4. What Determines Corruption

4.1. The Incentives Bureaucrats Face

The previous sections have discussed the impact of corruption on economic outcomes. This section examines what we know about why corruption exists, and related to this, what can be done with it.

To organize ideas, we first examine a simple framework that models the perspective of an individual bureaucrat, following the ideas of Becker and Stigler (1974). This framework treats the gains from corruption (the bribe) as fixed and asks when corruption will be preferable to honesty. We then examine what happens when the optimal bribe is determined by the bureaucrat taking into account market forces, following the ideas of Shleifer and Vishny (1993). The subsequent sections discuss the empirical evidence to date along all of the dimensions suggested by the simple theoretical framework.

Suppose that the bureaucrat receives a wage \( w \) from the government and, if fired, can receive an outside option \( v \). The bureaucrat can decide to be corrupt or honest. If he is corrupt, he is detected with probability \( p \), is fired, and receives outside option \( v \). If he is undetected, he receives his wage \( w \) plus the bribe \( b \), less a dishonesty cost \( d \). In equilibrium, he will be corrupt if and only if

\[
\frac{w - v}{1 - p} < \frac{b - d}{p}.
\]

This simple framework suggests several avenues for reducing corruption. One could increase the returns to staying on the job \( (w) \), or, equivalently in this context, one could decrease the outside option \( (v) \) by increasing punishments. One could also increase the probability of detection \( (p) \).

One implication of this simple framework is that if there is heterogeneity in \( d \) among potential bureaucrats, there can be selection where those who are most likely to be corrupt (those who have the lowest dishonesty costs \( d \)) will self-select to be more likely to become bureaucrats. Suppose that \( d \) in the population is distributed uniformly from 0 to \( \bar{d} \). If \( w - v > \frac{b - d}{p} \), then nobody will be corrupt, regardless of their level \( d \), and there is no reason that the distribution of \( d \) among bureaucrats will be different than the distribution of \( d \) in the population.

If, however, the above inequality does not hold, then people with low \( d \) will have a higher utility from becoming bureaucrats than those with high \( d \), since they will be relatively more efficient at corruption, so depending on how the government allocates jobs we might expect to have more low \( d \) people among bureaucrats than in the population. This implies that corruption may be harder to combat than one might expect, since a corrupt system may attract those types of bureaucrats who are more prone to corruption. It also implies that the effect of a given anti-corruption policy (i.e., a vector \( (w, p) \)) will depend on past levels of anti-corruption policies, since those past policies will influence the selection of bureaucrats.

The simple framework thus far has treated the amount of the bribe, \( b \) as exogenous. In practice, however, the bribe \( b \) may be set by the bureaucrat to maximize his profits. Specifically, conditional on deciding to be corrupt, the bureaucrat will set his bribes to maximize his profits, which are the number of
bribes he receives multiplied by the price, i.e. \( q_i b_i \). The key insight of Shleifer and Vishny (1993) is that the optimal solution depends on what other bureaucrats are doing and how they set prices. If a person needs permits from two different bureaucrats to complete a transaction, and both set prices independently, then each bureaucrat solves \( \max_{b_i} Q \left( b_i + b_{-i} \right) b_i \), taking the other bureaucrat’s bribe \( b_{-i} \) as given. In such a case, the total amount of the bribes \( (b_1 + b_2) \) will be higher than if there had only been a single bureaucrat, and the total quantity will be lower. Conversely, if a consumer needs a single permit which can be obtained from either bureaucrat, they will compete against each other and reduce the bribe beyond what a single, monopolistic bureaucrat would charge. The key insight is that the bribes themselves may be a function of the structure of the bureaucracy, and that changing the nature of the organization may have important implications for the level of corruption.

This simple framework is, of course, quite stylized, but it highlights the important role that both the incentive structure faced by individual bureaucrats (be it compensation, monitoring, selection, or other incentives) as well as the bureaucratic organization may play in influencing the amount of corrupt behavior. This section discusses the evidence to date on each of these factors in turn.

4.1.1. The Bureaucrat’s Decision Problem: the Role of Compensation, Selection, and Other Incentives for Bureaucrats

(i) Compensation

Despite the attention often given to civil service wages, there is relatively little evidence on their impact. Several cross-country studies find that higher public wages are associated with lower corruption, though these studies are essentially cross-sectional in nature. For instance, in a cross-section of 31 low-income countries, Van Rijkenghem and Weder (2001) find that a doubling of government relative to manufacturing wages is associated with only 0.5 point reduction in ICRG corruption index measured on a scale from 0 to 6. Meanwhile, Rauch and Evans (2000) find that the level of bureaucratic wages are significant in explaining only one of the five measures of bureaucratic performance, namely that a 1 standard deviation increase in salary is associated with an improvement of 0.5 standard deviation in the bureaucratic delay index measured on a range from 1 to 4.

With regard to more micro evidence, Di Tella and Schargrodsky (2004) test the efficiency wage idea by looking at a corruption crackdown in Buenos Aires hospitals’ procurement departments. In the context of the model above, they examine the impact of increasing \( p \), the probability of detection, and examine heterogeneous impacts on the prices paid for basic inputs based on the level of wages. They find that prices paid by hospitals for basic, homogeneous inputs decrease by 15 percent during the first 9 months of the crackdown, and following period prices increase, but remain 10 percent lower than those prevailing before the crackdown. During the first phase of the crack-down, when audit intensity can be expected to be maximal, higher wages have no effect on inducing lower input prices. Meanwhile, higher wages do

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1 To simplify the analysis, we will assume that conditional on being caught, the probability of being caught does not depend on the amount of the bribes or the quantity of bribes, though one could easily generalize the model to include these effects.
have a negative effect in the last phase of the crackdown, when audit intensity can be expected to take intermediate values—the wage elasticity of input prices exceeds 0.2 (controlling for fixed effects).

