EMPIRICAL ESSAYS IN CORPORATE GOVERNANCE, REGULATION AND CORRUPTION

By

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To my parents

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I conduct three empirical studies in economics of regulation, business bribery and political connection. Study 1 is "Universal Service Subsidies and Cost Inflation: Evidence from Telecommunications Sector in U.S.," study 2 is "Telecommunications Service in Developing Countries: Impact of Regulation on Bribery," and study 3 is "Political Connection and Bank Loan Contracting." The first study examines a very important public policy – universal service – in the telecommunications industry in the United States, where evidence is shown that some telecommunications companies overstate their costs in order to be qualified for more subsidy funds. The second study also examines the telecommunications industry, but in developing countries. This study shows that a regulatory strategy that focuses on both regulatory governance and regulatory substance tends to reduce bribery among business customers. The third study is also concerned with corruption issue, only this time in the banking industry. This study suggests that, at least in some countries, firms' political connections influence the allocation, the structure and the price of bank loans.

CHAPTER 1
UNIVERSAL SERVICE SUBSIDIES AND COST INFLATION: EVIDENCE FROM TELECOMMUNICATIONS SECTOR IN U.S.[1]

Introduction

Universal service has been a very important theme in telecommunications service in the United States since the 1970s (Mueller, 1993). The Federal Communications Commission (FCC) created the Universal Service Fund (USF) to help provide high quality telecommunications services at just, reasonable, and affordable rates throughout the Nation.[2] The USF uses fees imposed on telecommunications suppliers of interstate and international services to subsidize low-income households, rural telecommunications companies, eligible schools and libraries, and rural health care providers. Although the FCC does not require companies contributing to the USF to recover their contribution directly from their customers, most companies do.[3] The USF tax has increased from 3.19% on interstate and international services in 1998[4] to 10.20% in 2006[5], a 220% increase. Furthermore, Rosston, Savage and Wimmer (2008) have found that Federal high-cost universal service subsidies (or "High Cost Support" program) paid to a state do not reduce prices for telecommunications services in the rural areas of that state. It is not

[1]Coauthor with Chen Lin, Department of Economics, City University of Hong Kong, Hong Kong, China (email: chenlin@cityu.edu.hk). We are greatly indebted to David Sappington for very helpful comments and suggestions. We are grateful to Chunrong Ai, Sanford Berg, Simon Fan, Mark Jamison, seminar participants at University of Florida, seminar participants at Southern Economics Association conference for helpful comments. We also thank the Public Utility Research Center, University of Florida for financial and data support; however, the views expressed here do not necessarily represent those of sponsoring organizations.

[2]http://www.fcc.gov/wcb/tapd/universal_service/

[3]Many business customers have been receiving bills containing itemized "universal service charges" since January 1998. See The Federal Communications Commission's Universal Service Support Mechanisms, by the Common Carrier Bureau - Enforcement Division - July 1998. Form No. CCB-FS014.

[4]The Federal-State Joint Board Monitoring Reports, December 1998, CC Docket No. 98-202. Table 1.7 Universal Service Program Requirements and Fund Factors, the first quarter of 1998.

[5]The Federal-State Joint Board Monitoring Reports, December 2007, CC Docket No. 98-202. See Table 1.10 "Universal Service Program Requirements and Contribution Factors", the first quarter of 2006.

surprising then that disagreement over the nature and administration of the USF programs is widespread in telecommunications policy circles.

Amid the growing controversy surrounding this program, the FCC is in the process of wide-sweeping universal service reform. A primary focus is the High Cost Support (HCS) program, the largest program of the USF programs.[6] The goal of the HCS program is to ensure that consumers in all regions of the nation have access to telecommunications services and pay rates for these services that are reasonably comparable to the rates paid in urban areas. Without the HCS program, consumers in high cost areas would pay significantly more for service due to factors such as dense terrain or sparse population, which raise the cost of building telecommunications networks. From 1998 to 2005, over $21.85 billion in High Cost support has been disbursed to companies designated as eligible telecommunications carriers. The High Cost Loop Support (HCLS) program, as the largest component of the FCC's universal service HCS program, provides subsidy to small, primarily rural telephone companies whose costs exceed the national average.[7] These companies report their costs to the FCC and receive compensation from the HCLS fund to cover a portion of the reported costs. The support provided by the HCLS has increased from $56 million in 1986 to over $1.2 billion in 2006,[8] an increase of over 2,000 percent in real terms. In contrast, from 1986 through 2004, the gross book value of all assets for the largest local telecommunications carriers in the United States actually decreased in real

[6]The USF includes programs for financial assistance to low income households, schools and libraries, and rural health care facilities in addition to assistance to small, rural telephone companies with high costs. According to the report of Universal Service Administrative Company (2006), the size of High Cost Support program is about 60% of the total size of the four Universal Service Fund Programs.

[7]The HCLS was formerly referred to as the Universal Service Fund, and still bears that name in the Commission rules. It is now referred to as High Cost Loop Support to avoid confusion with the new, more comprehensive universal service support mechanisms that the Commission developed to implement the 1996 Act. *See* 47 C.F.R. § 36.601. *See also* 47 C.F.R. Part 54.

[8]Table 3.1 December 2005 Federal-State Joint Board Monitoring Reports, Federal Communications Commission. The USF subsidies to CETC (Competitive Local Exchange Carriers) are also growing rapidly. In 2006, CETC subsidies exceeded $820 million, or 21 percent of all HCF disbursements.

terms,[9] which raises concerns that the HCLS may be growing faster than is economically justified.

The subsidy program also appears to have invited corruption. To illustrate, Richard Martino and Kenneth M. Matzdorff have been found to have inflated expenses of the Cass County Telephone Company, LP in order to qualify for $8.9 million in unwarranted subsidies and disbursements (including 3.5 million Universal Service Fund). [10] A recent USA Today article (November, 2006) also cited the example of Big Bend Telephone, which serves 6,000 customers in Alpine, TX. In 2004, Big Bend spent $3.6 million, or 25% of total operating costs, on corporate overhead alone. At the same time, the company received $9.6 million in federal universal service funds.

Despite the debate and anecdotal evidence, we are unaware of systematic analysis of the soundness of universal service policy issue. We attempt to fill this gap in the literature. Using the panel data of 1140 rural telecom firms in 50 states from 1991 through 2002, we find that the program creates a moral hazard problem: the telephone companies that receive HCLS subsidies have an incentive to report high costs to the FCC in order to qualify for still higher support payments – and that at least some companies respond to this incentive by increasing their reported costs at the margin.

Specifically, the small and medium size rural telephone companies (or "rural Local Exchange Carriers" or "rural LECs")[11] that participate in the HCLS program receive payments based on their size and how their loop costs relate to the national average for telephone

[9]Table 4.8 2004/2005 Statistics of Common Carriers, Federal Communications Commission.

[10]http://www.usdoj.gov/usao/mow/news2006/martino.sen.pdf.

[11]Small and medium rural LECs are those with firms of 200,000 loops or fewer. Rural telephone companies are generally defined as either have less than 100,000 lines or serve predominantly rural areas. See 47 C.F.R. 51.5 for the definition of a rural carrier. A LEC is any carrier that is engaged in the provision of telephone exchange service or exchange access. An exchange area is a local calling area, typically a community or city.

companies.[12] In general, companies with larger per loop costs in the high-cost area are eligible for more subsidies so that these firms can provide services at rates that are reasonably comparable to the rates charged by other firms. This mechanism could provide financial incentives for rural LECs to overstate their costs in order to be eligible for larger subsidies.

We analyze this issue by exploring how the HCLS mechanism and firms' per loop costs change over time. Our study focuses on rural LECs in the United States between 1991 and 2002. During this period, the FCC promised to provide HCLS support to eligible rural companies based on cost thresholds and company size.[13] (See Table 1-1).[14]

As Table 1-1 reveals, the HCLS program reimburses a larger fraction of a firm's incremental costs as the level of the firm's costs rises above one of the identified thresholds (i.e., "National Average Annual Loop Cost", hereafter, "NALC"[15]). For example, the small and medium sized firms (i.e., firms with 200,000 loops or fewer) are eligible for reimbursement of 65% of their costs that are between 115% NALC and 150% NALC, and for reimbursement of 75% of their costs that exceed 150% NALC level.

We hypothesize that, in order to receive more support funds, companies will exaggerate their costs and/or assign greater portions of their costs to local loops, if the perceived benefit of the exaggeration exceeds the corresponding perceived cost. If firms do indeed manage or shift costs to meet the thresholds, we expect to observe relatively few firms with costs directly below

[12]A "loop" is a traditional local telephone line. It refers to the connection from the provider's central office to the customer's premises. Loops tend to be longer and more expensive to build and maintain in rural areas.

[13]Exceeding higher thresholds means a higher percentage of additional costs that are allocated between the state and interstate jurisdictions are recovered by the HCLS.

[14]Section 3-3, December 2005 Federal-State Joint Board Monitoring Reports. The calculation is based on the progressive principle, i.e., the funding subsidizes a larger percentage of loop costs from high cost groups than from low cost groups.

[15]The NALC is now frozen at $240, but the actual loop cost that the company needs to reach to qualify for subsidy is not fixed, due to the cap imposed on the total amount of subsidy.

the thresholds and a relatively large number of firms with reported costs just above the thresholds. Furthermore, because the reimbursement rate is higher for firms above the highest cost threshold, such cost shifting will be more lucrative and thus more pronounced in the higher reimbursement categories. We study the density function of reported firm costs near each threshold. We find a very small frequency of reported costs just below the thresholds and a corresponding high frequency of reported costs just above the thresholds. We also conduct regression analysis using the change of loop costs as the dependent variable and find that relative to companies in lower subsidy categories, companies in higher categories exhibit greater annual cost growth.

We also examine the impact on firms' cost shifting of the cap that was imposed on USF funding. Due to concerns about the USF's overall growth rate and annual growth fluctuations, the FCC adopted interim rules in December 1993, imposing an indexed cap on fund payments. We suspect that the cap policy would cause the firms to pursue the scarce funds even more aggressively, and thus would pursue more aggressive cost exaggeration. An examination of the two regimes (pre-cap and post-cap) reveals that after the cap was imposed, rural LECs exhibited more pronounced reported cost overstatement than before.

Our study contributes to the important and growing literature on universal service and universal service policies.[16] Many studies of universal service policy measure its impact on the household penetration rate of telephone service (Eriksson, Kaserman, and Mayo, 1998; Gasman, 1998; Riordan, 2002; Garbacz and Thompson, 2003; Estache, Laffont and Zhang, 2003; Hazlett 2006; Chiang, Hauge and Jamison 2007 and Holt and Jamison, 2007). However, little is known

[16]For example, Roller and Waverman (2001) find that telecommunications infrastructure is positively related to economic growth when the telecommunications infrastructure provides nearly universal service.

about incentives and behavior of telecommunication companies under the USF policy.[17] We add to the literature by providing a theoretical background and empirical evidence about firm incentives and behavior on cost overstatement in response to the USF policy.

The remainder of the paper is organized as follows. Section 2 provides background information about high-cost support mechanisms in the U.S. telecommunications industry. Empirical methodology and results are discussed in Section 3. Section 5 concludes and suggests directions for future research.

Institutional Background

Universal Service and USF

The stated purposes of the U.S. Communications Act of 1934 include "regulating interstate and foreign commerce in communication by wire and radio so as to make available, so far as possible, to all the people of the United States a rapid, efficient, nationwide, and worldwide wire and radio communication service with adequate facilities at reasonable charges."[18] Although this purpose is now commonly cited as universal service, the availability of universal service subsidies is much more recent (Muller, 1993). In fact, it wasn't until the late 1960s and the 1970s, by which time telephone service was widely available throughout the country, that the FCC adopted extensive subsidies for rural area (Gabel, 1967; Mueller, 1993; Jamison, 2002). The Telecommunications Act of 1996 also defines universal service mechanism to range from basic telephone service such as dial tone to advanced service such as access to emergency services. Today, universal service is typically aimed at providing telephone or

[17]Will Universal Service and Common Carriage Survive the Telecommunications Act of 1996? Eli M. Noam, *Columbia La Review*, Vol. 97, No. 4 (May, 1997), pp. 955-975; The Legal Process and Political Economy of Telecommunications Reform, Jim Chen, *Columbia Law Review*, Vol. 97, No. 4 (May, 1997), pp. 835-873.

[18]Communications Act of 1934, obtained from the University of Southern California website http://www.usc.edu/~douglast/202/lecture20/1934act.html, downloaded March 3, 2007.

telecommunications services to all households within a country, especially those low income consumers and users in rural and high cost area.

The breakup of AT&T in 1984 challenged the FCC's newly formed rural subsidies, which had been designed to work under a monopoly AT&T. Consequently, the FCC established the National Exchange Carrier Association (NECA) as an association of local telephone companies to assist in administering universal service subsidies targeted to telephone companies in high cost areas and the Universal Service Administrative Company (USAC)[19] to administer the USF. The USF is funded through mandatory contributions by providers of interstate and international telecommunications services. The contribution amount is calculated as a percentage of a carrier's interstate and international telecommunications revenues and is often reflected on consumers' phone bills. Besides the assistance to small, rural telephone companies with high costs, the USF also provides financial assistance to low income households, schools and libraries, and rural health care facilities.

High Cost Support (HCS)

The HCS is the largest component of USF program. On a nationwide average bases, approximately 27 percent of LEC local loop costs are allocated to the interstate (federal) jurisdiction, and 73 percent are allocated to the state jurisdiction.[20] The USF subsidizes the part of costs that allocated to the federal jurisdiction. The average loop cost, however, varies significantly among LECs. The FCC's HCS mechanisms enable LECs with high per loop costs to allocate more of their loop costs to the interstate jurisdiction,[21] thus recovering these costs from

[19]USAC is a subsidiary of NECA.

[20]The yearly Federal-State Joint Board Monitoring Reports, 1999.

[21]The FCC creates the rules by which regulated telecommunications carriers divide their costs between the federal jurisdiction and the state jurisdictions. This process is called separations. The FCC uses separations to affect subsidies by allowing some carriers to allocate additional costs to the interstate jurisdiction.

universal service support mechanisms, and leaving fewer costs to be recovered through the rates charged directly to customers. The HCS mechanisms include the High Cost Loop Support (HCLS) and a number of other mechanisms with smaller supporting funds that serve as safety nets and transitional mechanisms to support larger LECs.

High Cost Loop Support (HCLS)

Beginning in January 1988, the HCS mechanisms were targeted to increase benefits to small and medium sized LECs. The mechanisms took the form of changes in the additional interstate cost allocation for such LECs. This allows any eligible firms with an average cost per loop[22] that exceeds 115 percent of the national average to receive funding from the HCLS. Today, only rural carriers receive HCLS. Non-rural carriers receive subsidies based on cost model estimates instead of HCLS.

In December 1993, the Commission, at the recommendation of the Federal-State Joint Board[23] in CC Docket 80-286, imposed a limit on HCLS payments. The limit (or "cap") was indexed to the rate of growth in total telephone lines in the country. The cap is implemented by adjusting the national average cost per loop from the true average value to whatever base value is required to achieve the cap. For rural carriers, the National Average Loop Cost (NALC) is now frozen at $240.00[24] and the cap is indexed to the rate of growth in working lines of rural carriers plus the rate of inflation as measured by the Gross Domestic Product – Chained Price Index (GDP-CPI).

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[22]This cost is the cost per loop before separations, so it includes both the state and the interstate portion.

[23]A Federal-State Joint Board is comprised of both federal and state commissioners. The Joint Board investigates issues that the FCC refers to it and makes recommendations to the FCC.

[24]The FCC froze the national average because they "do not anticipate a dramatic increase or decrease in the actual national average loop cost in the near future". FCC 01-157, 2001. Also see *Fourteen Report and Order, Twenty-second Order on Reconsideration, and Further Notice of Proposed Rulemaking* in CC Docket No. 96-45, and Report and Order in CC Docket No. 00-256.

The series of changes to the HCS mechanisms were intended to be fair to both rural and non-rural companies and encourage more investment in rural infrastructure so as to advance universal telephone service. Despite all these changes, the HCLS that rural companies ultimately receive depends on their per loop costs in comparison with the NALC. Although FCC has frozen the NALC at $240.00, because of the cap imposed on the total payment, the base value required to receive the subsidy has risen from $234.49 from year 1991 to $270.79 in year 2003.

The cost overstatement stems from an information asymmetry between the FCC and rural LECs. The FCC allocates the subsidies based on the per loop costs reported by each rural LEC. These firms have an incentive to inflate their costs in order to qualify for increased subsidies. The inflation can be implemented by shifting the per loop cost across different accounts or over time ("cost shifting") or simply by exaggerating actual costs. For instance, a firm might attempt to increase the subsidy it receives by operating inefficiently or manipulating its measured total loop costs. The former could occur because the FCC generally cannot observe the operator's effort to control costs. The latter occurs when it is difficult to separate the costs of constructing facilities that are employed to serve end users both in high-cost and non-high-cost areas. In principle, accounting procedures might prevent such misreporting. However, with the development of the high technology in the telecommunications industry, bundled service[25] has become more popular. This makes it difficult to identify the portion of costs that are eligible for high-cost support. Manipulation of costs might be undertaken that increases the book value of per loop costs without incurring additional actual costs. In this paper, we do not try to differentiate those possible forms of cost adjustment. Rather, we consider these possible forms of cost adjustment and others as a firm contemplating whether to exert an effort to take full

[25]Bundled service usually offers the consumer a discount on integrated service, telephone, TV cable and internet, for instance. The high cost loop support mechanism is supposed to provide subsidy to the cost incurred on the phone lines. But the bundled service makes calculate the separating cost very difficult.

advantage of the prevailing regulations. So the terms "cost overstatement" or "cost inflation" we used throughout the paper could refer to any form of cost adjustment forms. To examine potential cost adjustments, we focus on the two subsidy cutoffs (115% NALC and 150% NALC); these provide very natural thresholds to split the firms into three cost ranges and study the firms' reporting of costs.

Empirical Analysis

Data and Sample

Our sample of rural LECs is derived from the FCC Wireline Competition Bureau Statistical Reports (formerly FCC-State Link). As can be seen from Table 1-1, the compensation policies differ for large and small companies. Since the HCLS mechanism was mainly targeted to increase the benefits to rural LECs, our study only focuses on small and medium sized LECs. Although some larger sized LECs also provide telecommunication service in rural areas and receive benefits from HCLS as well, there are very few such firms.[26] We therefore categorize our sample into three categories: *Ctg0*, *Ctg65* and *Ctg75* based on the thresholds presented in Table 1-1. *Ctg0* represents the category without subsidy; *Ctg65* denotes the threshold where firms receive 65% of subsidy for the part of costs that is between 115% and 150% of NALC; *Ctg75* is the highest cutoff where eligible LECs receive 75% of their reimbursement for the part of costs over 150% of NALC. The final sample comprises panel data for the 1140 firms in 50 states over 12 year period from 1991 through 2002, which generate more than 12,000 firm-year observations.

The two key variables in the firm classification and cost analysis are per loop cost data and NALC data. The per loop cost data come from Section 3 of the yearly Federal-State Joint Board

[26]Compared to over 11,000 observations of small and median sized LECs, there are only 84 observations of large LECs in rural areas during the period.

Monitoring Reports (1993 - 2005). The firms are categorized according to the "Embedded High-Cost Loop Fund Formula" in the report, which appears in Table 1-1. The NALC data are obtained from the yearly Federal-State Joint Board Monitoring Reports shown as "Total Industry Unseparated NTS Revenue Requirement per Loop" in the table of High-Cost Loop Support Data by firm.[27]

Evidence of Cost Inflation To Exceed Thresholds

As explained in section 3, a firm is most likely to overstate its true cost if this cost is very close to the next higher cutoff level. If firms do indeed manage or manipulate costs to meet the thresholds, we expect to observe relatively few firms with costs directly below the thresholds and relatively many firms at or directly above the thresholds. We therefore follow previous studies (e.g. Degeorge, Patel and Zeckhauser, 1999) to examine the density of firm costs near each threshold using a histogram. We anticipate a marked increase in the number of firms just above each threshold if the postulated cost shifting is occurring.

