing residual, LOCAL_RES, is not significant in the second stage.

In Table VI we perform another DWH test for the endogeneity of global corruption, AVLOCAL. Here the sample is again restricted to 27 observations so we caution against over interpretation, but the results still reject endogeneity. Column [1] of Table VI presents only the OLS results with AVLOCAL as the dependent variable. Here one sees that average capital/labour ratios are significantly and negatively linked to LOCAL, as are worse (higher) scores on public services. Column [2] indicates a reduced form of the first stage, including only AVLOGKL, AVPUBLIC and AVMONOPOLY, and the second stage results in the top panel. Here one sees that AVLOCAL is highly significant with a value of –1.42, with a coefficient of slightly larger magnitude than the estimate of approximately –1.1 found in Table III, and AVLOCAL_RES is nowhere near significant, with a t-statistic of just over 1. In case the column [2] result for AVMONOPOLY is driven by statistical artefact rather than underlying reality, column [3] presents an even more reduced first stage, with the second stage coefficient on AVLOCAL not statistically different from the previous regression.

These DWH tests suggest that our OLS results are adequate for gauging the relative influences of local and global corruption.[7] Thus our preferred estimate for the coefficient on LOCAL is –0.26, taken from regression [4] in Table I with country fixed effects, and our preferred estimate for the coefficient on AVLOCAL is the –1.3, taken from column [8] of Table I. These results imply that the global public bad effect of corruption is three times the magnitude of the local effect.[8]

VI. CONCLUSION

This paper set out to determine whether a link can be found between corruption and underlying firm productivity in Africa, with a distinction between the effects of local and global corruption. We have found that firms operating in economies where bribes are pervasive are on average only one third as productive as their counterparts operating in bribe-free economies. The public bad effects of corruption appear to dominate the local effects.

Our ability to produce these estimates is due to the existence of cross-country data from Africa on firm performance that includes detailed information on firm structure and on the corruption experienced by the firm. We control for the possible subjectivity of respondents regarding the extent of corruption and the effects of public infrastructure. The similarity in results for global corruption obtained when using the average country-level regression to those based on the firm-level regressions suggests that the coefficients on the firm level variables are not biased when we drop the country fixed effects.

Since we do not have panel data, we cannot control for country fixed effects when estimating the effects of global corruption. It could therefore be argued that our estimates for the effects of global corruption are biased up as we confound the corruption effect with all the other country-level differences which affect firm performance. That argument is clearly correct. However the county-level corruption variables are significant when we do control as much as possible for differences across countries. These controls include the trade orientation of the sample within each country (the AVEXPORTER variable), the extent of monopoly (the AVMONOPOLY variable), and the extent of foreign ownership (AVFOREIGN). We would argue that the data provide strong evidence that corruption is an important determinant of

firm performance in African economies. Moreover, focusing simply on the local impact of corruption while ignoring the global effect would be to misunderstand fundamentally the nature of corruption's effect on firm performance in Africa.

TABLE I. FIRM-LEVEL PRODUCTIVITY REGRESSIONS

Dependent Variable	LOGYL								
Regression	1	2	3	4	5	6	7	8	9
LOGKL	**0.64*** **	**0.64*** **	**0.64*** **	**0.62*** **	**0.66*** **	**0.63*** **	**0.63*** **	**0.62*** **	**0.63*** **
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)
LOGLAB	**0.03**	**0.03**	**0.02**	**0.01**	**0.01**	**0.002**	**0.01**	**0.001**	**0.001**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
EXPORTER	**0.19***	**0.19***	**0.19***	**0.17***	**0.27*** **	**0.18***	**0.18***	**0.21*** **	**0.21*** **
	(0.10)	(0.10)	(0.10)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.08)
MONOPOLY	**-0.77*** **	**-0.77*** **	**-0.76*** **	**-0.75*** **	**-0.88*** **	**-0.74*** **	**-0.75*** **	**-0.84*** **	**-0.87*** **
	(0.22)	(0.22)	(0.22)	(0.21)	(0.20)	(0.21)	(0.21)	(0.20)	(0.19)
FOREIGN	**0.31*** **	**0.31*** **	**0.31*** **	**0.23*** **	**0.25*** **	**0.24*** **	**0.23*** **	**-0.24*** **	**0.26*** **
	(0.12)	(0.12)	(0.12)	(0.11)	(0.10)	(0.10)	(0.11)	(0.11)	(0.10)
GLOBAL		**-0.02**	**-0.01**	**0.03**	**-0.25*** **	**-0.09**	**-0.02**	**-0.10**	**-0.03**
		(0.09)	(0.09)	(0.10)	(0.12)	(0.09)	(0.09)	(0.10)	(0.10)
LOCAL			**-0.20*** **	**-0.26*** **	**-0.62*** **	**-0.26*** **	**-0.35*** **	**-0.28*** **	**-0.39*** **
			(0.08)	(0.08)	(0.14)	(0.07)	(0.08)	(0.08)	(0.10)
PUBLIC				**0.25*** **	**0.24*** **	**0.25*** **	**0.25*** **	**0.29*** **	**0.31*** **
				(0.06)	(0.11)	(0.06)	(0.07)	(0.08)	(0.09)
WHINGE				**-0.08*** **	**-0.05**	**-0.08*** **	**-0.08*** **	**-0.09*** **	**-0.08*** **
				(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
AVEXPORTER						**0.30**	**0.34**		
						(0.49)	(0.47)		
AVMONOPOLY						**-1.99**	**-2.14***		
						(1.35)	(1.25)		
AVFOREIGN						**0.14**	**0.37**		
						(0.34)	(0.40)		
AVLOCAL						**-1.16*** **		**-1.33*** **	
						(0.32)		(0.23)	
AVGLOBAL							**-1.30*** **		**-1.45*** **
							(0.37)		(0.26)
AVPUBLIC						**-0.02**	**-0.02**		
						(0.14)	(0.17)		
Constant	**4.18*** **	**4.19*** **	**4.26*** **	**3.68*** **	**3.03*** **	**3.72*** **	**3.49*** **	**3.78*** **	**3.58*** **
	(0.45)	(0.45)	(0.45)	(0.54)	(0.55)	(0.57)	(0.57)	(0.45)	(0.44)
Country Controls	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**	**No**	**No**
Industry Controls	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Obs.	505	505	505	505	505	505	505	505	505
R^2	0.71	0.71	0.72	0.73	0.66	0.70	0.70	0.69	0.69

