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# Measuring and understanding corruption at the micro level

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# 1. Introduction

The past decade has witnessed a boom in the empirical literature (in economics) on corruption.[1] With few exemptions, the existing literature has three features in common; it is based on cross-country analyses, it exploits data on corruption derived from perception indices; and it explains corruption as a function of countries' policy-institutional environment.[2] These features are interlinked. The use of cross-country data naturally lends itself to study macro-determinants and effects of corruption (and vice versa), and given the difficulties (and costs) of collecting quantitative data on corruption, the use of perception data makes it feasible to study a large cross-section of countries.

The literature has provided important insights on the aggregate determinants of corruption, but it also also drawbacks. In particular, the use of perception indices raises concern about perception biases. Second, due to the aggregate nature of the data it tells us little about the relationship between corruption and individual agents. Most importantly conceptually macro determinants cannot satisfactory explain the within-country variation in corruption. Specifically, firms and other agents facing similar institutions and policies may still end up paying different amounts in bribes.

No doubt an important reason for the current state of the literature is that it is difficult to measure corruption. However as we argue and show below, while it is difficult to measure corruption, it is not impossible. In this chapter we discuss the result of two data collection effort carried out in Uganda in the late 1990s. Both projects had a more general focus than to study corruption, although corruption – broadly defined – was at the outset identified as a key issue to study.

[1] A (incomplete) list of recent contributions on the determinants of coruption include Ades and Di Tella (1997, 1999), Persson, Tabellini, and Trebbi (2000), Svensson (2000a), and Treisman (2000). On the effects of corruption, see Mauro (1995), Wei (1997), Johnson et al. (1997).

[2] Kaufmann and Wei (1998) also use firm-level data (based on the Global Competitiveness Report index) to assess the validation of the "grease argument", but the data is perception based and derived from questions referring to country characteristics. Ades and Di Tella (1999) utilize the same source but use country averages. Hellman et al. (2000a,b) also use micro (firm-level) data. The data (for 20 countries) is numerical but ordinal (based on multi-category responses to questions on corruption). In line with (and complementary to) the cross-country literature, they explain corruption as a function of the political-institutional environment (property rights protection and civil liberties). Di Tella and Schargrodsky (2000) use quantitative micro data (from hospitals) to test the Becker and Stigler (1974) hypothesis on wages and audits.

The first study dealt with "leakage" in large public sector spending program - a nonwage school grant. The hypothesis was that actual service delivery, proxied by primary enrollment, was much worse than budgetary allocations implied because public funds were subject to capture by local government officials and therefore did not reach the intended facilities (schools). To test this hypothesis, a diagnostic public expenditure tracking survey (PETS) was conducted to compare budget allocations to actual spending through various tiers of government, including the frontline service delivery points; i.e., the primary schools (Ablo and Reinikka, 1998; Reinikka, 2001). The comparison of disbursed flows from the central government (intended resources) with the resources actually received by primary schools, yielded an unique data set to study the level and determinants of leakage (Reinikka and Svensson, 2002a).

The second project extended a "standard" firm-level survey tool in order to collect quantitative information on bribe payments across firms (Reinikka and Svensson, 2001b). The idea was to combine detailed financial and structural information from the firms with the quantitative graft data, yielding a unique data set to study the determinants and consequences of corruption at the firm level.

What can be learned from these quantitative data collection efforts on measuring corruption at the micro level? In this chapter we review the key findings from the two surveys in Uganda. We briefly outline the methodology applied and discuss the policy implications. A short summary is given below.

The Ugandan school survey provided a stark picture of public funding on the frontlines. On average, only 13 percent of the annual per-student (non-wage) grant from the central government reached the school in the period 1991-95. Eighty-seven percent either disappeared for private gain or was used by district officials for purposes unrelated to education. Most schools received nothing! The picture looked slightly better when constraining the sample to the last year of the survey period. Still, in 1995, for every dollar spent by the central government to support primary schools non-wage expenditures the schools, on average, only received 22 cents.

An important finding from the Uganda PETS was that resource flows, and leakage, appeared to be endogenous to the schools' socio-political endowment. As shown in detail in Reinikka and Svensson (2002a), larger schools received a larger share of the

intended funds (per student). Schools with children of better-off parents also experienced a lower degree of leakage, while schools with a higher share of unqualified teachers experienced higher leakage. After addressing potential selection and measurement issues, these school characteristics had a quantitatively large impact on the degree of leakage.