We divide the middle cost range (i.e., 115% NALC-150% NALC) length into ten equal and small segments, which are coded as 1 to 10 (*CostIndex*), respectively. The firms within the range are classified into the ten evenly distributed cost segments (1-10), where 10 is closest to the upper bound of the range (i.e., 150% NALC). Then, for the no subsidy range (0% to 115% of NALC), we find ten equal continuous segments from the upper end (i.e. 115% NALC). Similarly, for the 75% subsidy range (i.e. above 150% NALC), we locate ten equal lengths from the lower end (i.e. 150% NALC). By doing so, we have 30 equal segment on the cost per loop line with 10 segments at each range. The results are based on the pooled sample. We ignore firms that are not located in this line segment for the moment.

[27]It can also be obtained from the yearly study results of Universal Service Fund by National Exchange Carrier Association.

Table 1-2 shows the distribution of the percentage of firms in each reimbursement category. *CostIndex*=1 means firms are at the bottom segment of the range while *CostIndex*=10 means firms are at the top segment of the range. As discussed earlier, we focus on the firm density around the thresholds. As can be also seen in Figure 1-1, we observe a smaller mass to the left of the thresholds compared to the right. In other words, we do find a jump in the number of firms at the thresholds. Specifically, only 1.22% of firms within the range locate in the segment directly below the threshold of 65% subsidy (i.e. 115% NALC), while 11.11% of firms within the range locate in the segment directly above the threshold. The jump around the threshold of 75% subsidy is less obvious, which maybe due to the much smaller subsidy increment in this case (10% in this case vs. 65% in previous case[28]). Specifically, about 8.39% of firms within the range locate in the segment directly below the threshold of 75% subsidy (i.e. 150% NALC), while 13.41% of firms within the range locate in the segment directly above the threshold. Overall, these findings are consistent with our first hypothesis.

Determinants of Loop Cost Change

As discussed in our second hypothesis, firms at a higher cutoff level have greater incentive to inflate reported costs since the marginal benefits of doing so is greater for firms at higher cutoff levels. In other words, the cost increment might be more pronounced within higher cutoff firms. We will empirically test this proposition as follows.

The dependent variable in our analysis is the change in per loop cost between one year and the year before. The reason we use a measure of the change in per loop cost instead of the level of per loop costs is because the level of per loop cost determines the reimbursement category (as

[28]Recall that from the first cutoff level Ctg0 to the second cutoff level Ctg65, firms' incremental subsidy increases from 0% to 65%, which is an increase of 65%; while from level Ctg65 to Ctg75, firms' incremental subsidy increases from 65% to 75%, which is only 10% increase.

shown in Table 1-1) that the firm belongs to.[29] After taking the difference, the difference will capture the change of the per loop cost which does not depend on the firm's category *per se*. We therefore are able to test the effect of the subsidiary threshold mechanism on the per loop cost change. Per loop cost change in the current year is defined as the difference between the per loop cost in the current year and the per loop cost in the preceding year. After taking the difference, there are eleven relevant temporal observations for the dependent variable. Although we can also take the difference between more than one year period, we assume the variation of one-year-per-loop-cost is a good measurement of the firm's cost behavior in our sample.[30]

In addition to the key categorical dummy variables which are defined in section 4.1., we are also interested in the effects of the cap policy on total subsidy. To capture the impact of HCLS subsidy cap on per loop cost change, we construct a dummy variable *Cap*. Although the FCC imposed a cap on USF payments in December 1993, it was not extended to rural carriers until July 1, 1999. We set *Cap*=0 to denote the period between 1991 and 1999 when the rural carriers are not subject to the USF payment cap, and *Cap*=1 to denote the period from 2000 to 2002 when the cap has been imposed on the fund subsidy. There still exists a debate in Congress on whether a cap should be placed on this fund. Based on our second conjecture, we expect that the cap policy should increase the firms' incentives to exaggerate their costs due to more intense competition for a more limited set of resources.

Several other firm control variables are included in the analysis. First, the current HCLS receivers can be divided into cost schedule companies or as average schedule companies

[29]We have also used the percentage change - the log ratio of per loop cost - as the dependent variable. The results are consistent with the change of per loop costs. To be consistent with our two hypotheses, we use the change of per loop costs as the dependent variable throughout the paper.

[30]We have also taken the subtraction between more than one year period. The results are consistent with the one-year-period ratio.

(C*method* = 1 if cost companies) based on their cost reimbursement methods[31]. Cost schedule companies receive compensation based on their reported operating costs. By contrast, the subsidies received by average schedule telephone companies do not depend on their reported costs. Instead, the average schedule companies receive compensation on the basis of industry average cost data in the study area and formulas that are designed to simulate the reimbursement that would be received by a cost schedule company that is representative of average schedule companies. The cost schedule companies can exert a more direct impact on potential subsidies through cost manipulation and inflation. We therefore expect a positive coefficient of *Cmethod*.

We also include the total number of loops (*Loops*) as a proxy for firm size. Firms with different size may have different incentive on cost inflation and larger firms may have more flexibility to do so. For example, reporting fewer operating loops is relatively easy for larger firms since it is more difficult to be detected. This allows them to increase the per loop costs on the book without generating any actual costs. Therefore, we expect that larger firms may have more ability on cost overstatement.

To isolate the effect of this subsidy mechanism, it is also important to control for state and industry level factors that may influence firm behavior in these markets (Ai and Sappington, 2002, 2004). These factors include: (1) demographic characteristics such as state population, population density, and the proportion of residents living in rural areas; (2) industry regulations that affect a firm's incentive to control its costs;[32] (3) industry technology, which can affect the

[31]Please see http://www.neca.org/source/NECA_Home.asp for more details.

[32]We include a regulation term that measures whether the firm is under "rate-of-return" regulation or "price cap" regulation. However, because this term varies little over time, the term is dropped in the fixed-effects regression. We expect that firms operating under price cap regulation will have smaller cost increments due to the more pronounced incentives for cost control under such regulation (Donald and Sappington, 1997). However, when we split the sample and consider each group separately, we do not find that "price cap" firms have statistically significant less cost increments than "rate-of-return" firms.

firm's costs of delivering service; and (4) general economic conditions in the state such as unemployment rate, gross state productivity and personal income.

After accounting for all of these factors, some relevant variation remains. To capture any residual systematic variation, we use fixed effects approach and introduce two types of dummy variables. First, we include the time-specific dummy variable to control for macroeconomic factors that vary over time but do not vary across firms or states, such as the interest rates and industry-wide technology advances. Second, we use the firm fixed effect to capture the unobserved and time-invariant features of rural LECs. These features can include factors such as investment style, management talent, corporate culture and operating efficiency, etc. The fixed effects methodology helps mitigate the potential endogeneity due to omitted variables and therefore isolate the cost inflation effects.

The fixed effect regression estimation can be expressed as follows. The standard errors are robust to heteroskedascity and serial correlation in the error term. In addition, we allow for clustering by firms to allow for possible correlation within firms across time periods.

$$CostDif_{it} = \beta_1 \cdot Ctg0_{it} + \beta_2 \cdot Ctg65_{it} + \beta_3 \cdot Ctg75_{it} + \beta_4 \cdot Loops_{it} + \beta_5 \cdot Cmethod_{it} + X_{it} + S_i + T_t + \varepsilon_{it}. \qquad (1)$$

The dependent variable CostDifit = Costit - Costi,t-1 denotes the cost inflation for firm i in year t. Xit is a vector of state or industry level control variables. The Si and Tt variables are firm-specific and time specific dummy variables, respectively. The other variables are defined as before. εit is the error term.

As noted above, the industry or state level variables are included in our estimating equations to reduce the likelihood of omitted variable bias. However, some of these explanatory variables are lack of time variance. After eliminating the time-invariant explanatory variables, four explanatory variables remain. They are: Pop, Unemp, Inc and Gsp. Popt, the population

density in year t of the state firm i is at, provides a measure of the state's general population characteristic. It's defined as the total population divided by the state area.33 Greater population density is associated with more loops availability, which can make it easier for the firms to manipulate reported cost. The variable Inct is per capital income in year t for the firm i's state. The variable Gspt, measures the gross state production. Unempst, represents the unemployment rate in firm i's state in year t. These variables provide measures of the state's general economic activity.34 The firms' cost overstatement behavior is driven by the goal of profit maximization. The state's general economic activity provides a macro environment on firm's investment activity and earnings prospect, which directly affects firms' decision on cost reporting. Table 1-3 provides the summary statistics for key variable. The variables Cost and CostDif represent the per loop cost and per loop cost change by each firm, respectively. As we mentioned earlier, the variable Ctg0, Ctg65 and Ctg75 are categorical dummies that represent three cutoff thresholds that receive subsidy by 0%, 65% over 115% of NALC and 75% over 150% of NALC.

The basic regression results are presented in Table 4 Column I. The firm fixed effects and time dummies are included. For brevity, the coefficients on these variables are not reported.

The most important findings in Table 1-4 are the positive and significant coefficients of the categorical dummies, suggesting that firms in higher subsidy cutoff categories demonstrate a significantly higher level of annual per loop cost growth. Compared with the category *Ctg0* which does not receive any subsidy, group *Ctg65* incurs cost inflation by 15.85 dollars more per loop each year, and group *Ctg75* has cost inflation by 46.0 dollars more per loop every year. Both of these estimated coefficients are significant at the 1% level. The coefficients for *Ctg75*

[33]The data for the population density variable are obtained from the U.S. Census Bureau (2002).

[34]The data for the unemployment rate are obtained from the U.S. Department of Commerce, Bureau of Labor Statistics (2002).

are significantly larger than those of *Ctg65*, which supports our second conjecture that companies in higher subsidy cutoff level have more incentive to overstate their loop costs in order to qualify for more subsidies.

Of course, statistical significance does not necessarily imply economic importance. To better understand the cost inflation for those "suspicious" firms, we focus on the firms which changed their cutoff categories during the periods and repeat the analysis. We suspect that the firms that switched to higher subsidy categories may increase their per loop cost more rapidly and aggressively, compared to other firms. In our data, 95% of the firms that have switched their cutoff category moved to higher cutoff levels rather than lower.[35] As can be seen in Table 1-4 Column III, we find that not only almost all of the estimated coefficients of the explanatory variables retain the same sign; furthermore, the magnitude for the coefficient of *Ctg65* and *Ctg75* is nearly three times for the entire sample as before, suggesting economically significant cost inflation for these firms.

In Table 1-4 Column II, we show the regression results for the whole dataset by including the cap regime variable. It is positive but not statistically significant. As we discussed before, the cap imposed on the universal service fund may affect various types of firms differently. For example, the firms that are qualified for the subsidy may respond to the cap imposition more aggressively than the other firms do. To capture these potential effects and explore more about the impact of subsidy cap imposition, we split our sample into two groups: pro-cap and post-cap. The results are presented in Table 1-5.

As can be seen, the impact of categorical variable on cost inflation increases after the imposition of the cap, as indicated by the greater magnitude of the coefficients of *Ctg65* and

[35]We removed those 5% firms that switch cutoffs back and forth.

Ctg75 in the Post-Cap policy regressions (Column II). For instance, the coefficients of *Ctg65* in Post-Cap policy almost double those in the Pro-Cap regressions. We conduct a Chow test and find the differences statistically significant at 5% level. This confirms our previous finding that firms at higher cutoffs have even stronger incentive on cost inflation to compete for the limited resources after the imposition of the cap.

To further test the robustness of the results, we also run the OLS regression year by year. The results are mostly consistent with our previous findings. For brevity, the results are not reported but available from the authors upon request.

As we discussed earlier, the state control variables may also yield some interesting findings. Consistent with our expectation, the population density is positively associated with per loop cost change and the gross state production is negatively associated with per loop cost change. The impacts, however, are insignificant for unemployment rate and the per capita income. This is probably due to the state level measurement that is not very descriptive of the macro environment for a particular firm.

The positive, significant coefficient on cost settlement variable, as we expected, indicates that companies using cost settlement have cost inflation due to more flexibility on cost reporting than revenue reporting.

Interaction Among Thresholds

As we discussed earlier, the average schedule firms may have less incentives in cost inflation than the cost companies do because their subsidies are based on generalized industry data in the study area. It is very difficult to exert a direct impact on subsidies through cost manipulation. This lends us a natural benchmark group to check the cost inflation patterns in different types of firms.

In the model specification, we include the interactions of threshold dummy variables and the cost methods (*Cmehtod*=1 represents cost company). The results are presentable in Column I, Table 1-6. The two interaction terms are positive and statistically at 1% level, suggesting that cost method induce more cost inflation for the firms qualified for the subsidiaries. Moreover, the coefficient for the *Ctg75* interaction is larger than the *Ctg65* interaction, which is consistent with our previous hypothesis that firms in the higher subsidy category have stronger incentives to inflate the costs. We further split our sample based on cost policy. The results are shown in Column II for cost companies and Column III for average schedule companies in Table 1-6. We find that compared to cost companies, average schedule companies have smaller estimated coefficients on both *Ctg65* and *Ctg75*, which confirms our finding using interaction terms. We also perform Chow Test and find the difference is at 5% significance level.[36]

Conclusion

Under the FCC's universal service fund HCLS mechanism, we have found evidence of cost overstatement; the impacts are especially pronounced when firm's per loop cost is close to the next higher cutoff reimbursement level. We also find evidence of more cost growth for firms that are at higher-subsidy cutoff level than those at lower-subsidy cutoff level. Probably more importantly, we found that the cap policy imposed on the total payment of HCLS has actually triggers rural LEC's to marginally overstate their costs so as to be eligible to be subsidized.

The potential relationship between three subsidy cutoff firms with cap policy merits further investigation. For example, it is important to have additional measure of the cost behavior so as to identify the magnitude of the relationship. From the standpoint of regulatory policy, it is also important to improve our knowledge of how to identify such adjustments in reported costs. In

[36]To note that, in this article, we do not try to argue the magnitude of difference on cost inflation between thresholds. Instead, we want to show the evidence that the cost inflation is more pronounced within higher cutoff firms due to the HCLS reimbursement mechanism.

this paper, we have not empirically differentiated the different forms of cost adjustment due to unavailability of data.

It is also important to analyze not just the moral hazard issue that this mechanism presents, but also the broader implications for how the United States might consider policies for broadband communications. For example, Former FCC Chairman Bill Kennard in an op-ed to the *New York Times* suggested that the USF should be expanded to subsidize broadband networks in rural areas.[37] If subsidy recipients respond to the USF incentives by inflating reported costs, then expanding the subsidy system might be a very costly, and ultimately ineffective, method for promoting broadband service expansion. Unless Congress can ensure that only the most efficient companies are granted the subsidies to provide quality service to rural areas, the potential for further waste is substantial.

[37]William Kennard, "Spreading the Broadband Revolution" *New York Times* op-ed, October 21, 2006, at A13.

Table 1-1. Embedded High-Cost Loop Fund Formulas

Cost Range as % of National Average	Expense Adjustment within Range	Categorical Dummy Variables
Firms with 200,000 Loops or Fewer		
0% - 115%	0%	*"Ctg0"*
115%-150%	65%	*"Ctg65"*
150% and above	75%	*"Ctg75"*
Firms with Over 200,000 Loops		
0% - 115%	0%	
115%-160%	10%	
160% - 200%	30%	
200% - 250%	60%	
250% and above	75%	

Notes: Firms with 200,000 loops or fewer are considered as small and medium sized firms. The HCLS program is targeted to those firms. This program reimburses a larger fraction of a firm's incremental costs as the level of the firm's costs rises above one of the identified thresholds i.e., "National Average Annual Loop Cost" ("NALC"). For example, the small and medium sized firms are not eligible for reimbursement for their costs that are below 115% NALC; they are eligible for reimbursement of 65% of their costs that are between 115% NALC and 150% NALC, and for reimbursement of 75% of their costs that exceed 150% NALC level. "Ctg0", "Ctg65" and "Ctg75" are used as dummy variables to denote three thresholds in the empirical regression analysis throughout the paper.

Table 1-2. Percent of Firms in Each Reimbursement Category

CostIndex	Ctg0	Ctg65	Ctg75	Cum.
1	12.82	11.11	13.41	37.34
2	10.78	8.06	10.65	66.83
3	35.48	7.95	12.03	122.29
4	24.49	10.92	10.02	167.72
5	4.86	11.63	8.8	193.01
6	3.61	11.71	10.65	218.98
7	2.89	11.91	10.06	243.84
8	1.87	10.06	8.51	264.28
9	1.97	8.28	8.38	282.91
10	1.22	8.39	7.5	300.02

Notes: This table shows the distribution of the percentage of firms in each reimbursement category. We divide the middle cost range (i.e., 115% NALC-150% NALC) length into ten equal and small segments, which are coded as 1 to 10 (CostIndex), respectively. The firms within the range are classified into the ten evenly distributed cost segments (1-10), where 10 is closest to the upper bound of the range (i.e., 150% NALC). Then, for the no subsidy range (0% to 115% of NALC), we find ten equal continuous segments from the upper end (i.e. 115% NALC). Similarly, for the 75% subsidy range (i.e. above 150% NALC), we locate ten equal lengths from the lower end (i.e. 150% NALC). Therefore, CostIndex=1 means firms are at the bottom segment of the range while CostIndex=10 means firms are at the top segment of the range. By doing so, we have 30 equal segment on the cost per loop line with 10 segments at each range. The results are based on the pooled sample. We ignore firms that are not located in this line segment for the moment. Specifically, only 1.22% of firms within the range locate in the segment directly below the threshold of 65% subsidy (i.e. 115% NALC), while 11.11% of firms within the range locate in the segment directly above the threshold. The jump around the threshold of 75% subsidy is less obvious, which maybe due to the much smaller subsidy increment in this case (10% in this case vs. 65% in previous case). Specifically, about 8.39% of firms within the range locate in the segment directly below the threshold of 75% subsidy (i.e. 150% NALC), while 13.41% of firms within the range locate in the segment directly above the threshold.

Table 1-3. Description of Variables

Variable	Mean	Min	Max	Standard Deviation
Cost	393.4295	72.17	997.89	143.4016
CostDif	13.1571	-171.18	309.8	40.35813
Ctg0	0.2468	0	1	0.4312
Ctg65	0.2906	0	1	0.4541
Ctg75	0.4626	0	1	0.4986
Cap	0.2733	0	1	0.4457
Loops	8.0397	2.8904	12.1727	1.4116
Cmethod	0.5312	0	1	0.4990
Pop	4.1596	0.0289	7.0530	1.0752
Inc	10.0916	9.5860	10.6673	0.1707
Gsp	11.6550	0.9100	9.4563	14.0787
Unemp	4.6990	2.3000	11.0000	1.3796

Notes: Variables *Cost* and *CostDif* represent the per loop cost and per loop cost change by each firm, respectively. The variable *Ctg0*, *Ctg65* and *Ctg75* are categorical dummies that represent three cutoff thresholds that receive subsidy by 0%, 65% over 115% of NALC and 75% over 150% of NALC. *Cap* is a dummy variable to capture the impact of HCLS subsidy cap on per loop cost change. *Cap*=0 denotes the period between 1991 and 1999 when the rural carriers are not subject to the USF payment cap, and *Cap*=1 denotes the period from 2000 to 2002 when the cap has been imposed on the fund subsidy. *Loops* represents the total number of loops for each firm to proxy the firm size. C*method* denotes cost reimbursement methods. C*method* = 1 if cost companies; C*method* = 0 if average schedule companies. Cost schedule companies receive compensation based on their reported operating costs. By contrast, the subsidies received by average schedule telephone companies do not depend on their reported costs. Instead, the average schedule companies receive compensation on the basis of industry average cost data in the study area and formulas that are designed to simulate the reimbursement that would be received by a cost schedule company that is representative of average schedule companies. *Pop*, the state's population density, provides a measure of the state's general population characteristic. It's defined as the total population divided by the state area; the variable *Inc* is the state's per capital income; the variable *Gsp*, measures the gross state production; *Unemp*, represents the state's unemployment rate. These variables provide measures of the state's general economic activity.