Niehaus and Sukhtankar (2013) examine the theoretical idea that the rents from keeping one’s job can deter corruption today in order to preserve tomorrow’s opportunities. The rents they examine come from corruption, not wages. Specifically, they examine a setting where officials have two types of corruption available to them. In their setting, corruption is measured as the gap between official and actual quantities—including over-reporting of days and under-payment of wages in the Indian National Rural Employment Guarantee Act. They are able to identify the effect of future rents on the level of corruption today because the program features two types of projects; some projects pay fixed daily wages, while others pay piece rates. They examine how corruption in the two types of projects varies with anticipated rent-extraction opportunities using an exogenous increase in the wage rate for daily wage projects. Their results show an 80 percent reduction in the daily theft on piece rate projects in the period post-wage increase. Hence, when the opportunities for theft from daily wage projects increase, theft on piece rate projects goes down. In addition, they find reduced over-reporting of days worked on daily wage projects in areas where the proportion of future daily wage projects is higher.

Aside from wage increases, other types of resource windfalls, such as federal transfers, could influence corruption by local officials. Brollo et al. (2013) use regression discontinuity design to study the impact of increased federal revenues transferred to Brazilian municipalities on local corruption and candidate selection. Since the level of federal transfer received by each municipality is determined by population, they use population discontinuities as an instrument for transfers actually received, looking at seven thresholds for receiving varying levels of funds and comparing municipalities just above or below these population thresholds. They find that a 10 percent increase in federal transfers to a municipality raises the incidence of broad corruption by 17 percent and narrow corruption by 24 percent, decreases the fraction of opponents with at least a college degree by 7 percent, and increases the reelection probability of incumbents by 7 percent. They hypothesize that the mechanisms behind these results are that increased funding means local politicians have more room to collect rents without being noticed by voters, and those candidates who have worse outside options are more likely to benefit from greater opportunities for corruption, thus the lower quality candidates attracted to municipalities with higher levels of corruption.

While these various studies all suggest that there might be a relationship between the future returns to employment and the amount of corruption chosen, they are by no means dispositive, and this remains an important area for future research.

(ii) Monitoring and Punishments

One would expect from the simple framework above that increasing monitoring and would lead to lower levels of corruption. In practice, however, the very individuals tasked with monitoring and enforcing punishments may themselves be corruptible, so increasing monitoring may simply increase transfers from low-level officials to auditors. Moreover, just because people are audited does not necessarily mean that auditors will find enough evidence to actually impose a punishment, even if corruption was taking place. Understanding the degree to which additional monitoring can reduce corrupt behavior is thus an important area for empirical research.

Olken (2007), in the study of roads in Indonesia, examines this question by conducting a randomized experiment on auditing. Before villages began building road projects, some villages were randomly
selected for a high audit intensity group, where they faced an audit by the government agency with 100 percent probability, as opposed to a 4 percent probability in the control group. Olken found substantial effects of the government audits, reducing corruption by 8 percentage points or about 30 percent from the baseline level. Interestingly, the audits revealed that there was substitution among alternative forms of corruption: although audits reduced missing expenditures, they led to increases in nepotism (i.e., the hiring of family members of the project leader or village officials to work on the project). One reason that the audits did not reduce corruption to zero was that, even though audits found problems in 90 percent of the villages they audited, the findings were typically administrative failures, such as improper receipts or a failure to receive the required number of competitive bids, rather than the direct evidence of corruption that would be needed for a criminal prosecution. Put another way, just because the probability of an audit was 100 percent does not imply that the probability of punishment, conditional on the presence of corruption, was 100 percent. Nevertheless, on balance, the results demonstrate that the traditional economic approach to fighting crime—increasing the expected cost of crime by increasing the probability of being caught—can play an important role in reducing corruption, even in a highly corrupt environment where those doing the monitoring are themselves potentially corruptible.

Another approach to providing monitoring—that does not involve a central auditor—is grassroots monitoring, where regular citizens are empowered to monitor their officials to prevent corruption. Olken’s study also examined this by randomly allocating villages to receive more intensive community monitoring. This was done through two interventions, with different purposes. The first intervention involved inviting hundreds of villagers to attend local accountability meetings, to reduce elite control over which community members were involved in the monitoring. The second intervention involved distributing hundreds of anonymous comment forms throughout the village, in order to allow community members to voice concerns or complaints without fear of retaliation.

The results showed that increased community monitoring can be effective, but only when the free rider problem in monitoring is limited and when pains are taken to reduce elite capture. Specifically, the invitations intervention reduced theft of materials, but only for theft of wages (i.e., convincing villagers to work for free but billing the project for their work). One reason may be that if theft of wages was detected, the benefits would go to the small number of people who worked on the project and should have been paid; they therefore have a strong personal incentive to make sure this type of corruption did not occur. By contrast, if there was theft of materials, the benefits from detecting it would accrue to the village as a whole in the form of a better road, so the free rider problem may be more severe. With regard to anonymous comment forms, they were successful only when they were distributed via school children, not via the neighborhood government, as the neighborhood leaders channeled the forms towards preferred people who were more likely to support the elite in the project. One important take-away from the results is that for community participation to work, it is important to get the details right in terms of protecting people from retaliation, limiting the free rider problem, and preventing elite capture.

Bjorkman and Svensson (2010) examine a related community monitoring intervention in Uganda, in which local NGOs encouraged communities to be more involved in the state of health service provision. The NGOs facilitated village and staff meetings in which members of the communities discussed baseline information on the status of health service delivery relative to other providers and the government standard. They also encouraged community members to develop a plan identifying key problems and steps the providers should take to improve health service provision. They find that the community-based
monitoring project increased the quality and quantity of primary health care provision. A year after the first round of meetings, treatment communities witnessed a significant improvement in health outcomes relative to communities assigned to the control group \(-0.14\) z-score increase in the weight of infants and a 33 percent reduction in child mortality, as well as 20 percent higher utilization for general outpatient services. Changes in the quality and quantity of health services resulted from behavioral changes of the staff, as treatment practices, including immunization of children, waiting time, examination procedures, and absenteeism improved significantly in the treatment communities. One challenge with the study is understanding the mechanisms behind the effect—something in the community monitoring package of interventions was clearly effective, but why this package was effective while the Glennerster et al. (2010) study of enhanced community monitoring in education described above was not is an important question for future research.