Robust standard errors, corrected for clustering at the country level, are indicated in parentheses.
*** denotes p-values at the 1% level or lower; ** denotes 5% level; * denotes 10% level.

Industry controls included in the regressions are: agriculture, construction, electricity, mining, commerce and services, finance; tourism, transportation and communications; and "other."

TABLE II. COUNTRY FIXED EFFECT VALUES FROM TABLE I, REGRESSION 4

Country	Value	Country	Value
Angola	-1.311	**Morocco**	-0.030
Botswana	0.131	**Mozambique**	-1.043
Burkina Faso	0.472	**Namibia**	0.019
Cameroon	-1.125	**Nigeria**	-0.697
Cote d'Ivoire	0.465	**Senegal**	0.274
Egypt	-1.605	**Seychelles**	0.294
Ethiopia	-1.111	**South Africa**	0.000
Ghana	-0.286	**Swaziland**	-0.476
Kenya	-0.835	**Tanzania**	-0.453
Lesotho	-0.271	**Tunisia**	0.032
Madagascar	-1.052	**Uganda**	-0.726
Malawi	-0.668	**Zambia**	-1.038
Mali	0.266	**Zimbabwe**	-0.700
Mauritius	-0.290		
		Sample Mean	-0.44
		Std. Deviation	0.59

TABLE III. COUNTRY-LEVEL PRODUCTIVITY REGRESSIONS

Dependent Variable	Country Fixed Effects from Table I, Regression 4				
Regression	1	2	3	4	5
AVEXPORTER	**0.79**	**0.64**	**0.74**		
	(0.54)	(0.51)	(0.50)		
AVMONOPOLY	**-1.43**	**-1.16**	**-1.16**		
	(1.80)	(1.99)	(1.84)		
AVFOREIGN	**-0.05**	**-0.18**	**-0.19**		
	(0.37)	(0.46)	(0.45)		
AVPUBLIC	**-0.19**				
	(0.23)				
AVLOCAL	**-0.73**	**-1.01*** **	**-0.39**	**-1.10*** **	
	(0.52)	(0.28)	(0.44)	(0.29)	
AVGLOBAL			**-0.99** **		**-1.40*** **
			(0.46)		(0.27)
Constant	**0.22**	**-0.16**	**-0.11**	**-0.18**	**-0.22**
	(0.67)	(0.48)	(0.46)	(0.10)	(0.10)
Obs.	27	27	27	27	27
R^2	0.47	0.44	0.51	0.35	0.37

The dependent variable is the coefficients on the fixed effect from regression 4 in Table I. Huber-White corrected standard errors are indicated in parentheses. *** denotes p-values at the 1% level or lower; ** denotes 5% level; * denotes 10% level.