Table 1-4. Determinants of Per Loop Cost Change

	I	II	III
Ctg65	15.8450**	15.8450**	69.8755**
	[1.1646]	[1.1646]	[11.6032]
Ctg75	45.9751**	45.9751**	126.8767**
	[1.8848]	[1.8848]	[5.4821]
Cmethod	13.8341**	13.8341**	32.1766+
	[3.4155]	[3.4155]	[18.4898]
Loops	11.3879**	11.3879**	58.3953**
	[2.6504]	[2.6504]	[15.3213]
Pop	88.8175**	88.8175**	115.1704*
	[26.8555]	[26.8555]	[58.3148]
Unemp	-0.1359	-0.1359	1.051
	[0.8728]	[0.8728]	[2.0033]
Inc	28.1033	28.1033	59.8419
	[31.6475]	[31.6475]	[60.6316]
Gsp	-61.2979**	-61.2979**	-116.5975**
	[21.0696]	[21.0696]	[37.4217]
Cap		2.0643	
		[9.3480]	
Firm fixed effects	*yes*	*yes*	*yes*
Year dummies	*yes*	*yes*	*yes*
Obs.	12492	12492	3542
R-squared	0.1979	0.1979	0.1282

Notes: Regressions are based on firm fixed effect estimation. Robust standard errors are in brackets.

+ significant at 10%; * significant at 5%; ** significant at 1%.

Notes: The regressions examine whether the cost increment is more pronounced within higher cutoff firms. The dependent variable is the change in per loop cost between one year and the year before. The time period is from 1991 to 2002. We include the firm fixed effects and time dummies in the model. For brevity, the coefficients on these variables are not reported. Column 1 presents the basic regression results. Column III focuses on the firms that changed their cutoff categories during the periods. and repeat the analysis. In our data, 95% of the firms that have switched their cutoff category moved to higher cutoff levels rather than lower. Column II shows the regression results for the whole dataset by including the cap regime variable.

The variable *Ctg0*, *Ctg65* and *Ctg75* are categorical dummies that represent three cutoffs. The variable *Loops* represents the total number of loops. C*method* = 1 if cost companies; C*method* = 0 if average schedule companies. *Pop* measures the state's population density; *Inc* is the state's per capital income; *Gsp*, measures the gross state production; *Unemp* represents the state's unemployment rate.

Table 1-5. Pro-Cap and Post-Cap Regressions

	Pro-Cap Policy	Post-Cap Policy
	I	II
Ctg65	18.2174**	34.6259**
	[1.4048]	[7.1300]
Ctg75	55.3055**	64.9797**
	[2.7753]	[8.4213]
Cmethod	17.9791**	41.4852**
	[4.9036]	[16.0007]
Loops	14.6316**	107.4858**
	[3.4212]	[34.4891]
Pop	116.1542**	-284.4335+
	[41.5952]	[163.9128]
Unemp	0.4191	-2.5115
	[1.1137]	[4.0346]
Inc	39.2466	-109.128
	[41.2405]	[131.5245]
Gsp	-68.8412*	-12.9368
	[30.9686]	[76.8322]
Firm fixed effects	*yes*	*yes*
Year dummies	*yes*	*yes*
Observations	9078	3414
R-squared	0.2062	0.446

Notes: Regressions are based on firm fixed effect estimation. Robust standard errors are in brackets.

+ significant at 10%; * significant at 5%; ** significant at 1%

Notes: This table shows the fixed-effects regression results by splitting the sample into two groups: pro-cap and post-cap. Pro-Cap is the period between 1991 and 1999 when the rural carriers are not subject to the USF payment cap; Post-Cap is the period from 2000 to 2002 when the cap has been imposed on the fund subsidy.

The variable *Ctg0*, *Ctg65* and *Ctg75* are categorical dummies that represent three cutoffs. The variable *Loops* represents the total number of loops. C*method* = 1 if cost companies; C*method* = 0 if average schedule companies. *Pop* measures the state's population density; *Inc* is the state's per capital income; *Gsp*, measures the gross state production; *Unemp* represents the state's unemployment rate.

Table 1-6. Threshold Interactions

	I	II	III
Ctg65	10.5016**	25.1553**	10.0193**
	[1.0139]	[2.6607]	[0.6265]
Ctg75	37.6463**	56.7611**	31.9428**
	[1.6873]	[3.4800]	[1.0745]
Cmethod	0.3127		
	[3.9836]		
Ctg65 × Cmethod	15.0695**		
	[2.6419]		
Ctg75 × Cmethod	19.9817**		
	[3.3249]		
Loops	11.0552**	22.1335**	7.0380**
	[2.6417]	[6.0509]	[2.6097]
Pop	78.8083**	96.3685*	22.9384
	[27.0223]	[39.2301]	[14.7228]
Unemp	-0.1311	-1.485	1.6012**
	[0.8778]	[1.4002]	[0.4198]
Inc	28.0409	-2.6536	60.1331**
	[31.7742]	[47.6513]	[19.1999]
Gsp	-60.5636**	-61.9018*	-28.3947*
	[21.2748]	[29.4895]	[13.1121]
Firm fixed effects	*yes*	*yes*	*yes*
Year dummies	*yes*	*yes*	*yes*
Observations	12492	6636	5856
R-squared	0.2006	0.2005	0.4409

Notes: Regressions are based on firm fixed effect estimation. Robust standard errors are in brackets.

+ significant at 10%; * significant at 5%; ** significant at 1%

Notes: In the model specification, we include the interactions of threshold dummy variables and the cost methods (*Ctg65 × Cmethod* and *Ctg75 × Cmethod*) The results are presentable in Column I. The two interaction terms are positive and statistically at 1% level, suggesting that cost method induce more cost inflation for the firms qualified for the subsidiaries. We further split our sample based on cost policy. The results are shown in Column II for cost companies and Column III for average schedule companies.

The variable *Ctg0*, *Ctg65* and *Ctg75* are categorical dummies that represent three cutoffs. The variable *Loops* represents the total number of loops. C*method* = 1 if cost companies; C*method* = 0 if average schedule companies. *Pop* measures the state's population density; *Inc* is the state's per capital income; *Gsp*, measures the gross state production; *Unemp* represents the state's unemployment rate.

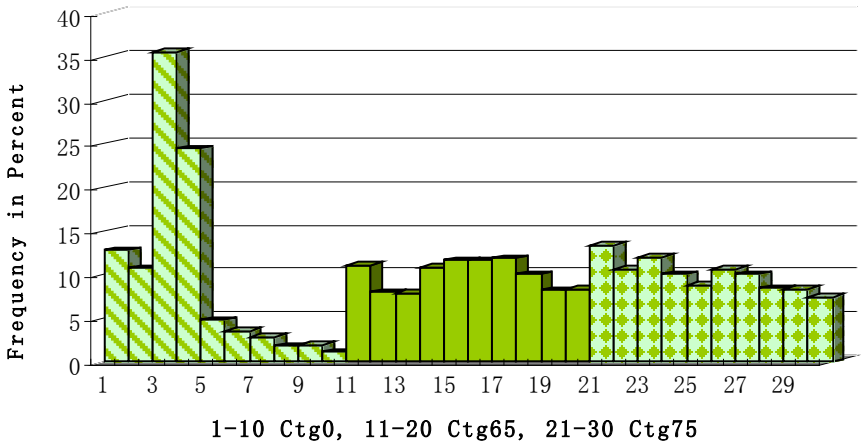

Figure 1-1. Frequencies Distribution

CHAPTER 2
TELECOMMUNICATIONS SERVICE IN DEVELOPING COUNTRIES: IMPACT OF REGULATION ON BRIBERY[1]

Introduction

Corruption in the telecommunications sector was highlighted in January 2008 when the U.S. refused to allow the former chairman of Hondutel (the Honduras Telecommunications Company) Marcelo Chimirri to set foot on the U.S. territory because of his connections to "serious cases of public corruption." Hondutel had been created in 1976 and was a government-owned telephone company that maintained monopoly rights over all fixed line telephony services in Honduras until December 2005. An official declaration published in the print edition of El Heraldo indicates that most of the corruption charges against Chimirri are related to "grey traffic."[2] However, there are other charges, such as "tolerating illegal phone business in exchange for kickbacks, threatening rival business, apparent electronic erasures ordered by Chimirri to eliminate evidence of corruption, and the use of Hondutel personnel and equipment to provide special treatment to high-level government officials, including Chimirri and President Mel Zelaya."[3] Similarly, Vietnamese telecom companies experienced a corruption crisis in 2004, when the government-owned telecommunications company, the Vietnam Posts and Telecommunications Corporation, was accused of awarding contracts on the basis of its relationships to the telecom minister, Do Trung Ta, rather than on merits.

Occurrences like these highlight the importance of achieving a deeper understanding of the ongoing regulatory reforms by developing countries that attempt to reduce corruption. The new

[1]I thank David Sappington, Sanford Berg, Chunrong Ai for their helpful comments. Special thanks are given to Patricia Casey who provided editorial assistance.

[2]"Grey traffic" is the term used to describe the illegal telephone traffic in which international voice-over-IP communications are reported as local, reducing the payment as well as the related income and sales tax for the call.

[3]"Hondurans 'shamed' by U.S. visa denial to corrupt ex-official," *El Heraldo*, Honduras, January 26, 2008, translated by Barbara Howe (original article in Spanish).

economics of regulation under incomplete information provides a useful theoretical framework to study public utility reforms in developed countries.[4] These policy changes – privatization, regulatory reforms, and liberalization – started in Chile, the United Kingdom, and the United States in the 1980s, followed by other European and Latin American countries. Under pressure from the International Monetary Fund (IMF) and the World Bank, developing countries have also been undertaking reforms since the early 1990s. Reforms are often implemented early-on in the telecommunications sector given the importance of this sector for facilitating business communications. An implicit assumption of many reform models is that regulatory contracts can be perfectly enforced: transactions are transparent and legitimate under the law. This assumption presumes a quality of institutions that may prevail in developed countries, but seldom exists in developing counties. A weak institutional environment limits the likely performance improvements from reforms, with low efficiency and poor service quality continuing. Corruption characterizes weak institutional environments, where such activity ranges from bribery (regarding telephone installation or repair) to side payments to equipment suppliers. This paper examines the impact of public policies on bribery by business customers.

To evaluate the overall impact of regulation on bribery, I follow a number of previous scholars' ideas (e.g. Brown, Stern, Tenenbaum, and Gencer, 2006; Levy and Spiller, 1994, 1996) and consider two main dimensions of regulatory systems: regulatory governance and regulatory substance. Regulatory governance involves the institutional and legal design of the regulatory system that can be sustained over time and the creation of the regulatory framework within which decisions are made. Regulatory substance is defined as the content of regulation.[5] More specifically, it involves the actual decisions made by the regulator that pertain to utility pricing,

[4]See, for example, Loeb and Magat, 1979; Baron and Myerson, 1982; Laffont and Tirole, 1986, 1993.

[5]Levy and Spiller (2004, 2006) use the term "regulatory incentives," alternatively.

entry policies, interconnection policies, and subsides, etc. The difference between regulatory governance and regulatory substance is that the former is the "how of regulation" and the latter is the "what of regulation."[6]

To evaluate the effectiveness of regulation on corruption control, I consider both regulatory governance and regulatory substance, because the evaluation should assess not only institutional design but also decisions and how those actions have affected sector performance (Brown, et al. 2006). The proposed two-dimensional measures of regulatory system capture the practical operations of regulatory agencies, which distinguish this study from previous work that focused only on elements of regulatory governance.[7] Many empirical studies ignore the regulatory substance effects due to the difficulty of obtaining data. This study provides an initial attempt to evaluate the regulatory substance effects on corruption by constructing an index of regulatory substance. Perfect measures of regulatory "substance" are not available. However, even imperfect measures prove both regulatory governance and substance have a statistically significant effect on corruption control.

Recent work by Clarke and Xu (2004) examines how privatization and competition affect corruption in the utility sectors of developing countries. They find that increased competition, more expansive private ownership, and less stringent capacity constraints are associated with reduced bribery in telecommunications and electricity sectors. This paper differs from Clarke and Xu's paper by considering additional channels – regulatory governance and regulatory substance – in the regulation system that may affect corruption during the process of regulatory

[6]Executive Summary, *Handbook for Evaluating Infrastructure Regulatory Systems*, 2006, Ashley C. Brown, Jon Stern, and Bernard Tenenbaum with Defne Gencer. the World Bank, Washington, D.C., p.5

[7]By discussing multiple dimensions of regulatory procedures, I do not expect to exhaust variables that are regulation-related, but to shed light on future research and bridge the gap in the key area of regulation that has been neglected in much of the current work on infrastructure reform.

reform. Regulatory governance is often discussed in empirical work on regulation. In contrast, theoretical work focuses on regulatory substance. A main result of this study is that either emphasis in isolation is inadequate. Although I find regulatory governance indeed affects bribery, its impact has to be facilitated with concrete regulatory substance that is successfully and appropriately put into place. The results show that the frequency of bribery is lower in countries with a better regulatory institutional environment, more regulatory resources, and more standardized regulatory substance. The standardized regulatory substance includes the standardized regulatory tariff setting, quality of service standards, sufficient but not redundant accounting professionals, periodic review procedures, and reasonable tariff levels.

This paper is broadly related to the previous work on the determinants of corruption. Recent literature has shown that corruption is lower in countries that have more open international trade, have experienced democracy for a longer period of time, have parliamentary systems, have greater freedom of press, have better infrastructure development, are characterized by fiscal decentralization, are more politically stable, and are associated with more private participation and competition.[8] The theoretical literature has examined the role of governance along with regulatory reforms in reducing corruption.[9] Empirical tests of those theories have examined how elements of prevailing regulatory institutions (proxied by various indicators) affect utility performance.[10]

However, in developing countries, the design of regulatory agencies to monitor infrastructure industries and the implementation of rules are often given less attention than other

[8]See, Ades and Di Tella, 1999; Clarke and Xu, 2004; Fan, Lin, and Treisman, 2008; Fisman and Gatti, 2002; Knack and Azfar, 2002; Kunicova, 2001; Laffont and N'Guessan, 1999; Lederman et al., 2001; Treisman, 2000; and Wei, 2000.

[9]See, Abed and Gupta, 2002; Glaeser and Goldin, 2006; and Laffont, 2005.

[10]See, for example, Correa, Melo, Mueller, and Pereira, 2008; Gutièrrez, 2003; Levy and Spiller, 1994, 1996; Noll, 2007; Stern and Cubbin, 2005; and Stern and Holder, 1999.

policies, like privatization (Kessides, 2003; Wallsten at el., 2004). The cross country or cross-industry empirical studies that explore regulation in developing countries often simply include a dummy variable to indicate the presence of a regulator or whether the regulator is autonomous (see Wallsten, at el. 2004). However, legal frameworks for regulation, regulators selected to implement policy, managers in regulated industries, and regulatory procedures and policies interact in complex ways. These interactions are described in the literature on regulation in the United States.[11] However, empirical work in developing countries is only beginning to explore how the regulatory framework actually functions and interacts with infrastructure industries, the political system, and the economy. This issue is important because the weak sector performance that can result from corruption limits citizen access to telephony, hinder utility reforms, and constrains private business development (Clarke, 1999; Estache, Goicoechea, and Trujillo, 2006).

The remainder of the paper is organized as follows. The next section presents the background. Section 3 presents the data and summary statistics. Section 4 presents the empirical methodology and results. Section 5 discusses robustness checks. Section 6 concludes the papers.

Background

Regulation in the telecommunications industry, evaluated in terms of regulatory governance and regulatory substance, might affect the activities of service providers in a number of ways. Corruption, among many challenges facing public service institutions by developing countries, is one of the most pervasive and difficult challenges to deal with. This paper employs available data to specially examine bribery by business customers. Since bribery is often hidden from the regulator, the secrecy of bribes will raise uncertainty of what those accepting the bribes

[11]See, for example, Baron, 1989; Braeutigam, 1989; Noll, 1989; Peltzman, 1976; and Stigler, 1971.

have promised. Such uncertainty and the associated non-transparent "tax" implicit in bribery diminishes the incentive to invest, which can limit the effectiveness of existing telecom reforms and retard private business development and growth. The examination of the business customers' bribery can help the regulator to be more efficient and effective to minimize corruption during the reform, and thus promote private business development within the nation. Note that the focus of this paper is not on entirely eliminating private enterprise bribery. "Under many realistic conditions it will simply be too expensive to reduce corruption to zero."12 The aim of bribery reduction is to achieve "a fundamental increase in honesty – and the efficiency, fairness, and political legitimacy – of government."[13]

The form of the regulatory design influences the nature of sector development. The crucial issue is how the structure and organization of institutions constrain service providers' behavior. The attributes to be taken into account should involve the credibility of the authority to safeguard the interest of private enterprises and also involve the specialized function of the authority to curb service providers' power to request bribery money. Note that the specific corruption issue I examine is how frequent the telecom users – private enterprises – need to bribe telecom service providers to get their phone connected.14 Bribery can include many forms of side payments, such as the side payments for connection, for under-billing, for writing-off debts, for recording fictitious payments, or for not enforcing collection. In this paper, I do not distinguish the types of bribery, nor do I differentiate which party initiates the bribe. Figure 2 below illustrates the

[12]Rose-Ackerman, S. (1978) "Corruption: A Study in Political Economy" Institute for International Economics.

[13]Rose-Ackerman, S. (1978) "Corruption: A Study in Political Economy" Institute for International Economics.

[14]A more broad definition of corruption has been developed in the literature. See, for example, Bardhan, 1997; Becker, 1968; Becker and Stigler, 1974; Friedman, Johnson, Kaufmann, and Zoido-Lobaton, 2000; Johnson, Kaufmann, McMillan, and Woodruff, 2000; Krueger, 1974; Leff, 1964; Mauro, 1995; Rose-Ackerman, 1975; Sevensson, 2005; and Shleifer and Vishny, 1993.

theoretical background for the attributes that could impact perceived bribery, especially the regulatory attributes and how they interact with service quality and other public policies to affect the perceived bribery by business customers.

Previous empirical work tended to focus on regulatory governance, or the institutional characteristics of the regulatory body, but did not paid much attention to the actual decisions made by the regulator. The implicit assumption is that the introduction of good laws and rules will result in good performance in the infrastructure sector. Although this may be true in developed countries like the U.S. and the U.K., it is not necessarily true in developing countries that suffer from a lack of effective accounting and auditing systems (Trebilcock, 1996; Campos, Estache, and Trujillo, 2003). Although poor governance is more likely to be associated with poor utility performance, good governance is not a guarantee of good outcomes (here, less bribery) (Brown et al. 2006). Thus, to evaluate the effectiveness of a regulatory system and its impact on bribery, it may be insufficient to consider regulatory governance only – one must also look at the policies that have been implemented. If components of a regulatory decision are highly unpredictable, they are unlikely to promote good sector performance. If a regulatory policy promotes bribery in the telecom sector and also reduces the rate of telecommunications deployment and profit, then private investors are likely to lack confidence in the political climate, which affects long-term investment plans. If greater bribery is associated with problems in regulatory rulings, then regulatory substance has implications for sector performance that may be as important as regulatory governance).

This paper considers two other important elements of regulatory reforms: privatization and competition. Privatization policy has been recommended by economists at the World Bank and other international agencies as a way to improve operating performance and bring more capital

into infrastructure sectors. Empirical papers, on the other hand, have obtained mixed results for the impacts of privatization. For example, Li and Xu (2001), Ros (1999), and Wallsten (2001) have found that utility privatization is often associated with an increase in investment and an expansion in capacity. However, in many low-income countries, private sector participation has been not only disappointing but may harm elements of performance,[15] which in some cases has led to widespread citizen dissatisfaction with privatization.[16] Competition is also an important issue in deregulation programs for infrastructure, since part of the industry may be open to competition (such as long-distance telephony and broadband), while the other segments often are regulated as a natural monopoly (such as local loops in telephony). Empirical studies found that privatization often is associated with poor performance in the absence of competition.[17] Increased competition should increase capacity or service quality, since firms are attempting to attract customers from rivals. Moreover, with multiple service providers, utility users can compare and switch between providers in response to bribe demands by their service representatives. Therefore, greater competition can also limit the operators' ability to solicit bribes.[18]

Influential international institutions, such as the World Bank, are encouraging and subsidizing countries to facilitate utility reform. Although the recommendations are frequently referred to as strengthening the institutional environment, such steps need to be considered in the context of the country's existing utility infrastructure quality. Utility service efficiency, quality, and construction lags can differ if purchasing firm must offer bribes to obtain utility service.

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[15]See the survey of the empirical literature on privatization by Parker and Kirkpatrick (2005), Megginson and Sutter (2006) and Boubakri, Cosset, and Guedhami (2008).

[16]See, Carrera, Checchi, and Florio, 2005; Estache, 2006; Hall, Lobina, and Motte, 2005 and Shirley, 2005.