Ferraz and Finan (2008) examine the role of electoral sanctions as punishments. In their setting, small municipalities were randomly chosen to be audited by government auditors. They examine the impact of the timing of auditing on the probability that the mayor is re-elected. They find that, conditioning on the actual number of corruption violations found by the auditors, those audited before the election were less likely to be reelected than those who were audited after the election. The finding suggests an important complementarity between audits—which provide information about corruption—and electoral accountability.

Finally, electoral rules can also create mechanisms and incentives to increase political accountability. In a follow-up paper, Ferraz and Finan (2010) use the same audit report as that in Ferraz and Finan (2008) for municipalities that were audited prior to the 2004 municipal elections to test whether electoral accountability affects the corruption practices of incumbent politicians. They compare mayors serving in a first term (eligible for re-election) to mayors in their second term (non-eligible for re-election) to identify the effects of re-election as an incentive to avoid corruption. Using the share of total federal resources transferred to municipalities that are associated with fraud in the public procurement of goods and services, diversion of funds, and over-invoicing of goods and services as a measure of corruption, they find that mayors with re-election incentives are significantly less corrupt than mayors without re-election incentives. In terms of magnitudes, they estimate that in municipalities where mayors are in their first term the share of stolen resources is, on average, 27 percent lower than in municipalities where mayors were non-eligible for re-election. Although this result suggests a two-term period is more effective than a one-term period as an anti-corruption policy, it does not mean politicians should be re-elected indefinitely. Term limits could also produce benefits if politicians in the absence of the pressure of being re-elected have better incentives to implement socially optimal policies with a long-term horizon.

(iii) Selection

Although the simple framework above suggested that the selection of who chooses to become a bureaucrat is potentially important, there is relatively little evidence on this point. One related paper is Ferraz and Finan (2011). Although this paper does not examine leakage per se, it does examine the role of wages in inducing selection of politicians. To identify these effects, they use a 2000 constitutional

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2 Fisman et al. (2012a,b) conduct a similar study in Europe, looking at the impact of equalizing wages across Members of the European Parliament (MEPs). They find that an increase in salary is associated with an increase in probability to run for reelection but a decrease in the quality of elected MEPs.
amendment introduced a cap on the maximum salary that could be paid to local legislators in Brazil, which varied according to the municipality’s population, and hence induced discontinuities in wages across municipalities. They find that higher salaries attract better candidates, though the effects are relatively modest—a 20 percent increase in wages only leads to a 0.2 increase in the average years of schooling and a 0.05 increase in the number of years of experience. Higher wages also improve the performance of a politician while in office. A 20 percent increase in wages leads to an increase of 25 percent in the number of bills submitted, however. We regard evidence on selection of politicians and the impact on corruption and leakages as an important area for future work.

Selection based on propensity to be corrupt could also lead to multiple equilibria in corruption. In particular, as the framework above discussed, in a corrupt equilibrium the people who have the highest propensity to take advantage of corruption will disproportionately choose to become civil servants, which could make fighting corruption in the future more difficult—i.e. the same policies that effectively control corruption in a low-corruption country might not be enough to eliminate corruption in a high-corruption country, and in fact the same set of incentives might be consistent with both high and low corruption equilibria. Testing whether there are indeed multiple equilibria in corruption—for reasons of selection or for other reasons—is an important area for future work.

(iv) Incentives

The framework outlined above was implicitly a model in which the only way the principal can observe what the bureaucrat is doing is through monitoring. For many government activities, however, there are direct indicators of the agent’s behavior. For example, it may be possible to monitor teachers’ attendance or the test scores of the children in their classes; it may be possible to monitor the number of citations issued by a police officer; it may be possible to measure the amount of taxes collected by a tax inspector. In such cases, creating explicit incentives based on these outcomes—whether direct financial awards or more complex incentive schemes through promotions, assignments, and the like—may be an important approach to reducing leakages.

In all of these cases, however, these indicators are imperfect measures of the civil servants’ objectives: we want teachers to help children learn, which is only imperfectly proxied by attendance (maybe they are not teaching) or test scores (maybe they are “teaching to the test”); we want citations issued only for those drivers who actually break the law, and not issued for those who do not; we want taxes collected when they are due but we do not want overzealous tax collectors collecting from those who do not owe. In understanding the importance of incentives, it is critical to deal with the so-called “multitasking” problem (Holmstrom and Milgrom, 1991) and ensure that the true goals of the principal are achieved, not just the ones that are incentivized.

There are several studies that suggest that incentives can be effective, though the results suggest that caution is in order. Duflo, Hanna, and Ryan (2012,b) show that incentives seem to work for teachers with good monitoring. They design a randomized experiment in which they varied the exposure to monitoring and financial incentives of teachers across 113 schools in rural Rajasthan. Teachers in treatment schools were exposed to daily monitoring (using cameras) and were remunerated based on a nonlinear function of their attendance, while teachers in the control group were neither monitored nor given financial incentives. They find that the program had an immediate and long-lasting effect on teacher attendance—
the absence rates was 21 pp lower in treatment schools—and also led to 0.17 standard deviation improvement in test scores. To disentangle the effects of monitoring from financial incentives, the authors estimate a structural dynamic model of teacher labor supply using the daily attendance data in the treatment schools, and find that teachers respond to the financial incentives: our estimates suggest that the elasticity of labor supply with respect to the level of the financial bonus is between 0.20 and 0.30.

However, Banerjee et al. (2008) provide a more cautionary tale of the impact of incentives, and show how over the medium term they can be undone. Specifically, they examine the effect of monitoring and financial incentives in improving attendance and effort of publicly employed nurses in rural health sub-centers in India. In collaboration with a local NGO, the attendance of nurses in treatment centers was monitored using time-clocks. The attendance data was then passed on to the government, which used the attendance data with a specific schedule of fines and punishments (introduced expressly for the program) to determine the wages of a given nurse. The program led to a substantial 27.9 percentage point increase in attendance in the first six months of the program. However, there was no impact over the subsequent six months. Their interpretation is that the local health administration deliberately undermined the incentive system by allowing nurses to a larger number of exempt days which were not subject to monitoring. The nurses also deliberately tampered with the unit/time stamping machines such that they could no longer be monitored. As a result, eighteen months after the program started, there was no difference between the absence rates in treatment and comparison centers (over 60 percent).