TABLE IV: DURBIN-WU-HAUSMAN TESTS FOR ENDOGENEITY OF LOCAL

		1ST STAGE OLS	1ST STAGE LOGIT
	Regression	1	2
2nd Stage Results (LOGYL as Dep. Variable)	**LOGKL**	**0.62*** **	**0.60*** **
		(0.04)	(0.04)
	EXPORTER	**0.17***	**0.20** **
		(0.09)	(0.09)
	MONOPOLY	**-0.71*** **	**-0.61*** **
		(0.22)	(0.19)
	FOREIGN	**0.19**	**0.26** **
		(0.11)	(0.11)
	GLOBAL	**0.05**	**-0.06**
		(0.11)	(0.10)
	LOCAL	**-0.98***	**-0.37** **
		(0.53)	(0.15)
	LOCAL_RES	**0.75**	**0.05**
		(0.56)	(0.06)
	PUBLIC	**0.30*** **	**0.24*** **
		(0.08)	(0.06)
	WHINGE	**-0.05**	**-0.07** **
		(0.04)	(0.03)
1st Stage Results (LOCAL as Dep. Variable)	**LOGKL**	**-0.004**	**-0.04**
		(0.01)	(0.08)
	EXPORTER	**-0.01**	**-0.04**
		(0.04)	(0.29)
	MONOPOLY	**0.07**	**0.49**
		(0.08)	(0.74)
	FOREIGN	**-0.07***	**-0.50***
		(0.04)	(0.28)
	GLOBAL	**0.11** **	**0.63** **
		(0.05)	(0.29)
	PUBLIC	**0.07*** **	**0.47*** **
		(0.02)	(0.16)
	WHINGE	**0.02**	**0.11**
		(0.01)	(0.08)
	LOGLAB	**-0.03*** **	**-0.25*** **
		(0.01)	(0.08)
	FAIR	**0.04** **	**0.29*** **
		(0.02)	(0.11)
	Country Controls in 1st & 2nd stage?	**Yes**	**Yes**
	Industry Controls in 1st & 2nd stage?	**Yes**	**Yes**
	Observations	498	485
	1st stage R^2	0.43	0.38
	F-statistic for significance of ANY_RES in 2nd stage	1.77	0.81
	p-value for F-test	0.20	0.38

The 1st and 2nd stage constant terms are not reported in order to conserve space. Robust standard errors, corrected for clustering at the country level, are indicated in parentheses. *** denotes p-values at the 1% level or lower; ** denotes 5% level; * denotes 10% level.

TABLE V: AVERAGE LOCAL PREVALENCE AMONG DIFFERENT FIRM SIZES

Firm Size (# workers)	Observations	LOCAL average	Within-Group Standard Deviation
<20	72	0.76	0.43
20-49.5	72	0.64	0.48
50-99.5	69	0.61	0.49
100-299.5	95	0.65	0.48
300-999.5	104	0.47	0.50
>1000	93	0.41	0.50

TABLE VI. TEST FOR ENDOGENEITY OF AVLOCAL

	Regression	1	2	3
2nd Stage Results (Country Fixed Effects as Dep. Variable)	**AVANY**		**-1.42*** **	**-1.27*** **
			(0.21)	(0.45)
	AVLOCAL_RES		**0.66**	**0.28**
			(0.56)	(0.85)
	Constant		**0.36*** **	**0.27**
			(0.12)	(0.27)
1st Stage Results (AVLOCAL as Dep. Variable)	**AVLOGKL**	**-0.10****	**-0.11*** **	**-0.07****
		(0.04)	(0.03)	(0.03)
	AVPUBLIC	**0.25*** **	**0.24*** **	**0.24*** **
		(0.07)	(0.06)	(0.06)
	AVMONOPOLY	**1.66**	**1.46****	
		(0.73)	(0.65)	
	AVEXPORTER	**0.11**		
		(0.32)		
	AVFOREIGN	**-0.08**		
		(0.30)		
	AVLOGLAB	**-0.09**		
		(0.06)		
	Constant	**1.02***	**0.73***	**0.45**
		(0.56)	(0.40)	(0.45)
	Observations	27	27	27
	1st stage R^2	0.57	0.52	0.40
	F-statistic for significance of ANY_RES in 2nd stage		1.37	0.11
	p-value for F-test		0.25	0.75

The dependent variable in the 2nd stage is the coefficient on the country fixed effect from regression [4] in Table I. Huber-White corrected standard errors are indicated in parentheses. *** denotes p-values at the 1% level or lower; ** denotes 5% level; * denotes 10% level.