[17]See, Boubakri, Cosset, and Guedhami, 2008; Megginson and Sutter, 2006; and Parker and Kirkpatrick, 2005.

[18]See, Ades and Di Tella, 1999; Clarke and Xu, 2004; Rose-Ackerman, 1978; Shleifer and Vishny, 1993.

Thus, an important, if often underemphasized, objective of utility reforms is to foster efficient and high-quality construction by the incumbent service providers and by new entrants. If telecom service quality is poor, and demand for service is quality contingent, then such a setting might create rents for utility providers. For example, if operators have discretion over which customers will have their service problems repaired first, then operators can demand extra payment in return for a quicker and better service (Clarke and Xu, 2004). A competing hypothesis is that the overall service quality in the country may mean that there is not much point in paying a bribe if the result is likely to be poor service quality. In this paper, this issue is not addressed because I do not use country-level data but rather firm-level data—so the customers are subscribing to the service. The importance of service quality varies across firms within each country. To the extent that paying side payments results in faster phone connection or repair service than when no extra payments are paid, we would expect that private firms are more likely to respond to attempts at extortion when they otherwise would receive poor and inefficient services.

Data

To examine the relationship between regulation and the bribery of regulated firms by their business customers, I employ firm-level data on more than 1,000 firms across 21 transitional economies. The dependent variable, *Bribe*, measures the frequency of extra, unofficial payment that is needed for firms to pay their service providers in order to get telephones connected. It does not measure the percent above the "official" price, but does give an indication of the extent of bribery. The main explanatory variables are measures of (1) regulation systems, including regulatory governance and regulatory substance; (2) whether the operators are privatized; and (3) level of competition in local telephone service. I also control for the countries' quality of

telephones, general public infrastructure obstacles,[19] the bribery frequencies practiced by firms in general, and a range of firm-specific and country-specific characteristics.

I use data from three main sources: (1) the World Business Environment Survey (WBES)[20] in 1999-2000 for firm-level data on corruption, service quality, infrastructure obstacle, general bribery frequencies, and a series of firm-specific characteristics; (2) Wallsten et al. (2004) for country-level data on regulation from their survey conducted in 2001; (3) World Telecommunication Regulatory Database published annually on the International Telecommunication Union (ITU) website for country-level data on privatization and competition, and the ITU Statistical Year Book 2005 for tariff-level data. I also collect macro country data from the IMF website and country-level data on governance from the World Bank's Worldwide Government Indicators (WGI) project by Kaufmann, Kraay, and Mastruzzi (2006). While the whole WBES database contains over 80 countries, the Wallsten et al. (2004) regulation dataset includes data on 45 countries. The limited overlaps of these two datasets reduce the sample to 21 countries and 1,715 firms. [21]

Bribery

This WBES survey is conducted by the World Bank and World Business Environment Survey team. The purpose of this survey is to help better understand the constraints for private business development and to advise governments on ways to change policies, develop new projects, and strengthen support for private firms' growth. They have surveyed firms of all sizes. In my sample, 39% of the firms are small firms (between 5 and 50 employees); 40% are

[19]General public infrastructure includes telephone, electricity, water, roads, and lands. The general public infrastructure obstacle means the general public infrastructure constraint for the operation and growth of business.

[20]It is also called "Measuring Conditions for Business Operation and Growth" Private Enterprise Questionnaire in 1999.

[21]I exclude the countries that have less than 20 firm observations.

medium-sized (between 51 and 500 employees); and 21% are represented by large firms (more than 500 employees). Most of the firms in the sample are from manufacturing (39%), service (35%), construction (10%), and agriculture (10%) sectors. The WBES also provides information on whether the firms are government-owned, foreign-owned, or privately-owned, and whether the firms are exporters. In addition, the WBES database provides information on annual sales and whether the firm is located in a major city.

From the WBES database, I take the answers to the questionnaire question "Do firms like yours typically need to make extra, unofficial payments to service providers to get connected to telephone?" as measurement for *Bribe* and code the answers as "1 = never, 2 = seldom, 3 = sometimes, 4 = frequently, 5 = mostly and 6 = always." Hence, a larger number for *Bribe* means more frequent bribery. [22] Overall, 6.4% of firms in my sample report that they always make extra, unofficial payments to public officials to get connected to telephone; 8.7% of firms respond as "mostly need to bribe" the telecom authorities; 6.1% report that they frequently pay bribes; 11.8% respond that they sometimes pay; 12.6% seldom pay; and 54.3% of the firms report that they never pay unofficial payments to the service providers.

I also calculate the overall standard deviation of the *Bribe* variable, which is 1.71, and also the between-country standard deviation and within-country standard deviation, which are 0.95 and 1.33, respectively.[23] This implies the frequencies of bribes that firms need to pay to get their telephone connected vary not only across firms within countries, but also across countries. For example, the average firm in Pakistan reports that it "mostly" has to pay additional payments to

[22]The original dataset is coded in reverse based on the answers. I recoded for the convenience of regression and explanation. I also dropped those firms that do not answer this question or the answer is "I don't know."

[23]The between-country standard deviation is calculated from the country averages; the within country standard deviation is calculated using the deviations from country averages.

the telecom authorities for telephone service (4.81), while the average firm in Hungary reports that it almost "never" needs to pay bribes (1.31).[24]

Regulation

I discuss here a number of arguments about regulation policies and develop four indicators in each of the two aspects of regulation – regulatory governance and regulatory substance – specifying the regulation policy to which each applies. Some of the regulatory indicators that I consider may operate simultaneously or offset each other in various ways. Based on the effect of each policy indicator, I construct two regulatory indices and draw a general conclusion regarding the two indices.

Regulatory governance

According to Gutièrrez (2003), Stern (1994), and Stern and Holder (1999), regulatory governance should include at least four elements: *Independence of the regulator*, *Clarity of Responsibility*, *Accountability*, and *Transparency and Participation*. Telecom regulation is far more credible in countries where the regulatory governance is featured with these four elements, and such countries tend to have a less severe bribery problem.

Independence: The independent regulatory agencies in many developing countries were only established in the late 1990s. Initially, most state-owned utilities were self-regulated or government-regulated, thus the regulation was always fiscally related or employment oriented, but seldom service oriented (Estache, Goicoechea, and Trujillo, 2006). Today, although some regulators are still subject to political interference and executive discretion, the creation of an autonomous agency may signal of the beginning of independent regulation. As pointed out by Gutièrrez (2003), the benefit of regulatory autonomy can be summarized in two parts: First, the

[24]The *Telecom Corruption* indicator for each country can be found in the Appendix A.

operating telecom activities monitored by the independent regulator will be focused more on service rather than political consideration and thus be more customer-oriented. Second, regulator autonomy means the separation of operation from the implementation of government policy. Such separation results in a more specialized regulatory body in regulatory matters, with greater technical understanding of sector operations; such bodies generally have some financial independence from the government. This independent entity will be more capable of supporting utility reform processes, including reducing corruption.

As noted earlier, all the regulation data in this paper are taken from Wallsten et al. (2004), also called "the World Bank Telecommunications Regulation Survey", which was conducted in 2001. This survey constructs variables measuring multiple dimensions of regulatory decisions, procedures, and processes. In developing countries, the degree of independence varies significantly. Wallsten (2003) pointed out that regulators may have an incentive to report that they are independent even if they are not. Therefore, to address the subjectivity problem, I use the answers to multiple survey questions to evaluate the autonomy of the regulatory authority.[25] Concerning the degree of independence, I consider (1) whether the regulator is separated from the utility and from the communications ministry; (2) whether the regulator's budget all comes from license fees or donors' contributions, rather than from the government budget; (3) if it is true that the minister or president cannot veto the regulator's decision; and (4) if it is true that the minister or the president has not written policy guidelines for the telecommunications sector during the past year. To avoid the subjectivity problem as mentioned earlier, I use question (2) to measure the regulator's financial independence and questions (3) and (4) to capture the minister or president intervention. Some of the regulators claim they are "separated" from the utility and

[25]For the other regulatory governance indicators and most of the substance indicators, I use the same strategy to avoid measurement biasness.

from the communications ministry in question (1). However, in the following questions, they still show some dependence elements. Thus, when I construct the *Independence* indicator, I give a value of "1" to each question if the answer is "yes," then I take the average of the last three questions and multiply by the answer to the first question. In this way, I can capture more variations on autonomy, compared to using one single dummy variable. The maximum number of the *Independence* indicator is "1," and the minimum is "0." The detailed description and calculation of the indices are in Appendix B, and summary statistics are presented in Table 2-1. In my sample, the mean of the *Independence* indicator is 0.4671.

Clarity of Responsibility: In some developing countries, the regulatory roles in the telecom sector are still shared between the regulatory body and government ministries. Non-overlapping responsibilities of different regulatory agencies with clarified roles are better mechanisms for regulatory reform (Spiller, 1996). The overlap of tasks increases the supervision costs. Thus, the regulator is established to supervise the dominant telecom operators and other service providers. *Clarity of Responsibility* is important to curb the operator's exercise of market power, such as reducing customer welfare, and requesting unofficial extra payments for service. In defining *Clarity of Responsibility* among regulatory agencies, the telecommunications regulator should have the power to set tariffs and allocate resources. Moreover, when two operators have conflicts, such as those related to interconnection and/or access terms, the regulator must have the power to solve the problem. Thus, concerns about *Clarity of Responsibility* should involve the following characteristics: (1) the regulator approves fixed-line local telephone prices; (2) the regulator grants licenses in fixed-line local telephony; (3) the regulator can decide how many licenses will be issued; (4) the regulator can assign spectrum use; and (5) the regular is in charge of resolving conflicts when two operators cannot agree on interconnection/access terms. To

construct this indicator, I give a value of “1” to each question if the answer is “yes” and “0” if the answer is “no.” I give the same weight to each question by taking the average. The sample mean is about 0.7142.

Accountability: To establish credibility, the regulator should also design a mechanism to solve disputes. These include the disputes between the regulator and operators and also between the regulator and other parties. The regulator’s decision can affect operators and other parties’ incentives, operating strategies, and outcomes. The dispute system is needed to avoid potential misbehavior or wrongdoings by the utility providers. I construct the *Accountability* indicator by considering answers to the following two questions: (1) whether the operator can appeal to the regulator when the operator disagrees with the regulator’s decisions; and (2) whether other parties can appeal to the regulator when they disagree with the regulator’s decisions. To construct this indicator, I give a value of “1” to each question if the answer is “yes” and “0” if the answer is “no.” I give equal weight to each question. The sample mean of accountability is 0.9466 with a minimum value 0.5.

Transparency and Participation: Regulators may also encourage public participation and monitoring. The data indicate that the degree of regulatory transparency and participation is different among developing countries. In some countries, the regulatory meetings are all open to the public in practice; some countries require openness by law; some countries make regulatory decisions publicly available; and some countries provide detailed explanations of their decisions to the public. There are counter-arguments about the role of public participation. In some developing countries, especially with poorly developed legal systems, accounting standards and education systems, people may not be able to effectively monitor operators. The complexity of telecommunications operating networks may make monitoring by the public sector very difficult.

A countervailing argument is that in some countries, if the regulators are not well compensated and hence have a potential to collude with operators, this results in a situation in which they do not have an incentive or have mixed incentives to enforce strict rules on operators (Gutièrrez, 2003). From this perspective, transparency in the regulatory design to eliminate collusion and public participation to enforce external monitoring may reduce corruption.

In constructing this indicator, four aspects of regulatory procedures are considered: (1) whether the regulatory meetings are open to the public in practice; (2) whether the regulatory decisions are publicly available; (3) whether the regulator publishes decisions; and (4) whether the regulator publishes explanations of decisions. To construct this indicator, I give a value of "1" to each question if the answer is "yes" and "0" if the answer is "no." I give an equal weight to each question, which gives an average of 0.7468.[26]

After constructing four indicators to measure aspects of regulatory governance, I also calculate an overall index for regulatory governance by taking the average of the above four indicators.[27] As the correlation matrix in Table 2-2 Panel A reveals, some of the regulatory governance indicators are highly correlated. To avoid the multicollinearity problem, I use this overall index in the regression. The regulatory governance index ranges between 0.4063 and 0.9063 with a mean of 0.7005 and a standard deviation of 0.1438.

[26]One could construct this variable giving different weight to each aspect, since it is possible, for instance, that the regulator publishes an explanation of decisions is conditional on whether the regulator publishes decisions. However, weighting all the aspects differently using the principal component method does not change the regression significantly. To be consistent with the way that I construct each indicator, use the equal weight methodology (in line with other studies).

[27]I also use the principal component method to construct the regulatory governance index. This method results in two variables and substituting these two variables does not change the regression results. However, the explanation of the variables and interpretation of the results become more difficult. The two variables also require more instrumental variables that are not available for the paper when I use IV estimation in the robustness checks. Therefore, I continue using the equal weighting method to construct the regulatory governance index.

One reason for the limited study of regulatory substance may be the lack of data availability. I overcome this by employing "the World Bank Telecommunications Regulation Survey," study to construct four general indicators of the regulatory substance of the countries in my sample drawing upon Brown et al. (2006) and Levy and Spiller's (1994, 1996): *Tariff Setting, Quality of Service Standards, Accountants Ratio* and *Periodic Review*. For the reasons explained below, an effective regulator must have the power to set tariffs, have quality of service standards, have effective accounting systems, and conduct periodic reviews of her decisions.

Tariff Setting: The tariff setting process is important to protect utility users and gain the confidence of investors. The regulator should have the power to establish a reasonable tariff level for the utility users to afford and for the utility providers to comply. I use whether the prices are regulated as a proxy for the power of the regulator on tariff setting.[28] More specifically, I consider prices for fixed-line local telephony, cellular telephony, domestic long-distance telephony, international long-distance telephony, and internet service provided over telephone lines. These services are commonly purchased by private businesses. Regulation of these tariffs provides benchmarks against the abuse of monopoly power by the service providers and reduces their power to request bribery. The detailed construction of this indicator is presented in Appendix B. This indicator ranges between 0 and 1 with a mean of 0.5595 and a standard deviation of 0.2380. More comprehensive price regulation is expected to be associated with less corruption between two parities of telecom users and providers.

Quality of Service Standards: It is also important for regulators to set a minimum service standard that the utility providers are expected to meet (Brown et al. 2006). The service quality targets include the same technical standards, the same service quality, and also the same price for

[28]I also added measurement for tariff setting methods. A more specific tariff setting method added to the indicator complicates the argument, and it does not show a significant effect in the regression and does not change the results.

similar services and operations. If the regulator can provide detailed standards for the regulated companies to comply, make both consumers and investors aware of the nature of the service, and if the prices are set at reasonable levels, service providers may be less able to exercise discretion towards their customers, and bribery should be reduced over time.

I do not have data that indicate directly whether the regulator sets service quality standards. Therefore, I use the proxy of whether the performance data (i.e., call completion rates by operator, faults and faults repair, and geographical coverage rates) are collected. Based on collected data, the regulator is in a position to issue warnings and impose fines if the agency has the authority to do so. The supervision of operator performance can pressure the operators to fix their problems, improve service quality, and enlarge service coverage through internal incentives rather than by allowing installers or managers to extract extra payments. In this paper, I consider answers to five questions to proxy for quality of service standards: (1) if the law requires that all entrants receive the same technical terms and conditions for access/interconnection; (2) if the law requires that all entrants receive the same prices for access/interconnection; (3) if the regulator collects data on the operator's call completion rate; (4) if the regulator collects the performance indicator for faults and faults repair; and (5) if the regulator collects the performance indicator for geographical coverage rates. To construct this indicator, I give a value of "1" to each question if the answer is "yes" and "0" if the answer is "no." I assign an equal weight to each question in constructing the *Quality of Service Standards* index, which has a mean of 0.8759 and a standard deviation of 0.1981.

Accountants Ratio: Audits can provide valuable information to regulators. However, developing countries often lack reliable accounting and auditing systems, often due to a limited number of accounting employees. To create a measure of a regulatory agency's accounting

resources, I divide the number of accountants employed by the regulator divided by the annual revenues of the firm (in U.S. dollars). A value of "1" is given for the country with the maximum of this ratio, which is in Honduras (0.0869). For the other countries, the above calculated ratio is divided by 0.0869. This yields a proxy for the *Accountants Ratio*. The measure has a mean of 0.1243 and a standard deviation of 0.1440 in my sample. A low value for this measure suggests limited auditing resources and insufficient accounting information, which may limit the regulator's ability to control bribery.

Periodic Review: Periodic regulator review is a necessary procedure for the regulator to evaluate and adjust its decisions during the regulatory process. Performing such routine functions by the regulators can prevent inappropriate regulatory procedures. It can also minimize undue discrimination toward consumers, reducing abusive business practices such as bribery requests.

I define the periodic review indicator as "1" if "there is a set period of time between regulator reviews," and "0" if otherwise.[29] The average of this indicator is 0.4764 with a standard deviation of 0.4996.

After constructing these four indicators of regulatory substance, I calculate an aggregate measure of regulatory substance by taking the average of these four indicators.[30] This aggregate regulatory substance variable ranges between 0.2648 and 0.7343 in the sample, with a mean of 0.5184 and a standard deviation of 0.1374. Compared with the regulator governance index, the regulatory substance index is lower by about 20 percentage points on average, but with almost

[29]A complementary measurement is the actual time period between which the regulator conducts a review. However, due to the large amount of missing data for the actual period reported by the regulator, I do not include this measurement. For the reported data, the period varies between 6 months to 2 years.

[30]I have also used the principal component method to construct the regulatory substance index. This method results in two variables and substitution of these two variables does not change the regression results. However, the explanations with these two variables are difficult. The two variables also require more instrumental variables that are not available for this paper when I use IV estimation in the robustness checks. Therefore, I continue using the equal weighting method to construct the regulatory substance index.

the same standard deviation. The difference in absolute value reflects the small average value for the A*ccountants Ratio*. To avoid the possibility that this absolute value difference reflects on the marginal effects, I compare marginal effects based on a one standard deviation change rather than the marginal effects based on actual level changes.

Summary statistics are presented in Table 2-1. The correlation matrices are presented in Table 2-2 Panel A for firm level variables and Panel B for country level variables. As shown in Table 2-2 Panel B, the regulatory indicators are usually highly correlated. This suggests some of them could operate simultaneously or offset each other in various ways. To include them all in the regression would introduce severe multicollinearity. Therefore, the construction of an overall index makes more sense for the purpose of regression. To examine the effect of each factor that I specified earlier, I also employ the piecewise strategy by adding factors to the model. I will discuss the empirical analysis results in detail in Section 3.

Regulatory substance

Besides the four regulatory substance variables, the tariff level is important, since tariffs are the critical aspect providing incentives for utility companies to operate in an appropriate way. However, the price of services is difficult to evaluate. The examination of prices has been conducted in several studies, but the results are mixed. In OECD countries, more government intervention and regulation seem to be related to lower telecommunications prices. However, this does not seem to be the case in non-OECD countries (Ure, 2003).

Moving from prices to their impacts on bribery, it is unclear whether higher prices or lower prices are more likely to be associated with frequent bribery. Low prices for key telecommunications services could mean that customers are financially able to pay an extra payment to get their phone connected promptly. High prices of services could have two different implications. First, the service costs could be high, leading to low rents for telecommunications

service providers. In this case, the service providers are likely to seek extra payments to defray their high costs. In addition, if the installation fee is very high but the service quality is poor, this might cause users to make extra payments to the telecom provider to fix their phones: users have already paid installation fees, and the incremental bribery payments are low relative to incremental benefits. Second, note that it is also possible that the high price of telecom service is associated with high rents to the service provider. In many areas of developing countries, telephone service and internet service are still considered to be luxury goods: only a few people can afford access in such settings. In those areas, people do not have much knowledge about the technology and a higher price may give people the impression that it is more of a luxury good. The lack of customer knowledge allows service providers to request side payments on trivial services even though those services may be costless (such as connecting multiple phones on one line). Thus, the impact of tariff level on bribery is ambiguous. This study includes a *Fee* variable as a control variable in all regressions. It is calculated by the sum of the monthly subscription fee and installation fee divided by the monthly GDP per capita.[31]

Privatization and Competition

Both privatization and competition data are from the World Telecommunication Regulatory Database published annually on the ITU website. The variable competition measures the logarithm number of operators within a country in 2001. The number of operators ranges from 1 to 5 in my sample. The variable of *Privatization* is calculated based on the ratio of operators that are privatized. For each operator, I take the value of 1 if it is fully privatized, 0.5 if it is partially privatized, and 0 if it is still government owned. Them I sum up the total value for each country and divide by the total number of operators in that country. The calculated

[31]The importance of the installation is emphasized here, since the up-front fee could be introduced as an annualized value. I also replace the *Fee* variable with either the monthly subscription fee or the installation fee in the regressions. The results do not change.