Another issue with incentives is that programs designed to incentivize good behavior by certain actors can sometimes incentivize corrupt behavior by others. For example, Linden and Shastry (2012) study the implementation of a conditional school nutrition program in India in which students receive 3kg of uncooked rice for every month of school in which they have at least 80 percent attendance. The idea behind the program is to both improve student nutrition as well as incentivize school attendance. Whether or not a student receives the transfer is completely dependent on the attendance records kept by the teacher of each classroom. When comparing attendance records of the teachers to attendance records taken once a week by external monitors, however, the authors find evidence that teachers use their discretion to inflate the attendance of certain students to put them over the 80 percent threshold. Of the 15,000 students in the sample, at least 40 percent received grain at least one month during the sample period in which they technically had not met the attendance requirements. Teachers were more likely to inflate the attendance records of girls, lower caste students, and high performing students but less likely to inflate for Muslim students. Patterns of attendance inflation suggest that teachers were doing so specifically in response to the nutrition program as they were more likely to inflate for children just below the 80 percent threshold and more likely to inflate at the end of the month when they could tell who needed the boost. Interviews with teachers suggest their actions were motivated by compassion in response to the difficult situation of extreme poverty and that they were not seeking benefits for themselves. This example suggests that corruption does not always come from malevolent intent nor does it necessarily decrease efficiency. As the authors suggest, the behavior of the teachers, as it was likely to be based on greater information about individual students, may have increased the efficiency of targeting students in need for the nutritional component of the program than if the implementation of the transfer had not been decentralized. At the same time, the actions of the teachers likely distorted incentives to attend school that were built into the program and may have been discriminatory in nature.
A second set of papers looks at the effect of performance pay for teachers on education outcomes. Muralidharan and Sundaraman (2009) find supporting evidence for the hypothesis that teacher pay incentives based on student performance improve educational outcomes. They conduct a randomized evaluation of a teacher incentive program implemented across a sample of government-run rural primary schools in the Indian state of Andhra Pradesh. Teachers in treatment schools were eligible to receive a bonus payment based on the improvement of the students’ average test scores. Some schools were assigned to a group incentive treatment, in which teachers were paid a group bonus based on improvements in the school-level average test score, while other schools were assigned to an individual incentive treatment in which the teacher was paid an individual bonus based on improvement in the average test scores of his/her students. Their results show 0.26 and 0.16 standard deviation increase in students’ math and language test scores, respectively, in schools where teachers were paid based on performance. However, while group and individual incentive schools performed equally well in the first year of the program, average test scores were 0.10 standard deviations higher in schools where teachers were given individual incentives relative to schools with group incentives by the end of second year of program.

In contrast, Glewwe et al. (2010) show that performance pay for teachers may not be as effective, since it leads to an improvement in outcomes only along the measures that are used to compute the formula that determines pay. They analyze a randomized experiment carried out by a Dutch NGO in Kenya, in which teachers in treatment schools were eligible to receive in-kind prizes based on the school-average test scores in district exams with penalties for students missing the exam. They find that students in schools where teachers were eligible to receive prizes showed a 0.215 standard deviation increase in the score on the formula used to reward teachers in year 2 of the program. However, there was little evidence that rewarding teachers increased broad capital accumulation beyond the narrow formula used to allocate rewards, and the program did not seem to affect the probability of dropping out.

Outside education and health, there is little evidence on how incentives change the performance of bureaucrats. Kahn et al. (2001) use tax reform instituted by the Brazilian government in 1989 to study the effect of performance-based wages for tax collectors, in an economy with widespread tax evasions. The reform offered a bonus to tax officials based on group and individual performance in finding and collecting taxes from tax evaders. They find that the growth rate of fine collection exhibits a break in 1989, and estimate that fine collections per inspection are 75 percent higher on average than what they would have been in the absence of the program, with substantial heterogeneity across regions. The authors do their best to provide evidence that the surge in tax collections post-1989 was due to the performance incentives provided by the tax reform, but since they do not have a control group, the evidence is suggestive but not conclusive. The tentative conclusion of this evidence is that there is room for incentives to succeed—see, for example, the studies of Duflo et al. (2012,b) and Muralidharan and Sundaraman (2009)—but that caution must be taken to design the incentives well and prevent them from being undermined.

Finally, Banerjee et al. (2012,a) examined the impact of training and frozen administrative transfers as an incentive mechanism to enhance police performance and improve public opinion towards the police. In eleven districts across Rajasthan 150 police stations were randomly assigned to receive in-service training at the Rajasthan Police Academy, including classes to improve the competence level and scientific techniques of investigating officers, and soft skills training such as communication, mediation,
stress management and motivation for all the other personnel. In addition, administrative transfers that seemed to have adverse effects on personnel and their families were frozen for one and a half years. The results showed that increasing the number of trained officers from 0 percent to 100 percent raised the probability that crime victims were satisfied with police investigation by 31 percentage points (more than a twofold increase) and increased the probability of making an arrest during an investigation by 26 percent.

An important next step in this research is to examine cases such as tax and police work in greater detail. In these cases, the agent’s task is very different from a teacher’s, since the goal of the agent here is to discriminate between innocent and guilty (or those who deserve tax and those who do not). In these cases, the incentive would only reward total output (total citations or total taxes) but it would be hard to incentivize on accuracy, so the multitasking problem may be much more severe. Given the perceptions of rampant corruption in these sectors, however, this seems like an important area for future work.

A second important open question for incentives involves the use of non-monetary incentives. In many civil service systems, there are constraints that make the implementation of monetary incentives quite difficult. Instead, these systems use task assignment and rotations as incentive devices, where those who perform well are given choice tasks and assignments in the future, and vice-versa. We also anticipate that this will be an important dimension of future work.