Figure I: AVLOCAL plotted against AVGLOBAL

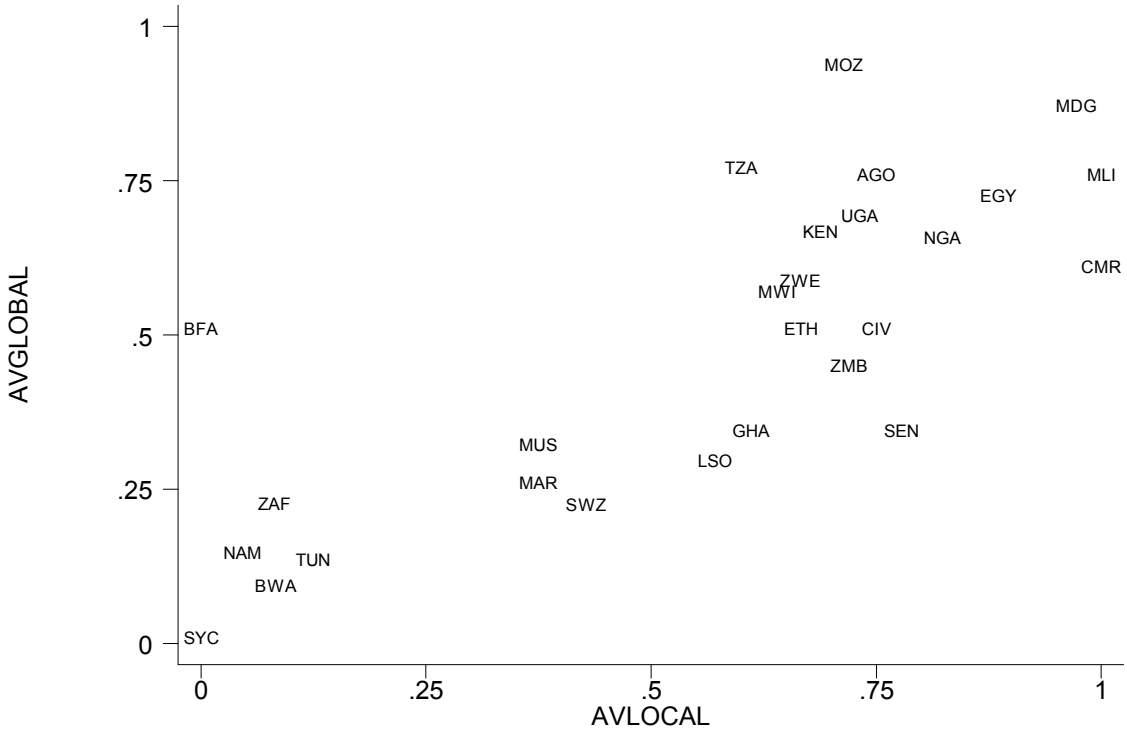
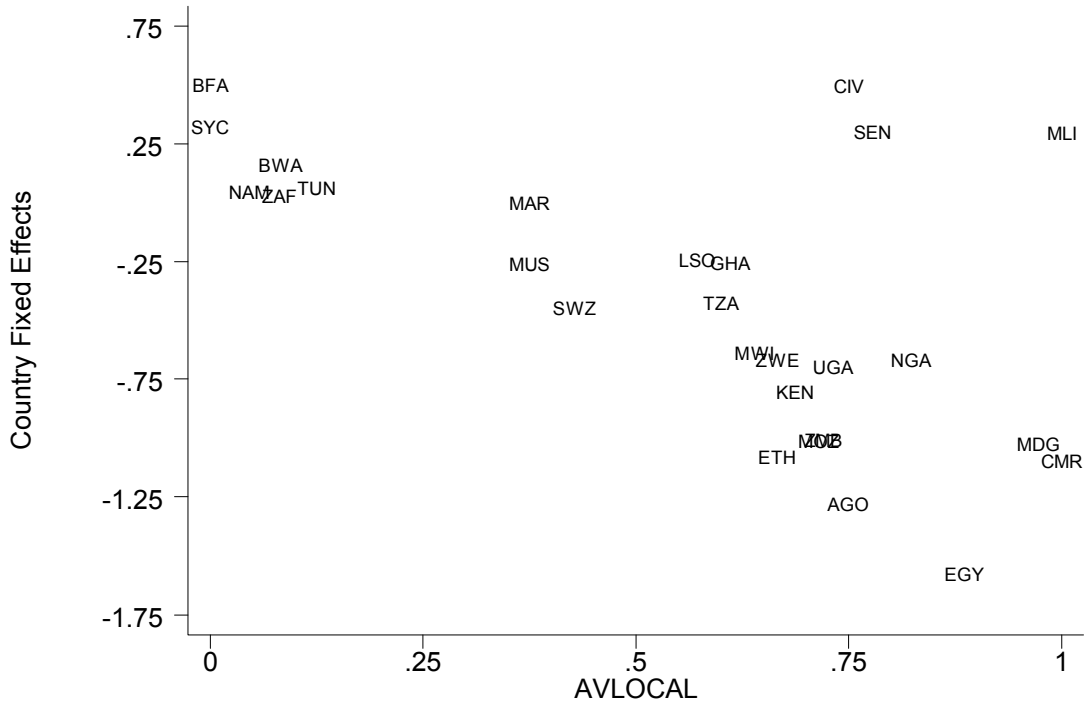


Figure II: AVLOCAL plotted against country Fixed Effects from Table I



APPENDIX A: SECTORAL BREAKDOWN OF FIRMS IN SAMPLE (N=505)