As in the cross-country work, the firm-level data revealed that variation in policies/regulations (but here across industries) can explain the incidence of corruption across firms (Svensson, 2002a). Specifically, firms typically had to pay bribes when dealing with public officials whose actions directly affect the firms' business operations. Such dealings are difficult to avoided when, for example, exporting, importing, or requiring public infrastructure services. The data revealed that more than 80 percent of the firms in Uganda needed to pay bribes during a typical business year (Svensson, 2001)

Further, the firm-level data indicated that firms' "ability to pay", proxied by firms' current and expected future profitability, and their "ability to refuse to pay", proxied by the expected cost of reallocation, explained a large part of the variation in bribes across graft-reporting firms.

Finally, the firm-level data revealed no systematic evidence that firms that pay higher bribes on average received more beneficial government favors in return. On the contrary, after addressing potential problems of endogeneity and measurement errors, Fisman and Svensson (2001) show that the rate of bribery was negatively correlated with firm growth. The adverse effect of bribery on firm growth was more than three times greater than that of taxation on growth.

The rest of the chapter is organized as follows. Section 2 discusses key features and findings of the tracking survey (PETS). Section 3 presents the firm-level approach and discusses the key findings on the incidence, level and effects of corruption at the firm level. Finally, section 4 concludes with a discussion about policy implications.

## 2. Using public expenditure tracking survey (PETS) to diagnose corruption

The principal motivation for the public expenditure tracking survey study was the observation that despite a substantial increase in public spending on education since Uganda's recovery started in the late 1980s, officially reported primary enrollment remained stagnant. The hypothesis was that actual service delivery, proxied by primary

enrollment, was much worse than budgetary allocations implied because public funds were subject to capture by local government officials and therefore did not reach the intended facilities (schools). To test this hypothesis, a new survey tool was designed and implemented in mid 1990s. The objective of the so-called public expenditure tracking surveys (PETS) was to gauge the extent to which public resources actually filtered down to the intended facilities and to collect quantitative data on service delivery at the frontline (i.e., the schools).[3] To this end a survey of 250 government primary schools was implemented in 1996, covering the period 1991-95.[4] Monthly releases of funds (capitation grants) by the center to the districts were compared with information from the school level, collected directly from the school records.

The Ugandan school survey provides a stark picture of public funding on the frontlines. On average, only 13 percent of the annual per-student grant (capitation grant) from the central government reached the school in 1991-95. Eighty-seven percent either disappeared for private gain or was used by district officials for purposes unrelated to education. Most schools received nothing. Based on yearly data 73 percent of the schools received less than 5 percent, while only 10 percent of the schools received more than 50 percent of the intended funds. The picture looks slightly better when constraining the sample to the last year of the survey period. Still, in 1995, for every dollar spent by the central government to support primary schools non-wage expenditures the schools, on average, only received 22 cents.

A striking feature in the data is that although a majority of schools did not receive funding (in a given year), there is still a large variation in leakage across schools. Reinikka and Svensson (2002a) develop a simple bargaining model to explain this variation. In the model, resource flows—and leakage—are endogenous to school characteristics, as schools use their bargaining power vis-à-vis other parts of government to secure greater shares of funding. Specifically, in the absence of central government oversight, local government officials and schools bargain over the non-wage expenditures, which the central government disburses to local governments (districts).

[3] For a conceptual discussion on PETS and related quantitative service delivery surveys, as well as references to ongoing survey work, see Reinikka and Svensson (2002b).

[4] See Reinikka (2001) for details on survey design and a review of other key findings from the Uganda PETS. Reinikka and Svensson (2002a) discuss data issues and the institutional setting in Uganda at the time of the survey.

The district is supposed to pass the grant on to schools. District officials have discretion over these funds as, at the district level, they only know the amount of monthly transfers. In principle a school could obtain information on disbursements of the capitation grant but in practice contacting central government is costly. Even if the school decides to incur the cost of obtaining the necessary information, exercising their voice (see Hirschman 1970) is also costly. It would require organizing the parents and teachers and lodging a complaint with a higher authority. The key implication of the model is that resources are not allocated according to the rules underlying the government's budget decisions, with obvious equity and efficiency implications.

As shown in Reinikka and Svensson (2002a), the model's predictions are confirmed in the data. Specifically, larger schools appear to receive a larger share of the intended funds (per student). Schools with children of better-off parents also experience a lower degree of leakage, while schools with a higher share of unqualified teachers experience higher leakage. After addressing potential selection and measurement issues, these school characteristics have a quantitatively large impact on the degree of leakage.