Open Research Questions:

- Do higher wages reduce corruption? If so, is it due to selection effects, efficiency wages, or because honesty is a normal good?
- When are government enforcers (auditors, police, prosecutors, anti-corruption commissions, etc) effective at reducing corruption, and when do they themselves become corrupt and only add to the problem?
- Are there multiple equilibria in corruption? If so, what causes this? And if so, can temporary corruption crackdowns have permanent effects?
- Can output-based incentives for government officials such as police and tax inspectors reduce corruption, or will they lead to over-enforcement and extortion?
- What are the possible selection and promotion criteria to reduce propensity of civil servants to be corrupt?
- How can community-monitoring programs be designed to make them more effective in monitoring civil servants?
- Can non-financial motivations, such as shame, intrinsic motivation, and mechanisms to internalize the greater good reduce corruption?

**4.1.2. The Market for Bribes: Changing the Structure of the Bureaucracy to Harness the Forces of Competition.**
The previous section described an approach to corruption and leakages based on a principal-agent framework, focusing on how a principal—i.e., the government—can overcome best monitor its agents—civil servants. The key focus of analysis is therefore the strategic relationship between principal and agent. In other settings, however, strategic interactions between corrupt agents themselves become important. In this view, articulated by Shleifer and Vishny (1993), corrupt agents behave like profit-maximizing firms, and the level of corruption is determined not just by monitoring, but also by the structure of the “market” for bribes, the elasticity of demand for the officials’ services, and the degree to which corrupt officials can coordinate with one another in setting prices. As outlined in the theoretical section above, depending on how the market is structured, these kinds of strategic interactions can either raise or lower the bribe amounts.

If a person needs to bribe multiple corrupt officials to perform a given task, Shleifer and Vishny argue that that the “double-marginalization” problem can arise. Specifically, if each agent does not fully internalize the effect of their bribes on other officials’ bribe revenues, the total amount of bribes one would need to pay could be higher than if the agents had acted independently.

Olken and Barron (2009) use the data they collected on the bribes truck drivers pay to empirically test idea that market forces partially determine the level of corruption and specifically to test for this type of double-marginalization. They exploited the fact that, during the period studied, the number of checkpoints along one of the roads was reduced in accordance with a peace agreement signed earlier in the year. They used this change in market structure to estimate the elasticity of the average bribe paid with respect to the expected number of checkpoints. They show that the average price paid at checkpoints increases when the number of checkpoints declines, consistent with double-marginalization along a chain of vertical monopolies. The results provide evidence for the Shleifer-Vishny view that the market structure has an impact on the total amount of bribes charged, and more specifically, that price setting in this particular context is decentralized rather than centralized. These findings highlight the need to consider strategic interactions between corrupt agents themselves, in addition to interactions between principals and agents, in designing effective anti-corruption policy.

An implication of this view is that a policy reform that moves from having a large number of independent agents to a single agent may reduce corruption and increase economic efficiency. Bruhn (2008) uses the sequential implementation of a reform that simplified business entry regulations across municipalities in Mexico to estimate the economic effects of such reforms more convincingly than in cross-country data. Although the paper does not look at the effects of the reform on corruption directly, the results do show that simplified regulation leads to increased efficiency. She finds that the reform increased the number of registered businesses by 5 percent, which was accounted for by former wage earners opening businesses. Wage employment also increased by 2.2 percent as a result of the reform, while competition from new entrants decreased the income of incumbent businesses by 3 percent. Conducting a similar study of the same reform of business entry regulation in Mexico, Kaplan et al. (2011) compare eligible industries to ineligible industries in municipalities which implemented the reforms. They find that the program generated 5 percent more new formal firms per month in eligible industries compared to ineligible industries. At the same time, however, they find these results to be temporary, concentrated in the first 15 months of implementation. Still, their back of the envelope calculations indicate that the benefit of the reforms are six times greater than the costs, so there are certainly efficiency gains with the simplification of the previous business entry regulation.
The flip side of strategic interactions between bureaucrats is that if bureaucrats are competing against one another, this could reduce the bribes paid and lead to lower bribes and more output.

One recent study that examines this is Burgess et al. (2011), which explores this issue in the context of deforestation in Indonesia. In particular, the study explores a setting in which local district forestry officials can allow logging beyond the legal logging quota in exchange for bribes. The study shows that as the number of political jurisdictions increases, so that there are more bureaucracies with the potential to facilitate illegal logging in a province, logging rates increase and prices for wood fall, consistent with a model of Cournot competition between bureaucrats.

Despite the potential for competition between bureaucrats to reduce bribes, other than the Burgess et al. (2011) study we know of no other evidence that examines how competition between bureaucrats works in practice. In the Burgess et al. study, competition occurs only through the product market—each district chooses how much wood to extract and market forces—a common demand curve—determine how much they receive in rents. In many other settings, however, individual agents would be able to choose which bureaucrat to work with to obtain a service, and the bureaucrats might compete on price. This type of Bertrand competition could result in even larger impacts of competition than the Cournot competition studied by Burgess et al. (2011). We regard studies examining Bertrand competition between agents as a first-order question for future work.

It is important to note that, in this context, competition leading to lower bribes is not necessarily socially optimal. In particular, it depends on what the government is trying to accomplish and whether the bribes are on top of, or instead of, official government fees. For example, in the case of deforestation studied by Burgess et al., bribes were to allow more logging than the government had deemed optimal (for example, for reasons of watershed protection or biodiversity protection). Competition meant lower bribes and greater quantities, which in this context meant more illegal logging, and hence greater social losses, than had there been less competition. On the other hand, in the case of the road checkpoints studied by Olken and Barron, traveling the road should have been free, so lower bribes would have meant greater road travel and greater efficiency. Understanding the welfare implications of these types of strategic efficiency, and we do not yet know of an empirical example demonstrating how competition between bureaucrats could lead to greater social efficiency.

Open Research Questions:

- Can changing the structure of the bureaucracy to encourage competition between government officials lower bribes?
- How should the trade-off between the need for regulation and lower corruption be measured?