Privatization variable ranges from 0 to 1, with a mean of 0.7414 and a standard deviation of 0.3463.

Other Control Variables

As noted above, the WBES survey data is conducted at the firm level, yet the regulation survey is conducted at the country level. While I examine the impact of regulation policies on firm level perceptions of corruption, I need to control for firm specific traits, such as firm size, industry sector, firm location, etc. I also study the link between survey responses regarding telephone quality, general infrastructure obstacle, and corruption faced by firms in general. I further control for many country-specific traits, such as GDP, GDP growth, and inflation level. In a robustness check, I also control for a series of country governance variables, so the differential impact of regulatory governance and substance can be determined for telecommunications in particular.

Quality of telephone, infrastructure constraints and corruption in general

The telecom service quality data are directly from the answer to the WBES survey question "Please rate the overall quality and efficiency of services delivered by the telephone agencies." I code the firms' answers as "1 = very bad, 2 = bad, 3 = slightly bad, 4 = slightly good, 5 = good, 6 = very good." A larger value means better quality.

The firms' ratings on *Service Quality* have six different degrees, but those answers are subjective in certain circumstances since they depend on who actually took the survey. Furthermore, respondents sometimes fail to differentiate clearly between telecom services and services from other public utility agencies. To minimize this problem, I use another control variable in the regression, which measures the general infrastructure constraint for the business. I extract the answer to the question of "general infrastructure (telephone, electricity, water, roads, and lands) constraint for the operation and growth of business" and code the *General*

Infrastructure Obstacle variable as "1 = major obstacle, 2 = moderate obstacle, 3 = minor obstacle, and 4 = no obstacle." Here a larger value means the general level of infrastructure services is less of an obstacle to firm development.

In addition, the firms' willingness to pay bribery fees to the telecom sector also is likely to be correlated with the firms' overall tendency to pay side payments to other sectors. If the firms commonly are willing to pay some irregular payments to get things done, then such firms will also pay to the telecom sector. Keeping this in mind, I also control for firms' overall frequencies of side payments. From the WBES survey questionnaire, I extract the question, "Is it common for firms to pay some irregular 'additional payments' to get things done?" and code the answer *Corruption in General* as "1 = never, 2 = seldom, 3 = sometimes, 4 = frequently, 5 = mostly, and 6 = always." A larger number of *Corruption in General* means more frequent side payments in general. The correlation coefficient between firms' answers on *Corruption in General* and bribery to the telecom sector *Telecom Corruption* is 0.4847.

Firm-specific traits

All firm specific control variables are derived from the WBES survey questions. They include customer ownership, firm size, sector, and location. Taking these in turn, the variables are defined as follows:

(1) Ownership: *Government* takes on the value 1 if the government owns any percentage of the firm; *Foreign* takes on the value of 1 if foreign entities own any percentage of the firm. In my sample, 16% of firms are government owned, and 17% of firms are foreign owned. The rest of the firms are considered privately owned. Firm's ownership affects utility bribe payments: private firms tend to have less political influence than government-owned firms, so they might be less able to resist bribe demands (Clarke and Xu, 2004);

(2) Firm Size: I use the logarithm of total value of sales as a proxy for firm *Size*. Small business firms are likely to suffer from cash flow problems, which reduce their ability to pay bribes (Clarke and Xu, 2004);

(3) Sector: Four dummy variables to capture the four main sectors those firms mainly belong to: *Manufacturing*, *Service*, *Agriculture*, and *Construction*. The analysis also includes the variable *Export*, which takes on value 1 if the firm exports and 0, otherwise.[32] Firms from different sectors have different demands for telecom service and thus may exhibit different frequencies of paying bribery given everything else the same;

(4) Location: I code this variable as "*Major* = 1" if the firm is located in the capital or a major city, "*Major* = 0," otherwise. The location of firms could also matter: telecom service providers are more likely to demand extra payments from rural companies if the bribe in rural areas is less likely to be monitored by the regulator than that in large cities.

Country Level Control Variables

To assess the robustness of the relationship between regulation and firms' access to telecom service, I include other country level variables. They are *GDP per capita*, GDP g*rowth* (the growth rate of GDP per capita), and *Inflation*. *Inflation* is the general rise in the level of prices. *Inflation* and *GDP per capital* measure the overall level of economic development. The growth rate of GDP per capita captures how fast a country is growing. A growing GDP may reflect greater potential gain to business customers from having a working phone system. All the macro control variables are taken the data in year 2001 from the IMF website.

[32]An ideal measurement for export is the percent of output exported. Although the WBES survey contains this question, half of the firms in the sample do not answer this question.

Empirical Methodology and Results

The Empirical Model

Due to the discrete nature of the dependent variable, the econometric methodologies I employ are ordered probit procedures. To examine the causal effects of regulation on corruption, I assume that the firms' underlying response can be described by the following equation:

$$\begin{aligned} &Telecom\ Corruption_{j,k} = \\ &\quad \beta_0 + \beta_1 \mathrm{Re}\,gulation_k + \beta_2 \mathrm{Pr}\,ivatization_k + \beta_3 Competition_k + \beta_4 Telecom\ Quality_{j,k} \\ &\quad + \beta_5 InfrastructureObstacle_{j,k} + \beta_5 CorruptionInGeneral_{j,k} + Firm\_Specific\ Variables_j \\ &\quad + Country\_level\ Control\ Variables_k + \varepsilon_{j,k} \end{aligned} \tag{2}$$

The j and k subscripts indicate firm and country, respectively. The dependent variable Telecom Corruption is measured with 1 to 6, a higher ranking corresponds to a higher level of corruption. Regulationk = {Regulator Governancek, Regulatory Substancek}. I use the ordered probit model and maximum likelihood estimation (MLE) to estimate Equation (1). I also compute heteroskedastic robust standard errors and allow for clustering within countries to take into account the possible correlations of errors. Specifically, I do not require the error terms to be independent across firms within the same country, but I assume they are independent across countries. As shown in the correlation matrices in Table 2-2 Panel A, the regulatory-related variables are usually highly correlated. To avoid the multicollinearity problem, I employ a piecewise strategy by adding one regulatory dimensional variable to the model at one time. After running a set of regressions with individual regulatory variables, I report regulatory indices, as explained and constructed earlier with multiple specific factors for both regulatory governance and substance in the regression. Recall that a higher value of the index means a stronger regulatory governance or substance. The ordered probit regression results are presented in Table 2-3, and I will explain the findings in detail in the next section.

Findings

Table 2-3 presents regression results with dependent variable as *Telecom Corruption*. From column 1 to 5, I start by running a regression that includes just one regulatory governance-related variable, i.e. *Regulatory Independence*, C*larity of Responsibility*, *Accountability,* and *Participation and Transparency*, associated with particular arguments discussed in Section 2. I then run regressions (shown in column 5, Table 2-3) for the regulatory governance index that are constructed based on the average of the above four variables. From column 6 to 10, I start by including the regulatory governance index variable, and also include one regulatory substance related variable each time, including *Tariff Setting*, *Quality of Service Standards*, *Accountants Ratio*, and *Periodic Review*. The last column, column 10, shows a model that combines both constructed indices in the regression. In all of these, I control for the tariff level (*Fee*) since the frequencies of bribery to the telecom service providers are very likely to depend on the price level. Note that due to the missing variables in the regulation survey, the number of firms I could include in the analysis starts at 1,715 (from 21 countries), but is reduced as additional regulatory variables are added.

Table 2-3 (column 1 to column 5) shows that no single regulatory governance indicator (including the regulatory governance index) has a statistically significant effect on corruption in isolation. However, as controls are added for regulatory substance, the regulatory governance controls are not only negatively associated with corruption, but also statistically significant. Several substance variables are associated with reduced corruption. This finding suggests that the model with the regulatory governance related variables but without regulatory substance variables is characterized by the missing variable problem; the results suggest that the regulatory governance may or may not have an impact on corruption control. However, after adding each regulatory substance factor to the model, both regulatory dimensions exhibit a statistically

significant effect on corruption curtailment, controlling for all other confounders. In particular, the last regression in column 10 shows both regulatory governance and substance have a statistically significant effect on corruption control. In summary, the results in Table 2-3 support the view that bribery in the telecom industry is less frequent in countries with strong regulatory governance and regulatory substance. The effect of telecom regulatory policies on telecommunications bribery is not only statistically significant, but also economically relevant, and the econometric model fits the data well. In terms of the fit, the Pseudo R^2 stays over 18%, which is high for these types of cross-firm empirical studies (Beck et al., 2006).

Ordered probit coefficients do not measure the magnitude of marginal effect, although the sign and statistical significance of the estimated coefficients can be interpreted in the same way as for linear regressions. In order to demonstrate the magnitude of the effectiveness of regulatory policies on corruption control, I further compute the marginal impacts of regulation on the probabilities that firms choose each of the six corruption levels (from “never” to “always”). For this, I use the coefficient estimates from the model that includes both regulation indices.

Table 2-4 presents the marginal effects based on the change of an “average” enterprise, as explained in Section 3.1. It shows the marginal effect if the explanatory variables increase one standard deviation, or change from the minimum value to the maximum value. As can be seen, the magnitude of the economic impacts is quite large. For instance, the estimated results suggest that a one standard deviation increase in the regulatory governance index value would lead to a 7.0 percentage point decrease in the probability that a firm reports it *sometimes* needs to pay the additional unofficial payments. If the regulatory governance index increases from the minimum to maximum in the sample, the probability that a firm reports a *sometimes* payment decreases by

16.2 percentage points. The effects are substantial given that about 12% of the firms in the sample report that they sometimes need to pay side payments to the telecom service providers.

Similarly, the estimates imply that a one standard deviation increase in the regulatory substance index would lead to a 6.1 percentage point increase in the probability that a firm reports that it *sometimes* need to pay the additional unofficial payments. If the regulatory substance index increases from the minimum to maximum in the sample, the probability that a firm reports a *sometimes* payment decreases by 14.2 percentage points. Again, the effects are not negligible, given that about 12% of the firms in the sample report that they frequently need to pay side payments to the telecom service providers.

The fully standardized coefficients for the ordered probit model are presented in Table 2-5. The coefficients shown in the last column (we call it "beta") means "for one standard deviation increase in x, y is expected to increase or decrease 'beta' standard deviations, while holding all other variables constant." Compared with the raw coefficients, we can see the regulatory governance effect (-0.3860) is close to the regulatory substance effect (-0.3362). As I mentioned earlier, although the absolute values of both indices are very different due to the feature of the constructing indices itself, the marginal effect of the fully standardized coefficient won't be driven by this difference. This finding suggests that even though regulatory governance itself may not reduce corruption, when it is supplemented with detailed regulatory contents, it has actually the same power to control bribery as regulatory substance.

The main difference between Table 2-5 and Table 2-4 is that Table 2-5 does not present the magnitude of marginal effects within each level of bribery frequency, so I can only make general conclusions. The results show that overall, regulatory governance has fairly the same effect in controlling for corruption, and both of the regulatory elements have the strongest impact for the

types of firms that have to *sometimes* bribe the utility providers. It is not intuitive why regulation has the strongest power in corruption control when bribery happens *sometimes*, rather than *seldom*, *frequently*, *mostly*, or *always*. One reason could be that the benefits for those firms that *sometimes* need to pay side payments are only marginal. If the regulator intervention is effective in controlling bribery, those supplying telecommunications at the margin will most likely stop extorting bribes because the risk of penalties from bribery might outweigh the benefits service providers can obtain.[33]

Table 2-3 and Table 2-4 also provide other important findings. First, the regression results often predict reduced bribery in the presence of privatization and competition. This is consistent with Clarke and Xu's (2004) findings. Second, it is interesting to note that although the tariff level (*Fee*) does not enter significantly when I only include regulatory governance indicators, it becomes positive significant after I add regulatory substance variables. This coincides with previous literature that the impact of the tariff level effects could be mixed. A third main finding concerns the telecom quality and infrastructure constraints. In countries where telecom quality is better and the general infrastructure is less of an obstacle for firm development, firms reported less frequent demands for bribes.

The firm and country control variables yield some interesting results, too. In all specifications, government-owned firms are less likely than their privately owned counterparts to pay bribes. Other things equal, government-owned firms are 3.9 percentage points less likely than privately owned firms to say they *mostly* need to pay additional payments and 21.3 percentage points more likely to say that they "never" need to do so. This finding suggests that in

[33]Note: who benefits from a bribe? The answer is both parties—otherwise the transaction would not occur. Of course, the customer would be even better off if there were no bribe. Furthermore, the legitimacy of the governance system is increased when bribery is infrequent.

developing countries, private firms are much more vulnerable to unofficial payment requests than government-owned firms. In a sense, state-owned customers have "protection" stemming from their connection to powerful ministries. This result suggests that justice is not practiced in an even-handed fashion in developing and transition economies. Regarding the dummy variables, I calculate the discrete change in the probability that the firm rates its bribery frequency to the telecom service providers due to a change in the dummy variable from 0 to 1. In addition, the coefficients on *GDP growth* are positive and statistically significant in 6 out of 10 models for the frequency of bribery, suggesting that firms in countries with higher *GDP growth* reported more exposure to bribery, due to the fact that telecom service in those countries may be more valuable than in other countries.

Robustness Checks

Endogeneity and Instrumental Variable (IV) Estimation

Because this paper employs firm level responses on bribery, it is less likely to be subject to the endogeneity issue than in a pure cross-country study, since it is unlikely that an individual firm's views about corruption will influence a country's telecom regulatory policies. Nonetheless, there may be a feedback effect from the private sector to the regulatory policies that a high level of corruption in the telecom sector may induce a call for more effective regulation. I use the two-stage instrumental variable estimation to address this issue. Table 2-6 shows the instrumental variable ordered probit analyses. I choose instrumental variables based on the theory and empirical work in Barth et al. (2004, 2006), and also used by Beck et al. (2006). In particular, I use ethnic fractionalization, the absolute value of a country's latitude, and the length of time it has been independent to predict cross-country variation in regulatory governance and regulatory substance policies. These three variables are used when studying the country differences in determining bank supervisory and regulatory policies. It is reasonable to use them

in the telecom sector because the link of the policy differences with these three variables is country based rather than sector specific. A detailed explanation of how these three variables are correlated with regulation policy chosen can be found in Beck et al. (2006).[34] The R-square in the first stage estimation is always above 97%, suggesting a good model of fit.

The instrumental variable regression results are consistent with the previous ordered probit regressions in Table 2-3. The key explanatory variables – regulatory governance and substance – and most other explanatory variables remain the same sign and have the same statistical significance. In Table 2-6 column 1 – 3, I use the ordered probit model with IV; in column 4-6, I further confirm my regression by using the ordered logit model with IV. Even when I use instrument variables, and change model specification, the results are still consistent with my previous findings.

Robustness to Controlling for Other Country Level Traits

Although Table 2-3 results hold when I control for an array of firm-specific and country-specific variables, there may still concern that regulatory variables are proxies for other country-specific traits. As Beck et al. (2006) pointed out countries with different general institutional environment may choose different regulatory practices. At the same time, these different traits may drive the integrity of regulation in the telecommunications industry. Following Beck et al.

[34]The basic idea of including latitude is that the European colonization shapes the country institutions and policy systems, Beck et al. (2006) have argued that European's tendency of extracting natural resources generates more powerful administrative structures. Since Europeans usually do not settle in tropical climates, more temperate climates are usually associated with more European settlers and more egalitarian policies. Including ethnic fractionalization is necessary because there is evidence that more ethnically diverse economies tend to choose policies to expropriate resources from each other and slow the economic growth. The basic idea to include the length of independence years is that countries that are independent in the 18th or 19th centuries are more likely to modify their colonial institutions and policies to be more conductive to economic growth. As argued in Beck et al. (2006), these three instruments are not necessarily the best exogenous explanations of telecom regulatory practices. However, these variables are reasonably exogenous, and previous theoretical and empirical work has suggested that these instruments can partially explain the policy today.

(2006), I assess whether there are still other factors driving both the selection of the regulatory policies and the corruption reported by firms.

To control for the country's institutional environment, I include a series of political and institutional quality indices – the World Governance Indices (WGI) – as a robustness check. The WGI (Kaufmann et al., 2006) are constructed with 6 indicators, based on 276 individual variables from 31 sources, produced by 25 different organizations. Those 6 indicators measure different dimensions of governance: (1) Voice and Accountability, which measures public participation and media freedom; (2) Political Stability and Absence of Violence, which measures legal protection; (3) Government Effectiveness, which measures bureaucratic quality; (4) Regulatory Quality, which measures policy implementation ability; (5) Rule of Law, which measures law enforcement and legal system efficiency; and (6) Control of Corruption, which measures the extent to which public power can resist corruption. Appendix B defines these variables in detail. The value of each indicator for countries in the sample can be found in Appendix A. A larger value of the index means stronger institutional governance. Table 2-7 shows the regression results. Again, the data are consistent with my previous results that both regulatory governance and regulator substance enter negatively in all regressions, and all of them are statistically significant. Moreover, all the estimated coefficients of WGI variables are negative and statistically significant, suggesting that a better general institutional environment lowers the degree to which firms have to bribe the telecom sector in practice.

Conclusion

Previous studies have considered how regulatory governance, especially the regulator autonomy affects service quality in the telecommunications industry. Clarke and Xu (2004) consider how corruption is affected by privatization and competition during the regulatory reform. This study provides a complementary analysis of how the entire regulatory system,

characterized by indices for regulatory governance and regulatory substance, affects corruption in developing countries around the world. The analysis finds that after controlling for the service quality, infrastructure as an obstacle, the tariff fee, and many other firm-specific and country-specific variables, regulation policies focused on both dimensions tend to reduce corruption.

Many empirical studies ignore the regulatory substance effects due to the difficulty of obtaining comparable data on policies. This study provides an initial attempt at evaluating the regulatory substance effects on corruption, by constructing an index from the aspects of tariff setting, accountants ratio, quality of service standards, and periodic reviews. Future research work could expand this index by incorporating more comprehensive indicators of the accounting system. Furthermore, an evaluation of how each component of a regulatory system affects sector outcomes would also be interesting. If a new regulatory system cannot promote good outcomes within the infrastructure sectors, the agency will be neither politically nor economically sustainable. Therefore, the ultimate goal for policymakers is not a specific set of institutional features, but a sustainable system that can convince investors that service providers have the opportunity to earn profits on investments (commensurate with risks) and assure consumers that the industry is providing service improvements at affordable prices.