These findings provide new insight into an area almost exclusively studied using cross-country data. They show that a large part of the variation in corruption at the local level can be explained by studying the interaction between the local officials and the end-users (schools in this case) as a bargaining game. From an analytical point of view this approach differs from much of the existing literature on corruption, since it focuses on the principal's (the school's) rather than the agent's (the district officials') incentives and constraints.

More generally, the public expenditure tracking survey (PETS) and related quantitative service delivery surveys are new promising microeconomic tools for diagnosing problems in basic service provision in developing countries (see Reinikka and Svensson, 2002b, for a discussion). Until recently the analysis of service delivery has focused almost entirely on financing of services, while provision, particularly issues related to institutions, incentives, and provider behavior, has received much less attention. The PETS addresses this omission.

## 3. Measuring and understanding corruption at the firm level

Can reliable micro (firm-level) data on corruption really be collected? For a long time it has been the common view that given the secretive nature of corrupt activities is it virtually impossible to collect reliable quantitative information on corruption. However, as argued by Kaufmann (1997) this presumption is incorrect. With appropriate survey methods and interview techniques firm managers are willing to discuss corruption with remarkable candor. At the same time, in order to collect reliable information on graft at the firm level it is crucial to design an empirical strategy that gives firm managers the right incentives to cooperate and truthfully report their experiences with corruption.[5]

Actual measure of corruption can either be derived indirectly, for instance by collection cost data on the provision of public services (see Svensson, 2001, 2002b), or more directly by getting an estimate of graft for firms in the same line of business (Svensson, 2002a).

The empirical strategy utilized to collect information on bribe payments across firms in Uganda had the following four key components. First, an industry association (UMACIS) implemented the survey. In Uganda, as in many other countries, there is a rooted distrust in most of the public sector. To avoid suspicion of the overall objective of the data collection effort it was therefore decided that the survey should be implemented by a body that most firms had confidence in. Second, the questions on corruption were phrased in an indirect fashion to avoid implicating the respondent of wrongdoing. Third, the corruption related questions were asked at the end of the interview, by which time the enumerator (hopefully) had established necessary credibility and trust. Finally, to enhance the reliability of the corruption data, multiple questions on corruption were asked (in different sections of the questionnaire). Consistent findings across measures significantly increase the reliability of the data. These multiple questions were incorporated into a "standard" firm survey instrument.[6] The data collection effort was also aided by the fact that corruption had to a large extent been desensitized in Uganda.

[5] A few recent attempts to study corruption at the firm level have paid little attention to this constraint. The data should be interpreted accordingly.

[6] As noted above, the firm survey had a much more general focus than to study corruption. The survey data have been used to examine a wide variety of issues, including evaluating the effects of trade liberalization on firm productivity (Gauthier, 2001); assessment of the bad news principle (Svensson, 2000b); studying the effects of, and coping with, poor public service provision (Reinikka and Svensson, 2001a). Reinikka and Collier (2001) summarize several of the findings from the firm survey.

Prior to the survey, several awareness-raising campaigns had been implemented on the consequences of corruption.[7]

Who must pay bribes and how much? The firm-level data suggest that, as in the cross-country work, the variation in policies/regulations (but here across industries) can partly explain the incidence of corruption. Specifically, Svensson (2002a) show that there are statistical differences between the group of graft paying and the group of non-bribing firms. Non-bribing firms tend to have characteristics suggesting they are operating in sectors with little or no contact with the public sector; that is, in the informal sector. They receive significantly less public services. They are less involved in foreign trade. They pay fewer types of taxes, particularly when controlling for tax exemptions.

These findings suggest that firms typically have to pay bribes when dealing with public officials whose actions could have large effects on the firms' business operations. This interpretation is further supported by the finding that firms reporting positive bribe payments spend significantly more time dealing with government regulations and spend more money on accountants and specialized service providers to deal with regulations and taxes. In other aspects, the two groups of firms are similar.

How much must graft-paying firms pay? To answer this question Svensson (2002a) develop a simple bargaining model in which firms, if forced to pay bribes in order to continue their operations, must bargain about the amount with a rent-maximizing public official. The group of graft-paying firms faces the same set of rules and regulations, but they differ in profitability and choice of technology. In the model, these firm characteristics determine the bargaining outcome.