4.2. External Factors that may Impact Corruption

The levels of corruption may be influenced by factors beyond the agent’s control. This section reviews the evidence on three important factors: technology, transparency, and the judiciary.
4.2.1. Technology

Technology is a very broad term, and there are many ways technology could affect the level of leakages. Broadly speaking, we consider two ways in which technology could matter: by providing tools that are hard for humans to tamper with and by enhancing communication. It is important to point out, however, that there are other mechanisms through which technology could matter, many of which likely have yet to be discovered.

(i) Providing tools that are hard to tamper with

For many (though not all) corrupt activities, the corrupt agent needs to somehow evade the rules or procedures that the official government bureaucracy has set up. Technology can help address this problem by ensuring mechanically that certain procedures are followed.

One nice example of this is the cameras study conducted by Duflo et al. (2012,b) in India. In this study, teachers needed to verify their attendance at school by having a student take a picture of them with the entire class at the start and close of each school day. Technology—the camera—meant that teachers could not simply fudge their attendance records. The use of this monitoring device coupled with monetary incentives that linked salaries with attendance reduced absenteeism from 42 percent to 21 percent and raised children’s test scores by 0.17 standard deviations.

Of course, technology is only as affective as the system it feeds into. Banerjee et al. (2008) evaluate the impact of an incentive program on nurse attendance in India showing that when the incentives were effectively in place, as they were during the first 6 months, they produced a substantial improvement in attendance, according to some measures a 100 percent increase. However, over time, the local health administration deliberately undermined the incentive system by allowing more and more excused absences, so that by the end of the sixteenth month the program produced no effect on absence rates.

A variety of other studies with similar conceptions are currently underway, and in India these ideas have in fact begun to be implemented in policy. For example, in Karnataka, India, a new program that integrates technology with incentives to monitor absences and leakages in the health sector and ultimately improve health outcomes is currently being implemented and evaluated. The program makes use of GPS systems, cameras, biometric captures and wireless transmission of data to record doctor and staff attendance, service delivery and payments. The monitoring system is combined with an incentive system of penalties and awards.

Similarly, in Andhra Pradesh, India, a system based on smartcards that disburse payments for two programs—an employment guarantee scheme and social security pension program—is also being implemented by the government. The idea of providing smartcards to beneficiaries and smartcard readers at the village level is to help reduce corruption and fraud by increasing security and precision in the payment process. Similarly, The Unique Identification Authority of India (UIDAI) is also implementing a large project at the national level in India called Multipurpose National Identity Card (MNIC) to provide a unique identification number to all citizens based on biometric information from the individual. MNIC’s main goal is to facilitate individual identification helping public programs to better reach intended beneficiaries. An important area for future research is to understand whether these types of technologies
are effective when implemented at scale, or whether their impact is undone by the sorts of forces identified by Banerjee et al. (2010).

(ii) Increasing communication

Technology can also have a substantial impact on corruption by facilitating communication, which can enable better monitoring. Yang (2008) explores how hiring foreign inspectors to verify the tariff classification and the value of shipments before they leave their origin country impacts import duty collections. The key mechanism to reduce customs fraud is the transmission of information from the foreign firm at the origin port to the client government. The flow of information could not only improve the monitoring ability but also reduce the bargaining power of corrupt customs officials, which can reduce bribes payments and custom clearance time. The results from the study provide evidence in favor of this hypothesis showing pre-shipment imports inspection programs increased import duty collection by 15 to 30 percentage points in the first five years after implementation.

Related to this, in many countries technology has played an important role in the design and administration of the tax system. One key idea of tax enforcement is double-reporting, where the tax department compares two independent reports about tax performance and investigates discrepancies. Here, the best evidence is from the developed world: Kleven et al. (2011) analyzes a randomized tax enforcement experiment in Denmark and find that the tax evasion rate is very small (0.3 percent) for income subject to double-reporting and much higher (37 percent) for self-reported income. Technology plays a key role here: in a manual system actually doing the matching from all the double-reported information would be very challenging, but once the system is automated it is much easier. Given the large number of countries in the process of modernizing and computerizing their tax infrastructure, it should be possible to study the impacts of this type of technology in the context of a developing country where tax evasion is usually higher.

Open Research Questions:

- Can using technology to reduce the discretion of government agents reduce corruption?
- Can using technology as a monitoring tool reduce corruption?
- Can using technology as an information sharing tool reduce corruption?

4.2.2. Transparency

One of the key themes of the international anti-corruption movement is the role of transparency—so much so that the largest worldwide anti-corruption NGO is called “Transparency International.” But does transparency matter? And if so, what are the mechanisms through which transparency could matter?

The basic idea about transparency is that by enabling information about government actions, citizens and civil society can do a better job monitoring what the government is doing and demanding better performance. However, the effect of making information about politicians publicly available is a priori
unclear. While disclosure of information can increase political accountability it can also undermine politicians’ privacy and, thus may disincentive more qualified candidates from participating in politics.

Several pieces of evidence suggest that, indeed, there is a relationship between providing access to information about politicians’ performance and both the political accountability and the quality of government. In a cross-sectional, cross-country study, Djankov et al. (2010) study the relationship between disclosure rules for information about parliament members and a numbers of measures of quality of government and corruption. Their main conclusion is that public disclosure, but not internal disclosure to parliament, is associated with lower perceived corruption and better government. They further find that information about politicians’ assets, liabilities, income sources, and potential conflicts, as opposed to simply income and wealth levels, are more consistently associated with better government. Since the study is cross-sectional in nature, they cannot rule out reverse causality (i.e., higher quality governments adopt better transparency laws).

In a more micro example, Banerjee et al. (2010) study how public disclosures about politicians’ performance and qualifications can influence electoral accountability in settings characterized by weak institutions and a less educated population by conducting a randomized experiment in Delhi, India. Using the Indian Right to Information Act and candidates’ affidavits, they created report cards for ten assembly jurisdictions during the run-up to the 2008 election in Delhi. They then randomly provided slum dwellers with pamphlets and free newspapers containing information on candidate qualifications and legislator performance. The information increased voter turnout by 3.5 percentages points and reduced the incidence of vote buying by 19 percentage points. The information campaign seems to increase the quality of government: the vote share of the best performing incumbent increased by 7 percentage points in the treatment group relative to the controls. An interesting next step would be to see if, over the long term, increased transparency in certain assembly districts encourages better quality candidates to run and/or encourages politicians to improve their behavior while in office.