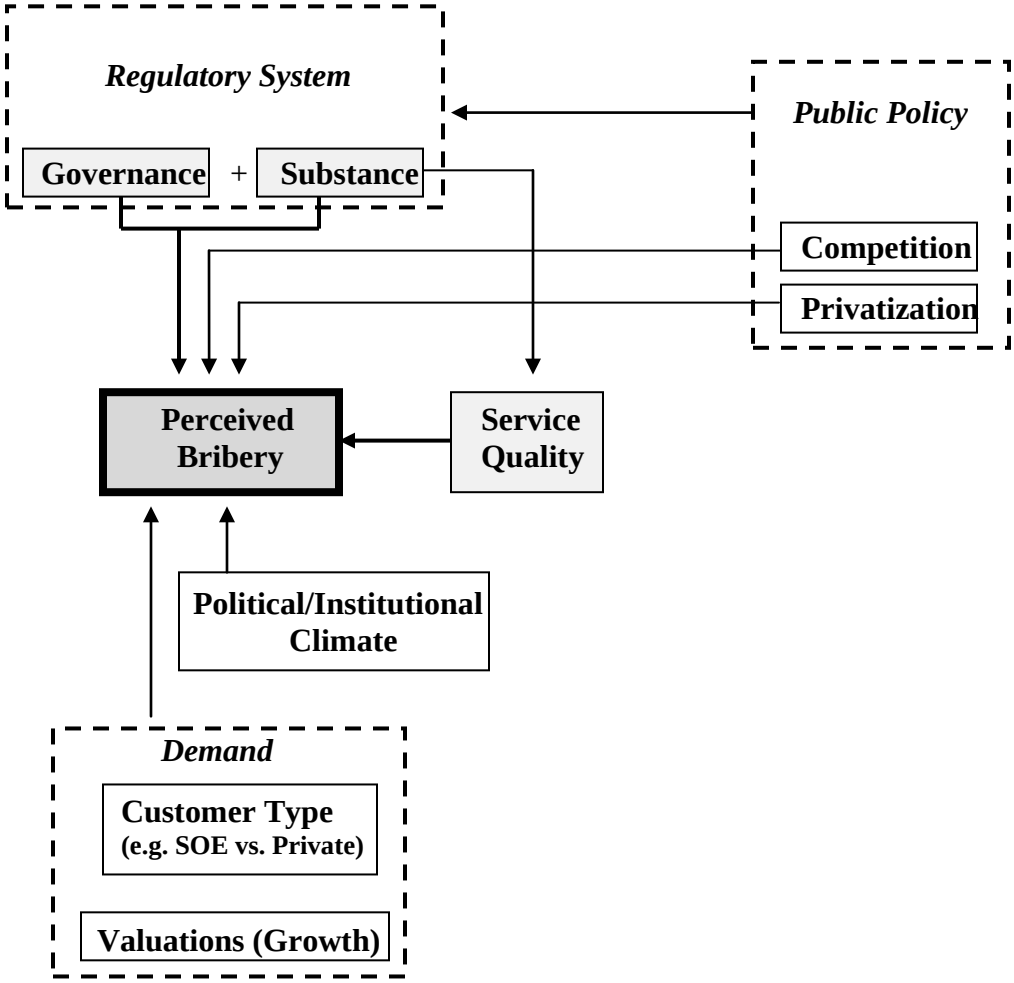

Figure 2-1. Factors Affecting Bribery

Table 2-1. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
telecom corruption	1715	2.1854	1.6212	1	6
regulatory governance	14	0.7005	0.1438	0.4063	0.9063
independence	17	0.4671	0.2966	0	1
clarity	17	0.7142	0.2930	0	1
transparency/participation	20	0.7468	0.1246	0.6250	1
accountability	20	0.9466	0.1545	0.5000	1
regulatory substance	18	0.5184	0.1374	0.2648	0.7343
tariff setting	20	0.5595	0.2380	0	1
accountants ratio	19	0.1243	0.1440	0	1
review	21	0.4764	0.4996	0	1
quality of service standards	21	0.8759	0.1981	0.2000	1
fee	21	0.4089	0.4263	0.0113	1.7771
subscription fee	21	8.1885	10.6594	1.2700	41.0700
connection fee	21	73.5858	81.2668	0	326
privatization	21	0.7414	0.3463	0	1
competition	21	1.7079	1.1428	1	5
telecom quality	1715	4.1644	1.2320	1	6
infrastructure obstacle	1715	2.4484	1.0979	1	4
corruption in general	1715	2.9236	1.6677	1	6
size	1715	4.5507	6.2604	0	23.4179
government	1715	0.1298	0.3141	0	1
foreign	1715	0.1017	0.2660	0	1
export	1715	0.4257	0.4946	0	1
manufacturing	1715	0.3819	0.4860	0	1
service	1715	0.3895	0.4878	0	1
agriculture	1715	0.0706	0.2562	0	1
construction	1715	0.0974	0.2966	0	1
major	1715	0.6577	0.4746	0	1
GDP	1715	7.4466	1.0084	5.0609	8.6084
GDP growth	1715	-5.6647	9.7426	-32.4600	11.6200
inflation	1715	18.7359	19.9786	-0.2000	64.9000

Table 2-2. Correlation Matrices

Panel A: Correlations between firm-level variables:

	regulatory governance	regulatory substance	indepen-dence	clarity	accounta-bility	particip-ation /transpa-rency	accoun-tants ratio	tariff	quality standard	review	fee	privatiz-ation	competi-tion	GDP	GDP growth
regulatory substance	-0.006	1													
independence	0.8671*	-0.3355*	1												
clarity	0.8349*	0.0683*	0.5651*	1											
accountability	0.3600*	-0.3454*	0.3680*	-0.0032	1										
participation /transparency	-0.1468*	0.2761*	-0.2723*	-0.0940*	-0.5059*	1									
accountants ratio	0.1684*	0.4112*	0.0588*	0.3437*	-0.1285*	0.0418	1								
tariff setting	-0.1736*	0.6429*	-0.3356*	-0.0682*	-0.2000*	0.3608*	0.1273*	1							
quality of service standards	0.2984*	-0.1797*	-0.0908*	0.4495*	0.0785*	-0.1009*	0.4155*	0.0156	1						
periodical review	-0.6300*	0.8547*	-0.5816*	-0.3878*	-0.3736*	0.3306*	-0.0385	0.4399*	-0.3338*	1					
fee	0.1367*	-0.0217	0.2524*	-0.1048*	0.2926*	0.0634*	0.1326*	0.3299*	0.1282*	0.0724*	1				
privatization	0.4328*	-0.3414*	0.5699*	0.4029*	-0.0494*	0.0182	-0.2115*	-0.2352*	0.1213*	-0.3852*	-0.0072	1			
competition	-0.5905*	0.0286	-0.2419*	-0.7905*	0.2089*	-0.1169*	-0.3575*	-0.1418*	-0.4148*	0.1775*	0.1534*	-0.006	1		
GDP	-0.3208*	-0.2724*	-0.1870*	0.0274	-0.2126*	-0.3533*	-0.1642*	-0.5505*	-0.0791*	-0.1565*	-0.6676*	0.1809*	0.1436*	1	
GDP growth	-0.2692*	0.1817*	-0.3926*	-0.1447*	0.0371	-0.016	-0.0937*	-0.1486*	0.0246	0.1958*	-0.4914*	-0.0620*	0.1247*	0.2491*	1
inflation	0.5051*	-0.1003*	0.7187*	0.1084*	0.1895*	-0.2950*	0.2111*	-0.1348*	-0.3848*	-0.3395*	0.0718*	-0.0144	0.0638*	-0.1840*	-0.4872*

Panel B: Correlations between country-level variables:

	telecom corruption	telecom quality	infrastructure obstacle	corruption in general	size	govern-ment	foreign	export	manufactur-ing	service	agriculture	construc-tion
telecom quality	-0.2013*	1										
infrastructure obstacle	-0.3116*	0.2551*	1									
corruption in general	0.4847*	-0.1421*	-0.2241*	1								
size	0.3147*	-0.1962*	-0.2327*	0.1951*	1							
government	-0.2041*	0.0975*	0.0763*	-0.2215*	-0.0942*	1						
foreign	0.0323	-0.1070*	-0.1009*	0.0322	0.3175*	-0.1328*	1					
export	-0.0214	-0.0489*	0.0018	-0.0235	0.2231*	0.0082	0.1877*	1				
manufacturing	0.0700*	-0.0085	-0.0576*	0.0274	0.0326	0.0503*	0.0555*	0.2845*	1			
service	-0.1246*	0.0895*	0.1149*	-0.0789*	-0.1868*	-0.0372	-0.0876*	-0.2112*	-0.6279*	1		
agriculture	-0.0245	-0.0516*	-0.0337	-0.0925*	-0.0853*	0.0613*	-0.0588*	-0.0622*	-0.2166*	-0.2201*	1	
construction	0.0498*	0.0088	-0.0016	0.1236*	0.0740*	-0.0727*	0.0013	-0.0918*	-0.2582*	-0.2624*	-0.0905*	1
major	-0.3982*	0.2200*	0.3126*	-0.2483*	-0.7882*	0.1387*	-0.2732*	-0.2240*	-0.1285*	0.2309*	0.1076*	-0.0532*

Table 2-3. Ordered Probit Model with Robust and Clustered Error Terms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
independence	-0.0143									
	[0.7916]									
clarity		0.0079								
		[0.5962]								
accountability			0.6519							
			[0.5549]							
participation				-0.2645						
				[1.0566]						
regulatory governance					-1.4514	-3.0095***	-3.6135**	-1.573	-2.3294	-3.7589***
					[1.3739]	[0.9365]	[1.6302]	[1.0929]	[1.6939]	[1.2680]
accountant						-2.4636***				
						[0.4813]				
tariff setting							-1.6456**			
							[0.6922]			
quality of service standards								-1.1866*		
								[0.6626]		
periodical review									-0.6480***	
									[0.2256]	
regulatory substance										-2.7640***
										[0.4595]
fee	-0.1644	0.2028	-0.2183	-0.165	0.55	0.9335**	0.8207*	0.6505	0.8901*	1.1871***
	[0.6811]	[0.4812]	[0.3113]	[0.3706]	[0.5202]	[0.4017]	[0.4507]	[0.4236]	[0.4904]	[0.3349]
privatization	0.0174	-0.1681	-0.073	-0.0686	-0.4363	-0.7173***	-0.2938	-0.2636	-0.7309**	-0.6634***
	[0.3795]	[0.3041]	[0.1477]	[0.1430]	[0.3680]	[0.2379]	[0.3723]	[0.3117]	[0.3097]	[0.1441]
competition	-0.0479	-0.1479	-0.082	-0.07	-0.3624*	-0.6666***	-0.6042***	-0.4566***	-0.4420**	-0.6835***
	[0.1663]	[0.1933]	[0.0605]	[0.0616]	[0.1998]	[0.1566]	[0.2040]	[0.1319]	[0.2140]	[0.1636]
	-0.0241	-0.0099	-0.0326	-0.0373	0.0089	-0.0184	0.0187	-0.0127	0.011	-0.0051
telecom quality	[0.0449]	[0.0375]	[0.0342]	[0.0335]	[0.0432]	[0.0481]	[0.0419]	[0.0467]	[0.0415]	[0.0442]
infrastructure obstacle	-0.1203***	-0.1152***	-0.1411***	-0.1462***	-0.0885***	-0.1030***	-0.0960***	-0.1016***	-0.0909***	-0.1064***
	[0.0315]	[0.0246]	[0.0290]	[0.0287]	[0.0267]	[0.0230]	[0.0263]	[0.0266]	[0.0271]	[0.0235]
corruption in general	0.3086***	0.3039***	0.3083***	0.3084***	0.3096***	0.3084***	0.3008***	0.3062***	0.3160***	0.3103***
	[0.0242]	[0.0250]	[0.0241]	[0.0240]	[0.0242]	[0.0244]	[0.0250]	[0.0251]	[0.0229]	[0.0236]

Table 2-3 Continued.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
size	-0.0046	-0.0222	0.0065	0.0014	-0.0447**	-0.0386**	-0.0553***	-0.0612***	-0.0627***	-0.0769***
	[0.0275]	[0.0244]	[0.0211]	[0.0200]	[0.0227]	[0.0180]	[0.0201]	[0.0164]	[0.0226]	[0.0174]
government	-0.6961***	-0.6424***	-0.6391***	-0.6468***	-0.5984***	-0.5862***	-0.6126***	-0.5724***	-0.5743***	-0.5624***
	[0.1392]	[0.1207]	[0.1122]	[0.1157]	[0.1402]	[0.1372]	[0.1371]	[0.1337]	[0.1349]	[0.1332]
foreign	-0.4279**	-0.2623	-0.4201**	-0.4352***	-0.2144	-0.0852	-0.2118	-0.1323	-0.2162	-0.1271
	[0.1845]	[0.1670]	[0.1645]	[0.1559]	[0.1611]	[0.1460]	[0.1542]	[0.1377]	[0.1619]	[0.1436]
export	-0.1722***	-0.1083	-0.1375*	-0.1508*	-0.0756	-0.3542***	-0.2003	-0.2900**	-0.2328	-0.2915**
	[0.0597]	[0.1042]	[0.0756]	[0.0793]	[0.0868]	[0.1270]	[0.1535]	[0.1319]	[0.1467]	[0.1377]
manufacturing	-0.0112	-0.0653	0.1056	0.1141	-0.229	-0.2272***	-0.1627*	-0.2234***	-0.1657*	-0.1762**
	[0.1754]	[0.1900]	[0.1924]	[0.1987]	[0.1420]	[0.0850]	[0.0953]	[0.0788]	[0.0855]	[0.0773]
service	0.0035	-0.0028	0.1171	0.115	-0.1930**	-0.0273	0.1059	0.0277	0.0578	-0.0046
	[0.1395]	[0.1777]	[0.1781]	[0.1800]	[0.0926]	[0.1885]	[0.2060]	[0.1922]	[0.1953]	[0.1954]
agriculture	0.1507	0.2581	0.2853	0.2656	0.0892	-0.2415	-0.1605	-0.2191	-0.1818	-0.1866
	[0.2492]	[0.2292]	[0.2551]	[0.2540]	[0.1996]	[0.1642]	[0.1504]	[0.1530]	[0.1466]	[0.1441]
construction	-0.0922	-0.0807	-0.0073	-0.0175	-0.1996	-0.0286	-0.0804	-0.0546	-0.0435	-0.0181
	[0.1786]	[0.1589]	[0.1810]	[0.1817]	[0.1554]	[0.0964]	[0.0865]	[0.0912]	[0.0916]	[0.0953]
major	-0.8049***	-0.5846	-0.7885***	-0.7943**	-0.2308	0.6817**	-0.2532	-0.1607	-0.6395	-0.4078
	[0.2644]	[0.3853]	[0.2000]	[0.3193]	[0.4399]	[0.2687]	[0.4316]	[0.3217]	[0.4610]	[0.4013]
GDP	-0.2022	-0.2171	-0.1458	-0.1829	-0.2673	-0.4347***	-0.4517***	-0.3505*	-0.1114	-0.2683**
	[0.2089]	[0.1789]	[0.1252]	[0.1375]	[0.1763]	[0.1339]	[0.1636]	[0.2052]	[0.1765]	[0.1289]
GDP growth	-0.0029	0.0213	-0.0048	-0.0028	0.0387**	0.0553***	0.0495***	0.0383**	0.0484**	0.0573***
	[0.0152]	[0.0145]	[0.0100]	[0.0138]	[0.0179]	[0.0133]	[0.0166]	[0.0156]	[0.0216]	[0.0152]
inflation	0.0107	0.0102	0.0106**	0.0107**	0.0181*	0.0214***	0.0182**	0.0128	0.0169*	0.0145**
	[0.0144]	[0.0065]	[0.0044]	[0.0047]	[0.0103]	[0.0065]	[0.0089]	[0.0110]	[0.0090]	[0.0065]
Observations	1333	1361	1667	1667	1097	1097	1097	1097	1097	1097

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 2-4. Magnitude of Marginal Effects on Bribery for an "Average" Enterprise

		Seldom	Sometimes	Frequently	Mostly	Always
regulatory governance	one standard dev. increase	-0.0338	-0.0700	-0.0372	-0.0491	-0.0221
	change from min to max	-0.0426	-0.1618	-0.1105	-0.1904	-0.1456
regulatory substance	one standard dev. increase	-0.0297	-0.0614	-0.0325	-0.0428	-0.0191
	change from min to max	-0.0306	-0.1423	-0.0972	-0.1622	-0.1129
fee	one standard dev. increase	0.0308	0.0637	0.0338	0.0445	0.0199
	change from min to max	-0.0349	0.1015	0.1003	0.2136	0.2209
privatization	one standard dev. increase	-0.0133	-0.0274	-0.0144	-0.0188	-0.0082
	change from min to max	-0.0248	-0.0795	-0.0481	-0.0702	-0.0368
competition	one standard dev. increase	-0.0495	-0.1037	-0.0560	-0.0756	-0.0359
	change from min to max	-0.1901	-0.2126	-0.0953	-0.1202	-0.0567
telecom quality	one standard dev. increase	-0.0004	-0.0009	-0.0005	-0.0006	-0.0003
	change from min to max	-0.0016	-0.0034	-0.0018	-0.0023	-0.0010
infrastructure obstacle	one standard dev. increase	-0.0075	-0.0155	-0.0082	-0.0106	-0.0046
	change from min to max	-0.0212	-0.0422	-0.0220	-0.0285	-0.0123
corruption in general	one standard dev. increase	0.0325	0.0673	0.0358	0.0472	0.0212
	change from min to max	0.0416	0.1505	0.0988	0.1611	0.1089
size	one standard dev. increase	-0.0313	-0.0647	-0.0343	-0.0452	-0.0202
	change from min to max	-0.1590	-0.1829	-0.0790	-0.0935	-0.0387
government	increase from 0 to 1	-0.0513	-0.0738	-0.0336	-0.0394	-0.0148
foreign	increase from 0 to 1	-0.0092	-0.0170	-0.0086	-0.0108	-0.0045
export	increase from 0 to 1	-0.0012	-0.0024	-0.0013	-0.0016	-0.0007
manufacturing	increase from 0 to 1	-0.0202	-0.0388	-0.0199	-0.0254	-0.0108
service	increase from 0 to 1	-0.0122	-0.0235	-0.0121	-0.0154	-0.0065
agriculture	increase from 0 to 1	-0.0003	-0.0006	-0.0003	-0.0004	-0.0002
construction	increase from 0 to 1	-0.0142	-0.0251	-0.0125	-0.0155	-0.0063
major	increase from 0 to 1	-0.0222	-0.0525	-0.0291	-0.0394	-0.0183
GDP	one standard dev. increase	-0.0188	-0.0386	-0.0204	-0.0266	-0.0116
	change from min to max	-0.0363	-0.1100	-0.0666	-0.0986	-0.0541
GDP growth	one standard dev. increase	0.0356	0.0738	0.0393	0.0520	0.0235
	change from min to max	-0.0363	-0.1100	-0.0666	-0.0986	-0.0541
inflation	one standard dev. increase	0.0191	0.0394	0.0208	0.0271	0.0119
	change from min to max	0.0242	0.1008	0.0650	0.1003	0.0582

Table 2-5. Fully Standardized Coefficient for Ordered Probit Mode[72]

	raw coefficient	P>|z|	fully standardized coefficient
regulatory governance	-3.7589	0.0030	-0.3860
regulatory substance	-2.7640	0	-0.3362
fee	1.1871	0	0.3496
privatization	-0.6634	0	-0.1477
competition	-0.6836	0	-0.5927
telecom quality	-0.0051	0.9080	-0.0046
infrastructure obstacle	-0.1064	0	-0.0834
corruption in general	0.3103	0	0.3706
size	-0.0769	0	-0.3552
government	-0.5624	0	-0.1328
foreign	-0.1271	0.3760	-0.0256
export	-0.2915	0.0340	-0.1015
manufacturing	-0.1762	0.0230	-0.0597
service	-0.0046	0.9810	-0.0009
agriculture	-0.1866	0.1950	-0.0432
construction	-0.0181	0.8490	-0.0064
major	-0.4078	0.3100	-0.1406
GDP	-0.2683	0.0370	-0.2090
GDP growth	0.0573	0	0.4082
inflation	0.0145	0.0260	0.2133

[72]For one standard deviation increase in x (explanatory variable), y (dependent variable) is expected to increase or decrease “beta” standard deviation, while holding all other variables constant, where “beta” is called a fully standardized coefficient.