		Number of firms indicating their "main business" is in:											
wbcode	Firms	Agriculture, hunting, fishing & forestry	Electricity, gas & water	Commerce (wholesale, retail, trade)	Communi-cations	Construc-tion	Mining & quarrying	Manufac-turing	Services	Financial	Tourism, hotel & restaurant	Transport, storage	Other
AGO	4	0	0	0	0	0	0	1	1	1	0	0	1
BFA	2	0	0	0	0	0	0	1	0	0	0	0	1
BWA	24	1	1	3	1	0	0	6	6	2	1	1	6
CIV	4	1	0	2	0	0	0	0	1	0	0	1	1
CMR	5	2	0	0	0	0	0	1	0	1	0	0	3
EGY	35	3	1	5	1	0	1	7	0	3	9	3	7
ETH	18	1	0	3	0	2	0	5	2	3	0	0	4
GHA	18	1	0	3	1	0	1	7	3	4	0	1	2
KEN	32	2	0	4	0	0	2	17	3	1	1	2	6
LSO	7	0	0	2	0	2	0	1	1	0	1	0	0
MAR	8	0	0	0	0	0	0	5	0	0	1	0	2
MDG	36	4	0	3	3	3	1	7	1	0	1	0	14
MLI	4	1	0	1	0	0	0	3	0	0	0	0	0
MOZ	14	2	0	1	0	1	1	4	3	1	1	0	2
MUS	16	0	0	3	1	1	0	7	4	3	0	1	0
MWI	25	2	0	3	0	0	1	10	2	1	0	2	10
NAM	22	3	0	7	1	0	2	2	1	2	2	1	5
NGA	17	1	1	2	0	0	0	7	3	4	1	0	3
SEN	9	0	0	2	0	2	0	2	1	0	1	1	4
SWZ	14	2	0	2	0	1	0	9	0	2	1	0	1
SYC	2	0	0	1	0	1	0	1	1	0	0	0	0
TUN	16	0	1	1	0	0	0	7	2	4	1	3	0
TZA	25	0	0	5	6	1	2	10	9	3	0	1	6
UGA	41	4	1	7	2	5	1	15	1	1	3	0	7
ZAF	37	1	1	4	2	4	3	11	6	4	1	1	8
ZMB	25	3	0	8	0	1	0	12	3	1	2	1	6
ZWE	45	6	0	6	1	1	3	19	7	4	4	4	11
Totals	**505**	**40**	**6**	**78**	**19**	**25**	**18**	**177**	**61**	**45**	**31**	**23**	**110**

* Note: row totals add up to more than the number of observations per country, since many companies indicate their involvement in more than one sector.