Combining the quantitative data on corruption with detailed financial information from the surveyed firms, Svensson (2002a) test the bargaining hypothesis and finds that, consistent with the model, firms' "ability to pay", proxied by firms' current and expected future profitability, and firms' "ability to refuse to pay", proxied by the expected cost of reallocation, can explain a large part of the variation in bribes across graft-reporting firms. Moreover, the results are statistically robust and remained intact when instrumenting for profits.

[7] See Ruzindana et al. (1998) and World Bank (1998).

These results suggest that public officials act as price (bribe) discriminators, demanding higher bribes (for a given public service) from firms that can afford to pay, and demanding lower bribes from firms that credibly can threaten to exit the market or use other means to acquire the service.

Do bribe payments constitute a heavy burden on firms? The evidence suggests they do. For the firms that reported positive bribes, the average amount of corrupt payments was about USD 8,280 with a median payment of USD 1,820. These are large amounts, corresponding on average to USD 88 per worker, or roughly 8 percent of total costs (1 percent in the mean). Including firms reporting zero bribe payments, the average payment is USD 6,730 with a median payment of USD 450.

Approximately 50 percent of the firms reporting positive bribe payments paid more in grafts (annually) than what they paid for security (including guards, investment in equipment etc.). Almost 50 percent of the firms reported larger bribe payments than total investment.[8]

When assessing this data it should be stressed that despite the data collection strategy, there are likely to be cases of misreporting in the sample. The average graft numbers may be sensitive to such misreporting. The strategy used to collect information on grafts, however, has minimized any obvious systematic biases in the correlation between reported grafts and the set of explanatory variable discussed above.

Fisman and Svensson (2001) use the same firm-level data set to address the question what are the effects of corruption on firm performance. Evaluating the effects of corruption (for instance on firm growth) using firm-level data is difficult. The problem is identification, since both growth and corruption are likely to be jointly determined. A simple example illustrates the point. Consider two firms in a given sector of similar size and age. One of the firms is producing a good/brand that is perceived to have a very favorable demand forecast, while the other firm is producing a good with much less favorable demand growth. Assume furthermore that the firms need to clear a certain number of business regulations and licensing requirements, and/or require some public infrastructure services. Moreover, assume that the public servants have discretion in

[8] Part for the explanation to this striking finding is the fact that a considerable number of firms invested very little or nothing in any given year.

implementing and enforcing these regulations and services. A rational rent-extracting public official would try to extract as high bribe as possible. In this setup one would expect a public official to demand higher bribes from the firm producing the good with a favorable demand forecast, simply because this firm's expected profit are higher and, thus, its ability to pay larger. If the forecasts also influence the firms' willingness to invest and expand, we would expect (comparing these two firms) a positive (observed) relationship between corruption and growth.

Fisman and Svensson (2001) try to overcome this simultaneity problem by using industry-location averages as instruments. They argue that if the aforementioned problem is specific to firms but not industries or locations, netting out this firm-specific component yields a bribe measure that only depends on the underlying characteristics inherent to particular industries and/or locations that determine to what extent bureaucrats can extract bribes. For example, in the case of industries, the extent to which the market for the produced goods are abroad, import reliance, and dependence of publicly provided infrastructure services.

Fisman and Svensson (2001) find that the rate of bribery is negatively correlated with firm growth. For the full data set, a one-percentage point increase in the bribery rate is associated with a reduction in firm growth of three percentage points, an effect that is about three times greater than that of taxation on firm growth. Moreover, after outliers are excluded, they find a much greater negative impact of bribery on growth, while the effect of taxation is considerably reduced.

Despite these strong results it should be stressed again that in reality some firms may still benefit (and possibly a lot) from corruption. What this type of econometric work identifies is what is true on average, or in general, and on average the data suggest that there is a strong negative relationship between bribery payments and firm growth.

The findings in Fisman and Svensson (2001) can help to shed light on a hotly contested issue, what are the consequences of corruption on firm growth and performance? At a conceptual level this debate has been going on for several decades (for an excellent review see Bardhan, 1997). On one side, the effect of corruption is thought of as being something like a tax, differing primarily in that the payment does not end up as public revenues. This "tax effect" reduces both the return to private capital (since part

of output will be extracted in bribes) and the amount of internally generated funds; i.e., retained profits, firms can use for capital investment. To the extent that corruption also deprives the government of income required to provide productive public goods, corruption is likely to be more detrimental to growth than taxation. In addition, the uncertainty and secrecy that necessarily accompany bribery payments is likely to compound this difference.[9] On the other side, proponents of the "grease argument" claim that bribery may allow firms to get things done in an economy plagued by bureaucratic holdups and be a way to get around tax and regulatory burdens. The firm survey findings suggest that the former rather than the latter claim on the effects of corruption is consistent with the data.