Table 2-6. Instrumental Variable Estimation

	Ordered Probit with Fitted Value			Ordered Logit with Fitted Value		
	(1)	(2)	(3)	(4)	(5)	(6)
regulation	-4.3987***			-7.6443***		
	[1.2963]			[2.5256]		
regulatory governance		-4.2494***	-5.3153***		-7.3565***	-9.0094***
		[1.5076]	[1.2491]		[2.6228]	[2.2884]
regulatory substance			-1.6368***			-2.6646**
			[0.6217]			[1.0658]
fee	0.5359	0.4826	0.6356**	0.9688	0.9291	1.1613**
	[0.3697]	[0.3408]	[0.3128]	[0.6170]	[0.5898]	[0.5286]
privatization	-0.4671	-0.6236**	-0.7251***	-0.7952	-1.0567**	-1.1977***
	[0.2903]	[0.2577]	[0.2097]	[0.5002]	[0.4641]	[0.3766]
competition	-0.4561***	-0.6085***	-0.7480***	-0.7956***	-1.0690***	-1.2870***
	[0.1213]	[0.1649]	[0.1380]	[0.2125]	[0.2848]	[0.2497]
telecom quality	0.0022	0.0366	0.0324	0.0041	0.0613	0.054
	[0.0467]	[0.0449]	[0.0472]	[0.0801]	[0.0787]	[0.0815]
infrastructure obstacle	-0.1091***	-0.1109***	-0.1252***	-0.2245***	-0.2296***	-0.2535***
	[0.0289]	[0.0206]	[0.0239]	[0.0615]	[0.0460]	[0.0513]
corruption in general	0.3111***	0.3173***	0.3180***	0.5398***	0.5476***	0.5496***
	[0.0239]	[0.0255]	[0.0246]	[0.0469]	[0.0480]	[0.0465]
size	-0.0590***	-0.0323*	-0.0447**	-0.1096***	-0.0676**	-0.0865***
	[0.0204]	[0.0186]	[0.0185]	[0.0333]	[0.0310]	[0.0310]
government	-0.5800***	-0.5928***	-0.5728***	-1.0067***	-1.0377***	-0.9961***
	[0.1374]	[0.1396]	[0.1361]	[0.2609]	[0.2720]	[0.2608]
foreign	-0.168	-0.1506	-0.1144	-0.2801	-0.2378	-0.179
	[0.1487]	[0.1467]	[0.1468]	[0.2626]	[0.2617]	[0.2598]
export	-0.2875**	-0.2352**	-0.2739**	-0.4646*	-0.3897*	-0.4501**
	[0.1297]	[0.1158]	[0.1174]	[0.2488]	[0.2261]	[0.2273]
manufacturing	-0.1579*	-0.1769**	-0.1572*	-0.2372	-0.2746	-0.242
	[0.0893]	[0.0901]	[0.0879]	[0.1867]	[0.1909]	[0.1831]
service	0.0238	0.1117	0.0643	0.0716	0.187	0.1223
	[0.1906]	[0.1920]	[0.1856]	[0.3013]	[0.3083]	[0.2903]
agriculture	-0.1871	-0.1784	-0.1669	-0.2609	-0.262	-0.2439
	[0.1609]	[0.1617]	[0.1650]	[0.3071]	[0.3114]	[0.3144]
construction	-0.0565	-0.1034	-0.0823	-0.1166	-0.1908	-0.1581
	[0.0917]	[0.0890]	[0.0949]	[0.1571]	[0.1524]	[0.1631]
major	-0.5328*	0.5889	0.4928	-1.0036**	0.8412	0.6785
	[0.2734]	[0.4428]	[0.3526]	[0.4573]	[0.7542]	[0.6304]
GDP	-0.3183*	-0.5280***	-0.5652***	-0.5424*	-0.8647***	-0.9243***
	[0.1806]	[0.1688]	[0.1669]	[0.3020]	[0.2935]	[0.2953]
GDP growth	0.0370***	0.0533***	0.0583***	0.0641***	0.0924***	0.1000***
	[0.0099]	[0.0123]	[0.0116]	[0.0171]	[0.0210]	[0.0205]
inflation	0.0082**	0.0290***	0.0245***	0.0141**	0.0506***	0.0428***
	[0.0034]	[0.0087]	[0.0087]	[0.0057]	[0.0161]	[0.0159]
Observations	1097	1097	1097	1097	1097	1097

Robust standard errors in rackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 2-7. Ordered Probit with More Macro Controls

	(1)	(2)	(3)	(4)	(5)	(6)
	-5.7616***	-5.6690***	-5.6044***	-3.5716***	-4.3257***	-5.1735***
regulatory governance	[1.3040]	[1.0619]	[1.0926]	[0.9042]	[1.1341]	[1.0048]
	-2.8251***	-1.5817**	-2.8895***	-2.7068***	-2.4454***	-2.9330***
regulatory substance	[0.4007]	[0.7985]	[0.4552]	[0.4977]	[0.2699]	[0.3769]
fee	1.3341***	1.6460***	1.4418***	1.3857***	1.2523***	1.3538***
	[0.3210]	[0.3679]	[0.3415]	[0.3963]	[0.2750]	[0.2658]
privatization	-0.5084***	-0.2168	-0.5554***	-0.6524***	-0.6077***	-0.5546***
	[0.1325]	[0.2876]	[0.1758]	[0.2058]	[0.1116]	[0.1565]
competition	-0.8055***	-0.7798***	-0.7757***	-0.5748***	-0.6918***	-0.7381***
	[0.1553]	[0.1445]	[0.1429]	[0.1416]	[0.1381]	[0.1250]
telecom quality	-0.0047	-0.0209	-0.009	-0.02	0.0008	-0.0045
	[0.0438]	[0.0484]	[0.0451]	[0.0480]	[0.0430]	[0.0439]
	-0.1142***	-0.1183***	-0.1191***	-0.1224***	-0.1119***	-0.1148***
infrastructure obstacle	[0.0237]	[0.0239]	[0.0224]	[0.0223]	[0.0235]	[0.0226]
	0.3030***	0.3030***	0.3005***	0.3011***	0.3056***	0.3013***
corruption in general	[0.0251]	[0.0253]	[0.0259]	[0.0261]	[0.0244]	[0.0257]
size	-0.0972***	-0.0823***	-0.0820***	-0.0626***	-0.0928***	-0.0845***
	[0.0193]	[0.0160]	[0.0157]	[0.0144]	[0.0181]	[0.0162]
government	-0.5569***	-0.5480***	-0.5627***	-0.5566***	-0.5564***	-0.5725***
	[0.1300]	[0.1328]	[0.1302]	[0.1330]	[0.1304]	[0.1302]
foreign	-0.1069	-0.032	-0.0888	-0.0396	-0.1275	-0.1128
	[0.1350]	[0.1305]	[0.1380]	[0.1385]	[0.1387]	[0.1377]
export	-0.2704*	-0.3494***	-0.3170**	-0.3929***	-0.2693*	-0.2823**
	[0.1443]	[0.1265]	[0.1361]	[0.1269]	[0.1433]	[0.1436]
manufacturing	-0.1648**	-0.2074***	-0.1955***	-0.2394***	-0.1627**	-0.1719**
	[0.0747]	[0.0690]	[0.0738]	[0.0733]	[0.0753]	[0.0753]
service	0.0082	-0.0484	-0.0249	-0.0802	0.0072	0.0028
	[0.1969]	[0.1930]	[0.1945]	[0.1909]	[0.1978]	[0.1975]
agriculture	-0.1648	-0.2172	-0.1838	-0.2304	-0.1652	-0.1649
	[0.1410]	[0.1483]	[0.1447]	[0.1536]	[0.1396]	[0.1445]
construction	-0.0263	-0.0243	-0.0319	-0.0342	-0.0288	-0.0247
	[0.0941]	[0.0957]	[0.0940]	[0.0954]	[0.0940]	[0.0951]
major	-0.4062	0.8168	-0.4615	0.0623	-0.5539	-0.5244
	[0.3525]	[0.6007]	[0.3305]	[0.2925]	[0.4058]	[0.3603]
GDP	-0.2142**	-0.3266***	-0.0038	0.1042	-0.1393	-0.0776
	[0.1083]	[0.1235]	[0.1406]	[0.1302]	[0.1295]	[0.1237]
GDP growth	0.0646***	0.0784***	0.0668***	0.0810***	0.0615***	0.0621***
	[0.0136]	[0.0131]	[0.0128]	[0.0162]	[0.0139]	[0.0114]
inflation	0.0135***	0.0098**	0.0156***	0.0198***	0.0171***	0.0169***
	[0.0052]	[0.0049]	[0.0044]	[0.0045]	[0.0058]	[0.0046]

Table 2-7 Continued.

	(1)	(2)	(3)	(4)	(5)	(6)
voice and accountability	-0.4195*** [0.1358]					
political stability and absence of violence		-0.6751** [0.2742]				
government effectiveness			-0.7256*** [0.1849]			
regulatory quality				-1.1514*** [0.2924]		
rule of law					-0.3790*** [0.1333]	
control of corruption						-0.5296*** [0.1387]
Observations	1097	1097	1097	1097	1097	1097

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

CHAPTER 3
POLITICAL CONNECTION AND BANK LOAN CONTRACTING[73]

Introduction

The literature suggests that, at least in some countries, politically connected firms have preferential access to debt financing.[74] The literature offers several explanations for why politically connected firms may enjoy more favorable access than their non-connected peers. For example, if politically connected firms can take over control of assets in event of default, especially have greater ability to force repayment of a debt, then lenders may be willing to extend credit on more favorable terms, such as lower interest rates and longer maturities (Qian and Strahan, 2007). Politically connected firms might also receive such favorable terms if lenders perceive an implicit guarantee from the government that the politically connected firms will be bailed out if they encounter financial difficulties (Faccio, Masulis and McConnell, 2008). It is also possible that lenders themselves have to rely on economic support from the governments that those firms are connected with. To secure the economic support, the lender may bribe those politically connected firms by extending favorable credit terms to them.

Bank loans are an important source of corporate debt financing. Consequently, it is important to determine whether the loans provided to politically connected firms tend to contain more favorable terms (such as lower pricing, longer loan maturity and less security requirement) than those provided to non-connected borrowers? It is also

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[73]I thank David Sappington, Sanford Berg, Chunrong Ai, Andy Naranjo, and Joel Houston for their helpful comments. I also thank Jennifer Itzkowitz, Brandon Lockhart, and Monika Causholli for their tremendous help on data collection.

[74]See, for example, Claessens, Feijen, and Laeven, 2006; Glaeser and Saks, 2004; Sapienza, 2004; Fan, Wong and Zhang, 2007; Leuz and Oberholzer-Gee, 2006; Johnson and Mitton, 2003; Khwaja and Mian, 2005.

important to determine whether any observed political favoritism varies with firms' characteristics (such as the firm size, tangibility of assets and financial performance). To assess these issues, I undertake a systematic examination of the link between political connections and loan contracting around the globe. I study 409 politically-connected firm observations from 29 countries over the period 1997-2006 along with a set of matching banks.

This research provides three primary conclusions. First, I find that political connection is associated with more favorable loan terms, including lower interest rates, longer maturities and less stringent collateral requirements. Second, after controlling for other factors, politically connected (but publicly-traded) firms are less likely to borrow syndicated loans than their non-connected peers. Diffuse ownership can provide banks a tool to reduce risk. Loans made to firms with political connections are also less likely to be secured by collateral. My result suggests that political connection can mitigate risk, which may explain why banks are more willing to extend credit to politically connected firms. Furthermore, the impact of political connection on loans depends on borrowers' characteristics. Greater favoritism is observed when firms are larger, have more liquidity and profitability, and have higher market value and more tangible assets.

This paper is related to work that examines the impact of rent seeking on financial markets. Krueger (1974) finds that entrepreneurs spend money and time to secure economic rents from government officials. Stulz (2005) shows how entrenched managers are motivated to pursue rents when they have limited cash flow rights. Shleifer (1994) and Bertrand, Kramarz, Schoar and Thesmar (2004) find that during the preferential treatment by government officials, politicians themselves are the net beneficiaries. Recent

literature examines the role of connections that were generated by campaign contributions[75] or related to dominant business families[76] and established friendships[77].

This paper is more focused on the effects of political connection on bank loan contracting. The growing literature on the consequences of political connection focuses on how such connection enhances corporate value[78], increases government bailout[79] and grants preferential access to debt financing[80]. Most of previous literature use data from a single country (except for papers by Faccio). This paper employs cross-country data to study how political connections affect bank debt contract terms. Dinc (2004) provides cross-country and bank-level evidence about political influence on banks. He shows that in emerging countries, government-owned banks increase their lending in election years relative to private banks. This paper differs from Dinc's paper in that I use the loan-level data and examine how banks provide rents to politically connected firms. This paper also extends Faccio's (2006) list of politically connected firms around the world – Faccio's dataset ends in 2001; I expand the dataset (also based on the Worldscope dataset) up to 2006.

My analysis also extends the literature on bank loan contracting. Previous contracting research has investigated how asset liquidation value (Benmelech, Garmaise, and Moskowitz, 2005), abnormal accounting accruals (Bharath, Sunder, and Sunder,

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[75]See, for example, Roberts, 1990; Kroszner and Stratmann, 1998; Ang and Boyer, 2000; Anup and Knoeber, 2001; and Claessens, Feijen and Laeven, 2008.

[76]See, for example, Morck, Stangeland and Yeung, 2000.

[77]See, for example, Fisman, 2001.

[78]See, Faccio, AER, 2006, Shleifer and Vishny, QJE, 1994.

[79] See, Faccio, Masulis and McConnell, *Journal of Finance*, 2006.

[80]See, for example, Chiu and Joh, 2004, Cull and Xu, 2005, Faccio, 2006, Johnson and Mitton, 2003, and Khwaja and Mian, 2005; Rajan, Zingales, 2003.

2008), shareholder rights (Chava, Livdan, and Purnanandam, 2007), financial restatement (Graham, Li and Qiu, 2008), creditor protection environment (Bae and Goyal, 2006; Qian and Strahan, 2007), and firm risk characteristics (Strahan, 1999) affect loan contract terms. This paper illuminates one more factor that could affect loan contracting terms – political connection. Although previous researchers investigate the debt financing characteristics of politically connected firms, few have examined multiple dimensions. I examine multiple dimensions of the loan contract, including both the price (interest rate spread) and non-price terms such as loan maturity, loan security, and ownership terms (syndication). I also examine how the nature of favoritism in loans varies with firms' characteristics. The results of the paper and those in previous studies substantially enhance our understanding of how loan contracting is affected by rent seeking.

The remainder of this paper is organized as follows. The next section describes the political connection data and the loan data. It also discusses other factors that affect loan contracts. Section 3 provides summary statistics of various loan samples and descriptive statistics on firm characteristics and loan information. Section 4 presents my main empirical results. Robustness checks are discussed in Section 5. Section 6 concludes.

Data

Dependent Variables

The bank loan data employed in this paper are drawn from the Dealscan database compiled by the Loan Pricing Corporation (LPC). This database contains detailed loan contracts information for both the United States and foreign loans made to corporations outside the Unites States. The Dealscan dataset starts in early 1980's. However, prior to

1997, data coverage outside the United States is sparse. Hence, I employ data between 1997 and 2006.

In my empirical analysis, I use "a loan" as the basic unit, which in Dealscan database is often referred to as "a facility". A loan or a facility refers to an individual component of a deal, i.e., a deal can be comprised of one or more loans. Dealscan allows me to identify which firms are borrowing from which banks in each year. While each loan can only have one borrower, it can have multiple lenders due to syndication. From the Dealscan database, I can also gather other information about the loans, including the loan spreads (interest rate – margin over LIBOR), loan maturities, loan amounts, and whether the loan is secured (i.e. has collateralization) or syndicated. These loan contracting terms serve as the basis for the dependent variables in my empirical model.

Definition of Political Connection and Data Source

The definition of political connection has been developed thoroughly in the literature. To address the question of rent seeking in loan contracting, I begin with the dataset of politically connected firms described in Faccio (2006). A firm is considered to be politically connected if it has at least one member of its board of directors (BOD), including the chairman of the board, the CEO, and the president, vice president or secretary of the board, being a member of the national parliament, a head of state, or a government minister.

To identify politically connected firms, I start with the sample that I hand-matched using the Worldscope database and the Dealscan database, based on the location of the headquarters, the ticker symbols and the name of the borrowing company. First, firms considered to be matched must locate in the same country in both datasets. Then, within

each country, I match firms based on ticker symbols. Ticker information is sometimes missing, so I further match firms based on their names. Some firms' names include abbreviations. Substantial work by hand was required for matching at this step. When the difference is not apparent, I use Google and Wikepedia to track the firms' relationship. For those firms that I cannot determine whether they are fully matched after the above steps, I consider them unmatched. I also limit the sample to non-financial firms and to countries that have at least 20 deals listed during the 10-year periods. Worldscope database includes balance sheet and income statement information only for publicly traded firms. Therefore, the matched sample consists of firms that tend to have larger size on average than firms in the entire Dealscan database. I further convert all financial values to dollars based on the exchange rate at the time when the loan is initiated. Although the Worldscope database includes over 20,000 publicly traded firms, the match limits the sample to 5,000 companies in 29 countries. I then merge my dataset with Faccio's (2006) political connection database. This allows me to identify 83 politically connected firms (409 firm observations).

Control Variables

Beyond the key independent variable, I also include three groups of control variables that are related to bank loans. They are firm characteristics, loan purposes, loan types, and the macro-environment of the country. Below are explanations of these variables:

Firm-specific variables

A borrower's credit risk is likely to affect the cost of a contract loan (Bae and Goyal, 2008). From the Worldscope database, I extract and construct the following firm-specific variables that might affect the structure and terms of bank loans:

(1) Firm size: larger firms are likely to be better known and often are more diversified than smaller firms. Therefore, larger firms may have a better reputation in the debt market (Faccio, Masulis and McConnell, forthcoming; Bay and Goyal, forthcoming; and Boubakri, Cosset and Saffar, forthcoming). This suggests that larger firms may receive more favorable contracting terms. To capture firm size, I use the natural log of total assets in U.S. dollars.

(2) Profitability: More profitable firms have lower default risk. Less profitable firms have more incentive to secure external profit though political connection to compensate for their weaknesses. Profitability is measured as the ratio of operating income to assets.

(3) Liquidity: Liquidity is a measure of firm's ability to pay its expenses. Firms with high liquidity can also have lower default risk. Liquidity is measured as the ratio of current assets to current liability.

(4) Leverage: Highly leveraged firms often have already established a solid reputation in the debt market. However, high leverage can generate high default risk, increase agency costs, and thus may reduce the lenders' benefits. Anticipating this, banks may require more stringent terms from highly leveraged terms. Leverage is measured as the ratio of total debts to equity.

(5) Tangibility (or Collateral Value of Assets): Tangibility is calculated as the ratio of the value of property, plant and equipment to total assets (Faccio, Masulis and McConnell, forthcoming). Together with profitability, liquidity and leverage, these variables capture the firm's basic financial condition that is related to default risk and thus may affect the bank loan spread.

(6) Price-to-Book Ratio: Price-to-Book ratio is a measure of firm's market valuation. Higher market valuation suggests less default risk. Price-to-Book Ratio differs from profitability in that it is determined in large part by the firm's profitability growth. This ratio is calculated as the sum of market value of equity (preferred and common stocks) plus the book value of debt, divided by the sum of book value of equity plus book value of debt.

(7) Industry: Borrowers from different industries may face different market competition. Political benefits also may vary across industries. For example, Agrawal and Knoeber (2001) found that politically connected directors are over-represented in U.S. manufacturing firms compared with others. The measurement of industry is based on four-digit SIC code.

Loan types and loan purposes

A politically connected firm's use of a bank loan might vary in terms of the type of the loan and the purpose of the loan. For syndicated loans, Dealscan contains information on the type of loan at the facility/loan level. Loans of different types are associated with different risks, so they typically are priced differently. Term loans are typically fully drawn down immediately upon issuance. The amounts repaid may not be re-borrowed. Lines of credit, on the other hand, can be re-borrowed and repaid. Thus, a line of credit is

expected to have a lower rate of interest than a term loan. I control for loan type with an indicator variable for term loan and an indicator variable for bridge loan or unknown types. The omitted category corresponds to lines of credit. Lenders can direct lending to specific purposes to mitigate risks (Bae and Goyal, 2008). For example, if a firm's political connection reduces its risk of default, the lender may prefer to lend for the purposes of acquisition compared to working capital. To classify the purpose of the loan, I group the 33 different purposes listed in Dealscan into six categories:

(1) Purpose 1 = debt repayment;

(2) Purpose 2 = working capital;

(3) Purpose 3 = takeover, acquisition or recapitalization;

(4) Purpose 4 = commercial paper backup line of credit/CP backup and LBO/MBO;

(5) Purpose 5 = project finance; and

(6) Purpose 6 = general corporate purpose.

I include an indicator variable for each of the first five categories. The omitted category is general corporate purpose.

Macro-environment variables

Macroeconomic conditions, such as economic development, could affect debt financing. As a proxy for economic development, I use the natural log of *GDP-per-capita*, *GDP growth* and *inflation* as control variables. These data are obtained from the World Development Indicators database (the World Bank website). Faccio (2006) and Boubakri, Cosset and Saffar (forthcoming) found that political connections are more common in countries that experience substantial corruption, so I also control for corruption by using the index (*Control-of-Corruption*) from the International Country

Risk Guide (ICRG). The average of each macro-environment indicators for each country are listed in Appendix D. In general, loan spreads tend to increase when the economy is in recession and shrink when the economy is expanding because banks typically require greater compensation for default risk when the economy is contracting.