A related example is Ferraz and Finan’s (2008) study in Brazil on how information about incumbent performance increases accountability and how the presence of the media can influence this result. The authors take advantage of the implementation of a federal government anticorruption program that randomly selected the municipalities where the use of federal funds was audited and the results publicly disseminated. The study showed public dissemination of corruption scandals in local governments had a negative effect on incumbents’ electoral performance, especially in those areas where local radio stations were present to broadcast the results of the audit reports. The probability of reelection for an incumbent who committed two corruption violations in municipalities with pre-election audit was 7 percentage points lower than one who had zero violations and 11 percentage points lower if radio stations were present in the municipality. One interpretation for the larger effect in municipalities where radio stations were present to divulge the information is that radios are more efficient in transmitting information about local politics to smaller municipalities.

Given the importance of the media in facilitating transparency surrounding government actions, a biased media can be a major roadblock to accountability. Research carried out in Argentina by Di Tella and Franceschelli (2011) finds evidence of the media being influenced by government transfers in the form of advertisement bought in newspapers. Documenting the front page coverage of government corruption in the four main national newspapers from the period between 1998-2007, they find that a 1
standard deviation increase in government advertising in a given month for a given newspaper is associated with a reduction in coverage of corruption scandals in that newspaper by .23 of a front page. This relationship is statistically significant at the 1 percent level even when controlling for month, newspaper, and a newspaper and president interaction dummy. Their results suggest that even when the media is not out rightly controlled by the government through censorship or intimidation, the government can use financial incentives to influence the media in a manner that limits its usefulness as a mechanism for holding government officials accountable and providing valuable information to voters.

A second way that transparency may matter—and the way that many suggest it does—is by providing citizens with information on what they are entitled to. Providing one example along these lines, Reinikka and Svensson (2011) study how an information campaign to monitor spending by local officials can reduce corruption and also increase educational outputs. They exploit a newspaper campaign in Uganda aimed at reducing capture of public funds by providing students’ parents and head teachers with information to monitor local officials’ use of an education grant. Their empirical strategy used distance to the nearest newspaper outlet as an instrument of school exposure to information, and they find that an increase in information resulted in an increase in the actual funds that reached the schools, or a decrease in corruption. Furthermore, they find that a one standard deviation increase in the share of funding reaching the schools is associated with .48 standard deviation increase in 7th grade enrollment and also has a positive, although weaker, impact on student learning. An important caveat is that distance to newspaper outlets may be non-randomly assigned, and may also have other, direct impacts on educational performance. Still, their results emphasize how innovations in governance can lead to cost-effective improvements in quality of social services in developing countries. Therefore, randomized studies and other methodologies that can better identify the causal mechanisms by which information impacts policy outcomes are an important priority for future research in this area.

A third way in which transparency could matter is by allowing citizens to signal interest in a particular outcome. Peisakhin and Pinto (2010) examine this by conducting a randomized experiment to test whether freedom-of-information laws can be used to obtain greater access to basic public goods that are otherwise attainable only through bribery. The experiment randomly assigned individual applicants in India to one of three mechanisms used when requesting public benefits and then tested the effect of these mechanisms on the time that elapsed before the applicant received the benefit. In the first treatment group, applicants submitted an information request under the Right to Information Act shortly after their applications. The second group of applicants presented a letter of support from a local NGO with their application. Finally, the third group of applicants paid a bribe to a local to obtain the benefits. According to the results, 94 percent of those who pay bribes or sent an information request received benefits over the course of one year, as opposed to 21 percent in the NGO and control groups. Individuals in the group that paid bribes received benefits in a median of 82 days, 38 days less than those in the groups that filed an information request. The groups that neither paid a bribe nor requested information only obtained benefits after 343 days. The results suggest that requesting information under the freedom of information law is a reasonable, though imperfect, substitute for bribing an official.

In a follow-up study, Peisakhin (2010) estimates the effect of the freedom-of-information law in the process of voter registration. The results suggest that the information law is an effective, free and legal substitute to bribery for middle class applicants. Once the time it takes to process the request for information is considered, paying bribes does not reduce the number of days needed to register for voting.
The experiment is then replicated for poor applicants with similar results, suggesting the information act can also empower under-privileged groups.

Despite this these recent studies, the academic literature still does not necessarily have the answer on the impact of some of the more macro-transparency questions that are the focus of much international advocacy. For example, there is a movement in the corruption and leakage field to increase overall budget transparency, through such organizations as the International Budget Partnership. There has also been a movement to increase transparency of natural resource revenues, through the Extractive Industries Transparency Initiative and groups such as Revenue Watch. To the degree that these macro initiatives operate at the country level, identifying their impact is harder, and an important area for future research.

Open Research Questions:

- Does transparency encourage government officials to be less corrupt?
- Does transparency enable citizens to monitor more effectively?
- What types of information releases are more effective in reducing leakages?

4.2.3. Judiciary

Judicial corruption may pose a particular challenge because the judicial system is a key component in the efforts necessary to fight other sorts of corruption. After all, if judges or prosecutors are corrupt, then it will be difficult to impose punishments against corrupt officials, since they can bribe the prosecutors or judges and avoid punishment. (Of course, they would still have to pay the cost of bribing the prosecutor or judge, which would pose a disincentive for corruption, but as discussed above these types of disincentives in practice seem flatter than the actual punishments imposed.)

Judicial corruption can also have important efficiency implications for civil contract enforcement. If judges are bribable, then in the event of dispute contracts will be awarded to the party who is able to bid more. This will be ex-post efficient (i.e., the outcome will be favor of the party with the most to gain ex-post), but not necessarily ex-ante efficient, and may therefore discourage certain types of contracts. For example, in the developed world companies often sign long-term sourcing contracts for the fuel of power plans before the plant is built, to ensure a steady stream of inputs to the plant. If the price of fuel rises, ex-post the fuel provider might wish to renege on the contract and sell fuel at a higher price to an outside party, which an outside (bribable) judge might let them do. But knowing that this might happen, the power plant might not get built, or if it did, it might have a different ownership structure where it also owned the fuel provider, to prevent this type of dispute.