## 4. Conclusion

In Reinikka and Svensson (2002a) we provide, to our knowledge, the first quantitative assessment of leakage in a large public expenditure program in a developing country. The strikingly high leakage figure points to the importance of studying the supply side of the service delivery system in order to understand the impact of public spending. The public expenditure tracking survey (PETS), and related surveys reviewed in Reinikka and Svensson (2002b), are feasible tools to use to study such supply side issues.

We also show that resource flows (leakage) are endogenous to the schools' socio-political endowment. Thus, rather than being passive recipients of flows from government, schools use their bargaining power vis-à-vis other parts of government to secure greater shares of funding.

Interestingly, the extent to which funding reached the intended beneficiary had little to do with conventional audit and supervision mechanisms, but on the schools' opportunity to voice their claims for the funds. Traditionally it has been left to the government and a country's legal institutions to devise and enforce public accountability. The Uganda findings question this one-sided approach. As the government's role and services have expanded considerably during the past decades, it has become apparent that conventional mechanisms, such as audit and legislative reviews, may not be enough.

[9] See Shleifer and Vishny (1993).

Collusion, organizational deficiencies, abuse, and lack of responsiveness to citizens' needs cannot easily be detected and rectified even with the best of supervision. When the institutions are weak, as is common in many developing countries, the government's potential role as auditor and supervisor is even more constrained.

As discussed in Reinikka (2001), following publication of the survey findings, the central government made a swift attempt to remedy the situation. It began publishing the monthly inter-governmental transfers of public funds in the main newspapers, broadcasting information on them on radio, and required primary schools to post information on inflows of funds for all to see. The objective of this information campaign was to promote transparency and increase public sector accountability by giving citizen access to information needed to understand and examine the workings of the capitation grant program for primary schools. By providing adequate information, schools and citizens would be empowered to monitor and challenge abuses of the system.

An initial assessment of these reforms a few years later, through a locally implemented PETS, showed that the flow of funds had improved considerably (Republic of Uganda, 2000). The improvement suggests that provision and dissemination of information can indeed play a crucial role in improving outcomes. The Uganda case also illustrates the possible impact that collection and dissemination of quantitative data on public spending and services can have as a tool to mobilize "voice" (Hirschman 1970). Individual complaints about services or characterizations about services offered based on isolated experiences tend to be brushed aside as anecdotal evidence or at best partial evidence. However, when systematic comparative data support public feedback, it is difficult to ignore and it can provide a spark for (public) action.

The chapter has also argued that with appropriate survey methods and interview techniques, it is possible to collect quantitative data on corruption at the firm level. The data reveals that more than 80 percent of the firms in Uganda need to pay bribes during a typical business year. Moreover, the amount paid could partly be explained by firm specific characteristics, such as current and expected future profits and the reversibility of the capital stock. These findings suggest that amount paid in bribes is not a fixed sum for a set of public services, but depends on the firm's "ability" to pay: the more the firm "could" pay the more it will have to pay. In other words, the "price" for a given public

service depends on ability to pay. We find no evidence that firms that pay higher bribes on average receive more beneficial government favors in return. In fact, the rate of bribery is negatively correlated with firm growth.

From a policy perspective the results point to a range of non-traditional and complementary options to reduce corruption, namely actions on the part of the business community to strengthen the bargaining position of individual firms. Such measures include: collecting and disseminating information about corrupt practices; informing the private sector and the public about service standard; guidelines and norms of major service providers; increasing individual firms ability to commit to no-bribery; and recognizing those how are doing a good work by resisting corruption.

As both the school-level and firm-level findings suggest, in general corruption can be effectively tackled only when the reform of the political process and the restructuring of the regulatory systems are complemented by a systematic effort to increase the citizens' ability to monitor and challenge abuses of the system, and inform the citizens about their rights and entitlements.[10] Breaking the culture of secrecy that pervades the functioning of the government and empower people to demand public accountability are two important components in such an effort.

Recent reviews of the growth performance of Sub-Saharan Africa have identified a number of recurring features of African politics that are likely to undermine the results of traditional institutional reforms. These features include restricted civil society involvement, state perceived as a vehicle of wealth accumulation, prevalence of patronage politics, and small elite with close political connections. Although each may not be applicable to every country, a successful national anti-corruption program must also tackle these fundamental determinants of corruption.

[10] Paul (1997) makes the same argument.

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