APPENDIX B: AVERAGE COUNTRY VALUES FOR MAIN VARIABLES IN TABLE I

Country	N	LOGYL	LOGKL	LOGLAB	EXPORTER	MONOPOLY	FOREIGN	GLOBAL	LOCAL	PUBLIC
AGO	4	12.12	13.64	5.25	0.75	0.25	0.50	0.75	0.75	4.93
		1.80	*2.34*	*1.90*	*0.50*	*0.50*	*0.58*	*0.50*	*0.5*	*0.88*
BFA	2	11.48	10.07	6.04	1.00	0.00	0.00	0.50	0.00	3.52
		0.02	*0.51*	*2.60*	*0.00*	*0.00*	*0.00*	*0.71*	*0.00*	*0.40*
BWA	24	11.10	10.32	4.84	0.50	0.08	0.46	0.08	0.08	2.55
		1.09	*1.47*	*1.50*	*0.51*	*0.28*	*0.51*	*0.28*	*0.28*	*0.70*
CIV	4	11.43	10.72	5.22	0.75	0.25	0.25	0.50	0.75	3.12
		1.95	*1.13*	*1.24*	*0.50*	*0.50*	*0.50*	*0.58*	*0.50*	*0.45*
CMR	5	8.10	8.00	5.30	0.40	0.20	0.40	0.60	1.00	4.19
		3.96	*3.40*	*1.77*	*0.55*	*0.45*	*0.55*	*0.55*	*0.00*	*0.64*
EGY	35	8.28	9.65	5.30	0.66	0.20	0.14	0.71	0.89	2.16
		1.81	*1.62*	*1.65*	*0.48*	*0.41*	*0.36*	*0.46*	*0.32*	*0.60*
ETH	18	9.17	9.19	4.71	0.39	0.00	0.00	0.50	0.67	3.47
		0.78	*1.02*	*1.61*	*0.50*	*0.00*	*0.00*	*0.51*	*0.49*	*0.95*
GHA	18	10.46	9.82	5.45	0.67	0.00	0.50	0.33	0.61	3.13
		1.09	*1.05*	*1.86*	*0.49*	*0.00*	*0.51*	*0.49*	*0.50*	*0.80*
KEN	32	9.97	9.50	5.89	0.91	0.00	0.47	0.66	0.69	4.55
		1.35	*1.26*	*1.61*	*0.30*	*0.00*	*0.51*	*0.48*	*0.47*	*0.75*
LSO	7	10.41	9.62	4.76	0.71	0.00	0.57	0.29	0.57	3.10
		1.47	*1.30*	*1.80*	*0.49*	*0.00*	*0.53*	*0.49*	*0.53*	*0.69*
MAR	8	11.59	11.26	5.70	0.88	0.00	0.50	0.25	0.38	3.06
		0.95	*1.24*	*1.14*	*0.35*	*0.00*	*0.53*	*0.46*	*0.52*	*0.80*
MDG	36	8.35	7.98	4.33	0.44	0.06	0.17	0.86	0.97	4.21
		1.60	*1.89*	*1.76*	*0.50*	*0.23*	*0.38*	*0.35*	*0.17*	*0.57*
MLI	4	10.87	9.51	4.58	1.00	0.00	0.25	0.75	1.00	4.32
		1.52	*0.94*	*0.87*	*0.00*	*0.00*	*0.50*	*0.50*	*0.00*	*0.52*
MOZ	14	9.89	10.10	5.28	0.57	0.07	0.64	0.93	0.71	3.98
		1.33	*1.43*	*1.68*	*0.51*	*0.27*	*0.50*	*0.27*	*0.47*	*0.46*
MUS	16	10.60	9.76	4.96	0.69	0.00	0.13	0.31	0.38	3.53
		0.91	*1.29*	*2.03*	*0.48*	*0.00*	*0.34*	*0.48*	*0.50*	*1.06*
MWI	25	9.49	8.97	5.57	0.64	0.08	0.24	0.56	0.64	3.92
		1.52	*1.43*	*1.67*	*0.49*	*0.28*	*0.44*	*0.51*	*0.49*	*1.00*
NAM	22	10.71	10.05	4.69	0.86	0.09	0.36	0.14	0.05	2.58
		1.02	*0.99*	*1.82*	*0.35*	*0.29*	*0.49*	*0.35*	*0.21*	*0.98*
NGA	17	10.16	9.83	5.88	0.53	0.06	0.24	0.65	0.82	4.09
		0.94	*1.02*	*1.28*	*0.51*	*0.24*	*0.44*	*0.49*	*0.39*	*0.86*
SEN	9	10.61	9.38	3.45	0.78	0.00	0.11	0.33	0.78	3.25
		1.52	*1.64*	*1.09*	*0.44*	*0.00*	*0.33*	*0.50*	*0.44*	*0.61*
SWZ	14	9.82	8.95	4.98	0.79	0.07	0.50	0.21	0.43	3.80
		1.04	*1.67*	*1.90*	*0.43*	*0.27*	*0.52*	*0.43*	*0.51*	*0.81*
SYC	2	11.31	10.09	2.59	0.00	0.00	0.50	0.00	0.00	2.33
		0.36	*1.77*	*2.11*	*0.00*	*0.00*	*0.71*	*0.00*	*0.00*	*0.49*
TUN	16	11.20	10.90	6.39	0.69	0.13	0.19	0.13	0.13	2.03
		0.74	*0.81*	*1.71*	*0.48*	*0.34*	*0.40*	*0.34*	*0.34*	*0.55*
TZA	25	10.18	9.49	4.79	0.48	0.00	0.56	0.76	0.60	3.75
		1.03	*1.26*	*1.58*	*0.51*	*0.00*	*0.51*	*0.44*	*0.50*	*0.90*
UGA	41	9.65	9.46	3.82	0.61	0.00	0.27	0.68	0.73	3.52
		1.33	*1.58*	*1.42*	*0.49*	*0.00*	*0.45*	*0.47*	*0.45*	*0.94*
ZAF	37	11.09	10.20	6.91	0.89	0.03	0.27	0.22	0.08	3.29
		1.27	*1.85*	*2.35*	*0.31*	*0.16*	*0.45*	*0.42*	*0.28*	*0.68*
ZMB	25	9.59	9.65	4.20	0.56	0.04	0.32	0.44	0.72	3.78
		1.21	*1.14*	*1.72*	*0.51*	*0.20*	*0.48*	*0.51*	*0.46*	*0.87*
ZWE	45	9.23	8.59	5.51	0.71	0.04	0.24	0.58	0.67	4.02
		1.26	*1.19*	*2.34*	*0.46*	*0.21*	*0.43*	*0.50*	*0.48*	*0.84*
Overall	505	9.90	9.54	5.14	0.66	0.05	0.31	0.51	0.58	3.50
		1.61	*1.63*	*1.93*	*0.47*	*0.23*	*0.46*	*0.50*	*0.49*	*1.04*

Numbers in italics denote standard deviations

Values indicated under the EXPORTER, MONOPOLY, FOREIGN, GLOBAL, and LOCAL columns are country-level averages of the firm-level dummy variables, with possible values ranging from 0 to 1. In the regression results, these averages are referred to as AVEXPORTER, AVMONOPOLY, AVFOREIGN, AVGLOBAL and AVLOCAL, respectively.