Despite the importance of judicial corruption, there is very little rigorous literature on the topic, both in terms of the consequences of judicial corruption and how to control it. Indeed, there is relatively little empirical literature on courts in developing countries at all, with most literature focusing on delays. In one study, Visaria (2009) use the introduction of debt recovery tribunals to study the effect of judicial quality on the repayment behavior of borrowers and the lending decisions of banks in India. In a cross-country study, Djankov et al. (2003) explore the effectiveness of courts as mechanisms of resolving simple
disputes and examine how the characteristics of the legal procedure affect courts’ efficiency and the ability to deliver justice. We regard these areas as important directions for future research.

Open Research Questions:

- What are the impacts of judicial corruption on economic efficiency?
- How can the extent and effects of judicial corruption be measured?
- What approaches work best in reducing the levels and efficiency costs of judicial corruption?
- Is it possible to insulate the judiciary from corruption that is endemic in the rest of the government?

4.2.4 Culture

Several research studies across disciplines have suggested that individuals and groups are influenced in their behavior by social norms, or culture.

To test the influence of culture on corruption, Fisman and Miguel (2007) compare people from different cultural backgrounds that are functioning within the same legal and regulatory environment by taking advantage of a natural experiment in New York City. They study diplomatic parking violations of United Nations government officials representing 149 countries before and after the city started imposing a penalty for such violations. Before 2002, all UN officials had diplomatic immunity and therefore faced no penalty for breaking parking laws, costing the city literally millions of dollars in unpaid parking tickets. After 2002, however, the city was given permission to remove license plates of diplomats with three or more parking offenses. Fisman and Miguel find that in the pre-enforcement period from 1997-2002, the parking violation corruption measure for each country is strongly (1 percent significance level) and positively correlated with standard corruption measures for each country, accounting for region fixed effects and a wide range of country level controls. Thus, when there is no penalty for breaking the law, diplomats seem to follow the behavior norms of government officials in their own countries. In the post-enforcement period from November 2002-2005, however, parking violations fell dramatically, by 98 percent, across countries of all levels of corruption. In fact, the impact of legal enforcement appears larger than the effects of variation in cultural norms across countries, suggesting that enforcement of penalties can be used as a tool for controlling individual corruption.

What is true for the individual, however, may not be true for the group. When looking at firm level corruption in the form of tax evasion by US firms with foreign owners, DeBacker et al. (2012) find that not only does level of corruption of the owner’s home country have a strong positive association with tax evasion, but firms with owners from more corrupt countries are also less likely to reduce tax evasion in the face of new IRS enforcement measures. While these IRS measures were effective at reducing corporate tax evasion overall, they were less effective against firms with higher corruption norms, suggesting that enforcement may effect individual corruption differently than organizational corruption.
4.3. Anti-Corruption Policy in the Long Run

Much of the evidence discussed above shows the short-run effects of anti-corruption policies. But there is ample evidence to believe that the long-run impacts could be quite different. For example, it could take corrupt officials time to learn how to manipulate a new system, so the long-run effects of an anti-corruption policy could be smaller than the short-run effects. Alternatively, it could take time for a new group of civil servants to select into the system, so an anti-corruption policy could be more effective over time if it encourages more low-corruption types to select into the civil service.

There are several examples that suggest that the long-run effect of anti-corruption policies may be smaller than the short-run effect as officials adapt. One of the examples already described is Banerjee et al. (2008). In this study, an incentive program on nurse attendance in India was found effective only during the first 6 months of the intervention, when the program was correctly in place. Later, however, the system was undermined by the local health administration and the program was no longer able to improve nurse attendance.

Bobonis et al. (2013) also provide an example where the disclosure of information about corruption practices only induced a reduction in corruption levels in the short run. They compared the level of reported corruption for municipalities audited before and after an election in Puerto Rico. The results seemed to confirm the positive effect of the program showing corruption was lower in municipalities audited before the election. However, in subsequent terms corruption levels increased, especially among those who refrained from rent-seeking activities in the first audit.

In the case of Brazil, Ramalho (2007) uses the 1992 impeachment of President Fernando Collor to evaluate the impact and persistence of corruption on the market value of politically connected companies. The results suggest that the market perceived the decrease in the president’s probability of staying in power as affecting the value of politically connected companies, but only temporarily. According to the results, family-connected companies had on average daily abnormal returns 2 to 9 percentage points lower during bad event days, with the effect reversing completely within one year. One interpretation is that over the course of the year, these previously politically connected firms were able to form new connections.

In Colombia, Camacho and Conover (2011) study the manipulation of the poverty index score as an eligibility requirement to gain access to social programs. They show strategic behavior in the timing of household interviews around local elections, and direct manipulation of scores given by a sharp discontinuity on the scores exactly at the eligibility threshold. The results suggest that in total three million people had their score changed, which accounts for about 40 percent of the beneficiaries. Also, they provide some evidence that manipulation increased in cases where the elections were more competitive and decreased with more community organizations and higher newspaper circulation.

A final examine is Burgess et al. (2011). They examine the determinants of illegal logging in Indonesia using satellite data to track logging and find that when a district’s oil and gas revenue increases, providing an alternate source of rent extraction for local district officials, illegal logging falls. However, within 3 years, the effect reverses and illegal logging is back to its previous level. Burgess et al. provide suggestive evidence that the mechanism is a change in the political equilibrium—the higher oil and gas
rents change the nature of the governing coalition towards a type of coalition associated with higher rent extraction. This new political coalition presumably extracts rents not just from oil and gas but also from the forest sector.

In sum, the evidence in this section provides a word of caution: in many cases, reductions in corruption in the short run do not always persist in the medium run, with effects often being undone within a period of 1-3 years. This suggests that, to the extent possible, anti-corruption actions should be tracked over a period of several years to determine whether the impacts are persistent.

Open Research Questions:

- How can corruption be effectively combated in the long run?
- How can the impacts of anti-corruption programs be made to persist?
- How can clean governance and anti-corruption values be made intrinsic among civil servants?