APPENDIX C: DESCRIPTION OF VARIABLES

FIRM CHARACTERISTICS

Variable	Description
LOGYL	Natural log of (firm's value of total sales in past year / firm's size of labour force). Prices in USD.
LOGKL	Natural log of (firm's value of total assets / firm's size of labour force)
LOGLAB	Natural log of (firm's size of labour force), where labour force is calculated as the number of full-time employees plus 0.5*(the number of part-time employees).
EXPORTER	Dummy 0-1 variable for firms that export
MONOPOLY	Dummy 0-1 variable for firms reporting "no competitors" in their primary market
FOREIGN	Dummy 0-1 variable for firms that are 50 percent or greater foreign owned/controlled
PUBLIC	This is a broad measure of public institutions, based on a weighted average of component responses to ACR question I.15: "Please rate the overall quality, integrity and efficiency of services delivered by the following public agencies or services: (a) customs service/agency; (b) the judiciary/courts; (c) roads department/public works; (d) postal service/agency; (e) telephone service/agency; (f) the electric power company/agency; (g) water/sewerage service/agency; (h) public healthcare services/hospitals; (i) education services/schools; (j) police; (k) armed forces/military; (l) central government leadership; (President/PM/Cabinet); (m) the Parliament." Possible answers are: (1) Very good, (2) Good, (3) Slightly Good, (4) Slightly Bad, (5) Bad, and (6) Very Bad. To construct the weightings, questions (a) and (b) were averaged into a single measure of the Regulatory Environment; questions (c) through (g) were averaged into a single measure of Infrastructure; questions (h) and (i) were averaged into a measure of Social Services; questions (j) and (k) were averaged into a measure of Security; and questions (l) and (m) were averaged into a measure of Political Institutions. These five sub-aggregates were in turn averaged (unweighted) to construct the overall PUBLIC variable.
WHINGE	Firm's deviation from mean country response to ACR question F.1: " 'I have full confidence in the ability of my country's financial system to provide financing to private firms like mine.' To what degree do you agree with this statement?" Possible answers range from (1) Fully agree to (6) Strongly disagree.
FAIR	Firm's response to ACR question I.6a: "In resolving business disputes, do you believe your country's court system to be fair and impartial?" Possible answers are (1) Always (2) Mostly (3) Frequently (4) Sometimes (5) Seldom (6) Never.

CORRUPTION MEASURES

Variable	Description
Measures of local corruption:	
SERVICEYES	Dummy variable created from ACR question G.6.a:"Do firms like your typically need to make extra, unofficial payments to get connected to public services (e.g. electricity, phone)?" Possible answers are (1) Always (2) Mostly (3) Frequently (4) Sometimes (5) Seldom (6) Never. Answers of 4 or less are coded as SERVYES=1.
LICENSEYES	Dummy variable created from ACR question G.6.b:"Do firms like your typically need to make extra, unofficial payments to get licenses and permits?" Possible answers are (1) Always (2) Mostly (3) Frequently (4) Sometimes (5) Seldom (6) Never. Answers of 4 or less are coded as LICEYES=1.
TAXYES	Dummy variable created from ACR question G.6.c:"Do firms like your typically need to make extra, unofficial payments to deal with taxes and tax collection?" Possible answers are (1) Always (2) Mostly (3) Frequently (4) Sometimes (5) Seldom (6) Never. Answers of 4 or less are coded as TAXYES=1.
GOVYES	Dummy variable created from ACR question G.6.d:"Do firms like your typically need to make extra, unofficial payments to gain government contracts?" Possible answers are (1) Always (2) Mostly (3) Frequently (4) Sometimes (5) Seldom (6) Never. Answers of 4 or less are coded as GOVYES=1.
CUSTOMSYES	Dummy variable created from ACR question G.6.e:"Do firms like your typically need to make extra, unofficial payments to gain government contracts?" Possible answers are (1) Always (2) Mostly (3) Frequently (4) Sometimes (5) Seldom (6)

	Never. Answers of 4 or less are coded as CUSTYES=1.
LOCAL	Dummy variable equal to 1 if SERVICEYES, LICENSEYES, TAXYES, GOVYES, or CUSTOMSYES =1
LOCAL-softer	Dummy variable equal to 1 if "softer" versions of SERVICEYES, LICENSEYES, TAXYES, GOVYES, or CUSTOMSYES =1, with variable individual component variables taking a value of 1 when initial answers are 5 or less, rather than 4 or less as in the original LOCAL variable
LOCAL-tougher	Dummy variable equal to 1 if "tougher" versions of SERVICEYES, LICENSEYES, TAXYES, GOVYES, or CUSTOMSYES =1, with variable individual component variables taking a value of 1 when initial answers are 3 or less, rather than 4 or less as in the original LOCAL variable
LOCAL-select	Dummy variable equal to 1 of SERVYES, TAXYES, GOVYES, or CUSTYES =1
Measure of global corruption:	
GLOBAL	Dummy variable created from ACR question G5: "In your country, irregular, additional payments connected with import and export permits, business licenses, exchange controls, tax assessments, police protection or loan applications…" Possible answers range from (1) = "Are required for effective business" to (6) = "Are rare in the business community." Answers of 1, 2 or 3 are coded as GLOBAL=1.

COUNTRY AVERAGES

Variable	**Description**
AVLOGYL	Mean level of LOGYL in each country
AVLOGKL	Mean level of LOGKL in each country
AVLOGLAB	Mean level of LOGLAB in each country
AVMONOPOLY	Mean level of MONOPOL in each country
AVEXPORTER	Mean level of EXPORTER in each country
AVFOREIGN	Mean level of FOREIGN in each country
AVGLOBAL	Mean level of GLOBAL in each country
AVLOCAL	Mean level of LOCAL in each country
AVPUBLIC	Mean level of PUBLIC in each country

APPENDIX TABLE A-1. FIRM-LEVEL PRODUCTIVITY REGRESSIONS WITH SPECIFIC CORRUPTION FORMS:

Dependent variable	LOGYL							
Regression	1	2	3	4	5	6	7	8
LOGKL	**0.63*** **	**0.62*** **	**0.63*** **	**0.63*** **	**0.62*** **	**0.62*** **	**0.63*** **	**0.62*** **
	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
EXPORTER	**0.17***	**0.18****	**0.18***	**0.19***	**0.18***	**0.18***	**0.17***	**0.18***
	0.09	0.09	0.10	0.10	0.10	0.09	0.09	0.09
MONOPOLY	**-0.73*** **	**-0.72*** **	**-0.73*** **	**-0.75*** **	**-0.74*** **	**-0.74*** **	**-0.72*** **	**-0.75*** **
	0.21	0.21	0.22	0.22	0.22	0.22	0.22	0.22
FOREIGN	**0.26****	**0.24****	**0.24****	**0.23****	**0.25*** **	**0.24****	**0.25****	**0.26****
	0.11	0.10	0.11	0.11	0.11	0.11	0.11	0.11
PUBLIC	**0.22*** **	**0.24****	**0.24*** **	**0.24*** **	**0.23*** **	**0.25*** **	**0.24*** **	**0.23*** **
	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
WHINGE	**0.09*** **	**-0.08*** **	**-0.08****	**-0.07****	**-0.08****	**-0.08*** **	**-0.09*** **	**-0.08*** **
	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
LICENSEYES	**-0.13**							
	0.10							
SERVICEYES		**-0.24****						
		0.10						
TAXYES			**-0.29*** **					
			0.10					
GOVYES				**-0.33*** **				
				0.10				
CUSTOMSYES					**-0.17*** **			
					0.10			
LOCAL-softer						**-0.23*** **		
						0.08		
LOCAL-tougher							**-0.18****	
							0.08	
LOCAL-select								**-0.25*** **
								0.08
Constant	**3.77*** **	**3.77*** **	**3.73*** **	**3.73*** **	**3.81*** **	**3.88*** **	**3.76*** **	**3.87*** **
	0.52	0.51	0.50	0.49	0.51	0.52	0.51	0.50
Country Controls?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Industry Controls?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Obs.	503	505	497	480	493	505	505	505
R^2	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73

Robust standard errors, corrected for clustering at the country level, are indicated in parentheses.
*** denotes p-values at the 1% level or lower; ** denotes 5% level; * denotes 10% level

"LOCAL-softer" is a modified measure of LOCAL that sets a lower (i.e. less frequent) standard for the presence of corruption. "LOCAL-tougher" sets a higher (i.e. more frequent) standard for the presence of corruption. "LOCAL-select" differs from LOCAL in that it does not include LICEYES in its composition, since that variable is not independently significant in regression 1 of the above table.

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[1] Much of the empirical macroeconomic research on corruption's links to growth and investment was stimulated by Mauro [1995]. Other important macro studies have indicated that corruption acts as a tax on foreign investment (Wei 1997a, 1997b], leads to increases in bureaucratic red tape [Kaufmann and Wei, 1999], supports larger unofficial economies [Friedman *et al.*, 2000] and indirectly enhances the conditions for currency crises [Wei and Wu, 2001]. There is, however, an increasing interest in the micro effects [*e.g.*, Fisman and Svensson, 1999].

[2] Although the full ACR data set contains data on nearly 1,700 firms, we reduce the sample for our analysis to 505 by deleting those firms with missing observations for relevant variables as well as those with capital/labour ratios of greater than 30 or less than 0.1, the latter modification aiming to delete wild outliers and probable misreporting.

[3] Details of the questions and the scale can be found in Appendix C.

[4] This would support the evidence put forward by Nickell [1996].

[5] ($0.18 = 1 - e^{-0.20}$). To check whether the results in Column 3 are a product of the somewhat arbitrary cut-off between survey answers of "sometimes" and "seldom" instead of between "frequently" and "sometimes" in the construction of LICENSEYES, SERVICEYES, GOVYES, CUSTOMSYES, and TAXYES, we created a second variable that sets a higher standard for the presence of corruption, so that each of the binary measures of firm-level corruption take a value of 1 if respondents gave answers of 3 ("frequently") or less instead of 4 ("sometimes") or less. The results for this variable, named "LOCAL-tougher" are almost exactly the same as those for LOCAL. Likewise we created an "LOCAL-softer" variable that set a cut-off at 5 ("seldom") instead of 4. Again the results were not statistically different from those for LOCAL. This suggests that the exact cut-off for the construction of the local corruption variable does not appear to be driving our overall estimation of z_i effects. These and other robustness checks are presented in Appendix Table A-1.

[6] More precisely, firms with an average PUBLIC score that is one standard deviation higher (i.e. worse) than the mean are on average 30 percent more productive per unit of labour. ($0.30 = 1 - e^{1.04*0.25}$)

[7] The rejection of endogeneity for ANYCOR is further supported by Hausman-Sargan overidentification tests of instrumental variables regressions that used a variety of instruments.

[8] $3.2 = (1 - e^{-1..33})/(1 - e^{-0.26})$