Summary Statistics

Table 3-1 Panel A provides the summary statistics on the key explanatory variable *Political Connection* and other explanatory variables measured in the study. The sample is from 1997 to 2006 and covers over 10,000 loan facilities in 29 countries. Panel B provides the summary statistics for only non-U.S. firms. In contrast, Panel C provides summary statistics for the U.S. firms. The summary statistics in Panel B and C do not show that the samples have significant difference between the U.S. firms and the non-U.S. firms, although the U.S. firms represent about half of the whole sample size. Table 3-2 examines how loan terms, loan purposes, loan types, syndication structure and borrower characteristics vary as a function of political connection. This table presents the means of loan and borrower characteristics based on the political connection indicator. The variables are defined in the Appendix C.

The summary statistics presented in Table 3-2 reveal significant differences in loan characteristics for politically connected firms and their non-politically connected peers. The table indicates that, compared with their non-connected peers, politically connected firms receive bank loans with longer maturities, with lower spreads, that are less secured and that are less syndicated. The important question is whether such political ties are systematically related to differences in loan spread, loan maturity and security after controlling for other relevant factors. To show that political connection matters in loan

contracting, it is important to control for borrower risk characteristics, loan purposes, loan types, industry effects, time-period effects and country effects. In the next section, I will discuss the econometric issues and present the key results.

Multivariable Analysis

Effect of Political Connection On the Cost of Bank Loan

To examine the effects of political connection on bank loan contracting, I assume that the banks' underlying decision can be described by the following equation:

$$Spread = \alpha + \beta Political\ Connection + \gamma X + \mu T_t + \lambda C_c + \varepsilon. \quad (3)$$

In the regression, each observation represents a single loan. The dependent variable is the cost of debt, or loan spread in basis points. To capture the effect of political connection, I define a dummy variable *Political Connection*, which is equal to one if the loan is made to a firm that is politically connected. The term *X* represents control variables, including firm characteristics, loan characteristics (loan types and loan purposes), and macroeconomic factors that may influence the cost of debt. In equation (3), I also include T_t, a year dummy and C_c, a country dummy variable. The regression results are reported in Table 3-3. For all the regressions, I compute heteroskedastic-robust standard errors and allow for clustering within countries to take into account of possible correlations of errors.

In column 1 of Table 3-3, I include only the *Political Connection* dummy, year dummy and country dummy variables and do not control for any other variables. The estimated coefficient for *Political Connection* is negative but not statistically significant. The regression in column 2 of Table 3-3 includes firm characteristics and loan types and purposes that can influence the cost of bank loans. The firm characteristic control

variables include firm size (the logarithm of firm assets), firm profitability, liquidity, leverage, tangibility and price-to-book ratio. The results in column 2 show that after controlling for firm and loan characteristics, loan spreads decrease by about 21 basis points if a firm is politically connected. This result is not only statistically significant, but also economically significant. The results also indicate that large, profitable, highly liquid, highly market valued and levered firms are associated with a lower cost of debt. Consistent with Carey and Nini's (2007) finding, loans that are at least partly drawn at issuance have economically significant higher spreads.

I further control for two other loan characteristics that might be correlated with the price of debt and report the results in column 3 of Tabl3 3-3. I control for loan maturity, because the bank requires a liquidity premium for holding a longer term debt and this liquidity premium translates into a higher loan spread. I also include *ln (loan size),* the natural logarithm of the amount of a loan, that may capture economies of scale in bank loan lending and thus is expected to be inversely related to the loan spread. The regression results show that further controlling for loan maturity and loan size, the impact of political connection on loan spread is still significant with a magnitude of 16 basis points. The results also show that loans with larger amounts are associated with lower spreads.

In column 4 of Table 3-3, I use four more variables to control for macroeconomic environment: *GDP-per-capita*, *GDP growth*, *inflation* rate and country C*ontrol-of-Corruption*. The results show that GDP and inflation rate are positively related to loan spread, suggesting that macroeconomic conditions affect individual loan rates.

Finally, in column 5 of Table 3-3, I control for industry effects. Although the estimated coefficient of *Political Connection* becomes slightly smaller and not statistically significant (but very close), the whole results in Table 3-3 have suggested that politically connected firms possibly have obtained loans with relatively low interest rates than their non-connected peers.

Assets In European Countries

Carey and Nini (2007) found that corporate loan market is not globally integrated and the interest rates on syndicated loans are economically significantly smaller in Europe than in the United States, other things equal. This is also referred to as the "interest rate puzzle" or "pricing puzzle." Houston, Itzkowitz and Naranjo (2008) further note that this difference primarily holds for those firms do not have complete access to European capital markets. If these arguments hold, then they will confound my finding of political connection effect to the extent that firms that have access to European lending market are also politically connected. Thus, in this section, I follow Houston, Itzkowitz and Naranjo's (2008) idea and further control for non-European firms that have foreign assets in Europe.

I repeat the regressions as shown in Table 3-3, but include two more dummy variables, European firm dummy (*Eurofirm*) and Non-European firm with European assets dummy (*Euroassets*), as explanatory variables. European firm dummy is used to indicate whether a firm's headquarter is located in Europe. Non-European firm with European assets dummy indicates whether a Non-European firm has assets in Europe. Assuming that the linear model is sufficient and that this specification includes the "interest rate puzzle," the results reported in Table 3-4 indicate that Non-European firms

with European assets encounter lower cost of debt. More importantly, I find similar results for the impact of political connection as presented in Table 3-3. After adding all the control variables, the results indicate that the effect of political connection is still economically and statistically significant with a coefficient indicating a 15 basis points decrease in the loan spread made to a politically connected firm. This implies that even though corporate financing costs differ across Europe and the United States, political connection still explains some pricing discrepancies across countries. Consistent with Carey and Nini's (2007) and Houston, Itzkowitz and Naranjo's (2008) "pricing puzzle", I also find that, on average, loans to European firms are cheaper than loans to North American firms by approximately 40 basis points. Since the average loan size for the sample firms is $299 million, the political connection in a loan implies an average of decrease of $448,500 per loan in annual interest payment. Furthermore, the loan spread decreases by about 17% if a firm is politically connected. Therefore, the effect of political connection on the cost of debt is not only statistically significant but also economically significant.

Effect of Political Connection on Other Loan Contract Terms

If political connection conveys a signal of a company's future prospects, lenders might incorporate this information into debt contracts by altering not only the loan rate but also other contract terms, such as maturity, security requirement and ownership structure. In this section, I focus on how political connection affects these three major non-price loan contract terms.

Column 1 of Table 3-5 reports the results on the impact of political connection on debt maturity, controlling for other variables that could possibly correlate with maturity.

The dependent variable is the natural log of debt maturity in months. The coefficient on *Political Connection* dummy indicates that political connected firms acquire loans that have maturity of 20% (10.6 months) longer on average than their non-connected peers, implying that loan maturity also helps address risk and information benefit arising from political tie.

The regression results also document the following relationship between control variables and debt maturity. First, large firms tend to secure loans of longer maturity, which is consistent with the empirical evidence presented in previous literature.[81] Second, firms with more liquidity and leverage have access to loans with longer maturity. In addition, the size of loan is positively related to loan maturity.

If politically connected firms have mitigated credit risk or have information priority, then it may affect the structure of lenders in a loan. Most of the lending in my sample is comprised of syndicated bank loans. When information asymmetries are large, concentrated lending (or reduced syndication) can serve as a better choice for monitoring. In comparison, syndication can be structured to deter strategic defaults (See Bae and Goyal, forthcoming; Esty and megginson, 2003; Qian and Strahan, 2007 and Sufi, 2007).[82] If a political tie can serve as an implicit guarantee of a government bailout should the borrower encounter financial difficulty, then political connection can mitigate risk. If syndication is a tool for banks to deter defaults, then syndication may be less likely to be observed among politically connected firms. In other words, political

[81]See, for example, Barclay and Smith (1995), Johnson (2003), Stohs and Mauer (1996) and Graham, Li and Qiu (2008).

[82]Some firms default because they are unable to repay, e.g., they are insolvent; while other firms default because they are unwilling to repay although they are solvent. The latter is the strategic default.

connection will result in less syndicates. Column 2 of Table 3-5 reports how political connection affects syndication in a loan, where *Syndication* is a dummy variable with one indicating a loan is syndicated, zero otherwise. The coefficient from the probit regression suggests that after controlling for other variables, syndicates are 12% less present in a loan made to firms that are politically connected than those are not.

The estimated coefficients of control variables on the likelihood of a loan being syndicated provide the following evidence. First, the loan size is positively related with syndication, because larger amounts of debts may need multiple lenders to assume loans. Second, firm size is positively related to the likelihood of syndication. This is consistent with the findings by Graham, Li and Qiu (2008). Large firms typically have less information asymmetry, and thus can borrow from more lenders. In addition, high liquidity firms seek to preserve flexibility with less syndication in their financial contracts. This is possibly because of a lower default risk with such firms. In contrast, highly levered firms are more likely to use syndicated loans, possibly because multiple lenders can diversify their loan portfolios.

Finally, I study the impact of political connection on the likelihood of a loan being secured. Collateralization is an important feature in financial contracts. If political connection suggests an implicit guarantee of debt payment, then collateralization is expected to be less likely to be required. I estimate a probit model where the dependent variable is one if a loan is secured and zero otherwise and report the result in column 3 of Table 3-5. The *Political Connection* dummy coefficient is -.728 translates into a 28% marginal effect in the probit model. This indicates that the probability of a loan being secured decrease by 28% because of political connection, holding other variables at their

means. This is consistent with the view that politically connected firms are less likely to be required to provide collateral against their loans.

The predicted effects of control variables on the likelihood of a loan being secured are fairly intuitive. Large, profitable, low leverage firms with more tangible assets have lower default risk and thus are associated with a lower probability of secured loans. Loan maturity is positively related with the likelihood of a loan being secured. This suggests that shorter debt maturity could substitute for security in corporate financing.

Robustness Checks

To investigate whether the results are driven by regions, for example, whether political connection has equal impact on both developing countries and developed countries, I conducted a split sample analysis. Column 1 of Table 3-6 include the dummy variable *Developed*, which is one if the loan is made to a firm in a developed country, zero otherwise. Column 2 of Table 3-6, I further include the European firm dummy and Non-European firm with European assets dummy in the regression. These two regressions are not controlled by industry effects. In Column 3 of Table 3-6, I include industry effects in the model. The estimated coefficients are similar to the regression results in Table 3-3, with developed countries experiencing much lower interest rate spreads than developing countries. This is an important result, suggesting that political influence has a greater impact in developing countries.

To investigate whether the results are driven by a few loans lent to politically connected firms due to extreme high loan spreads, I further perform a median regression that estimates the effect of explanatory variables on the median loan spread, conditional on the values of explanatory variables. This results presented in Column 4 of Table 3-6

are similar to those from the OLS regression in column 5 of Table 3-3, suggesting that the results are not driven by outliers.

Furthermore, in my empirical analysis, the basic unit is a loan or facility. However, a loan is usually part of a deal that consists of multiple loans in a contract. Thus, the loans within a deal may not be independent. Treating all the loans independent may overstate the statistical significance. To address this issue, I aggregate loans into deal level by computing weighted average loan terms such as spread, maturity, by loan amount. I then estimate the regressions at the deal level and find that deal level regression results reported in Table 3-7 are consistent with the loan level results.

Lastly, in the loan spread regression, one potential issue is that the independent variable, loan maturity, may be endogenous, since loan spread and loan maturity are sometimes simultaneously determined in a loan contract. To deal with this potential endogeneity problem, I use a two-stage least square regression with firm's asset maturity as an instrumental variable for debt maturity.[83, 84] In the first stage, I regress loan maturity on a firm's asset maturity. The predicted value of loan maturity is then used on the right-hand side of the second-stage regression The result from the two-stage regression, reported in Table 3-8, shows that the *Political Connection* dummy remains statistically and economically significant after controlling for the endogeneity of loan maturity.

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[83]Following Stohs and Mauer (1996), asset maturity is measured as the weighted average of the maturity of long-term assets and current assets. The maturity of long-term assets is measured as gross property, plant, and equipment divided by depreciation; the maturity of current assets is defined as current assets divided by the cost of goods. The weight for long-term assets is the share of gross property, plant, and equipment in total assets, and the weight for current assets is the share of current assets in total assets.

[84]See, for example, Myers, 1997; Stohs and Mauer, 1996; Johnson, 2003; Graham and Harvey, 2001; Bharath, Sunder and Sunder, 2008; Graham, Li, and Qiu, 2008.

In sum, the effect of political connection on the cost of debt is robust to a variety of specifications and remains economically and statistically significant.

Conclusion

In sum, the evidence provided in this paper is consistent with the view that banks respond to firms' political ties by decreasing loan spreads, raising loan amounts, and increasing loan maturities. Thus, at least in some countries especially in developing nations, political connections influence the allocation, the structure and the price of bank loans. This result is consistent with the idea that some environments are more efficient in writing and enforcing loan contracts than others, as suggested by LLSV (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1994, 1997, 1998) and emphasized by Sufi (2007) and Qian and Strahan (2007). This result further implies that the legal and the institutional environments have substantial effects on financial contracts (Bae and Goyal, forthcoming; Qian and Srahan, 2007). My study provides new evidence on how political connection influences the design of financial contracts and affects the cost and terms of debt.

Table 3-1. Summary Statistics for Loan Facility and Firm Characteristics

Panel A: All Firms

Variables	Obs	Mean	Std Dev.	Min	Max
political connection	22708	0.0180	0.1330	0	1
loan spread	13163	155.9244	118.4930	1	650
ln(loan size)	22520	17.6291	2.4738	11	24
maturity	21346	44.3305	32.3752	1	720
security	10205	0.5602	0.4964	0	1
syndication	22708	0.7404	0.4384	0	1
ln(firm size)	20153	21.5065	2.3918	11	28
profitability	18188	31.2376	19.1262	-92	100
liquidity	17286	1.8098	2.5841	0	96
leverage	22695	0.7408	2.0690	0	86
tangibility	16040	10.0295	27.5839	0	162
price-to-book	21403	2.6825	8.5116	-177	322

Panel B: Non-U.S. Firms

Variables	Obs	Mean	Std Dev.	Min	Max
political connection	10469	0.0388	0.1931	0	1
loan spread	2507	99.9393	92.9611	1	604
ln(loan size)	10284	16.6077	2.8131	11	24
maturity	9908	45.3491	36.6744	1	720
security	2726	0.2282	0.4197	0	1
syndication	10469	0.5727	0.4947	0	1
ln(firm size)	9197	22.1827	2.4677	15	28
profitability	7223	27.6767	18.7983	-92	100
liquidity	6806	1.5012	2.2405	0	77
leverage	10467	0.6359	1.1855	0	64
tangibility	6386	24.3298	39.6383	0	162
price-to-book	10050	2.1401	4.9966	-93	179

Panel C: U.S. Firms

Variables	Obs	Mean	Std Dev.	Min	Max
political connection	12239	0.0002	0.0157	0	1
loan spread	10656	169.0959	120.0030	5	650
ln(loan size)	12236	18.4876	1.7318	11	24
maturity	11438	43.4482	28.0966	1	420
security	7479	0.6812	0.4660	0	1
syndication	12239	0.8838	0.3205	0	1
ln(firm size)	10956	20.9389	2.1693	11	28
profitability	10965	33.5833	18.9784	-92	100
liquidity	10480	2.0102	2.7663	0	96
leverage	12228	0.8307	2.5933	0	86
tangibility	9654	0.5700	0.4324	0	14
price-to-book	11353	3.1627	10.6767	-177	322

Table 3-2. Loan and Borrowers Characteristics by Political Connection

	Political Connection		
	Yes	No	Difference in Mean
Loan Characteristics			
Mean loan spread (basis points)	81.23	156.52	-75.29***
Mean loan maturity (months)	53.24	44.17	9.07***
Mean loan amount (the natural log of $ million)	16.89	17.64	-0.78***
Syndication indicator (%)	45.97	74.55	-28.59***
Security indicator (%)	22.76	56.5	-33.74***
Loan Types Indicators (frequency)			
Term Loan	20.54%	24.79%	
Lines of Credit	19.56%	39.58%	
Bridge loan and Others	59.90%	35.62%	
Loan Purpose Indicators (frequency)			
Purpose 1: Debt repayment	20.78%	15.35%	
Purpose 2: Working capital	9.54%	14.96%	
Purpose 3: Takeover, Acquisition and Recap	8.56%	11.71%	
Purpose 4: CP backup, LBO/MBO	1.22%	7.47%	
Purpose 5: Project finance	0.00%	0.55%	
Purpose 6: General corporate purpose	57.21%	48.64%	
Firm Characteristics			
Mean firm size (the natural log of $)	22.85	21.48	1.37***
Mean profitability	30.94	31.24	-0.30
Mean leverage	0.74	0.74	0.00
Mean liquidity	1.37	1.82	-0.45**
Mean tangibility	14.62	9.96	4.67***
Mean price-to-book value	2.21	2.69	-0.48

Table 3-3. Effect of Political Connection on the Cost of Debt

	(1)	(2)	(3)	(4)	(5)
political connection	-23.8176	-20.5596**	-16.1417*	-15.0242*	-14.3014
	[18.0690]	[7.6926]	[8.0963]	[8.0478]	[8.4014]
maturity			-0.0026	-0.0138	-0.0235
			[0.1147]	[0.1070]	[0.1013]
ln(loan size)			-14.2622***	-14.2829***	-14.1019***
			[2.0201]	[1.9874]	[2.0281]
ln(firm size)		-28.0890***	-18.1721***	-18.0968***	-18.1417***
		[0.7202]	[1.1815]	[1.1176]	[1.1115]
profitability		-0.6436***	-0.5903***	-0.5869***	-0.6354***
		[0.0345]	[0.0472]	[0.0493]	[0.0587]
liquidity		-3.3898***	-3.8617***	-3.8411***	-2.9704***
		[0.3379]	[0.3701]	[0.3857]	[0.2623]
leverage		11.3992***	11.7599***	11.8149***	11.1975***
		[0.7125]	[0.5602]	[0.5495]	[0.5201]
tangibility		0.098	0.1326	0.1747	0.2232*
		[0.2010]	[0.1656]	[0.1297]	[0.1291]
price-to-book		-0.2107***	-0.1195**	-0.1195**	-0.1300**
		[0.0388]	[0.0489]	[0.0482]	[0.0581]
term loan		60.3757***	54.7145***	55.0614***	55.2433***
		[6.7511]	[6.2329]	[6.0283]	[5.9252]
bridge loan		-3.6282	-10.0374	-9.989	-10.8302*
		[2.9972]	[6.1552]	[6.2250]	[5.7267]
purpose1		1.2482	5.6750**	5.1915**	6.0721***
		[2.1304]	[2.1263]	[2.4039]	[2.1557]
purpose2		-5.2907***	-4.0796**	-3.9568*	-3.7187*
		[1.6951]	[1.9477]	[1.9564]	[2.0444]
purpose3		18.8799***	25.4427***	25.3367***	26.0584***
		[1.3157]	[1.4460]	[1.4916]	[1.4275]
purpose4		-39.5324***	-36.0489***	-36.4715***	-34.1697***
		[3.4947]	[3.6768]	[3.4255]	[3.3631]
purpose5		29.9517***	19.9429	19.1973	19.8849
		[9.9481]	[11.7256]	[11.8297]	[12.5932]
GDP-per-capita				0.0039**	0.0039**
				[0.0015]	[0.0014]
GDPgrowth				5.24	5.8107
				[3.9136]	[3.7581]
inflation				3.6620**	3.5602**
				[1.6832]	[1.6303]
control-of-corruption				-28.6770**	-28.0974**
				[13.0791]	[13.0965]
Control for					
Year dummy	Yes	Yes	Yes	Yes	Yes
Country dummy	Yes	Yes	Yes	Yes	Yes
Industry effects	No	No	No	No	Yes
Observations	13163	9119	8739	8739	8739
R-squared	0.0976	0.425	0.442	0.4441	0.4501

Clustered and robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3-4. Effect of Political Connection on the Cost of Bank Loan (More Control Variables)

	(1)	(2)	(3)	(4)	(5)
political connection	-23.8438	-20.9021**	-16.4472*	-15.2467*	-14.5883*
	[18.3049]	[8.1031]	[8.2826]	[8.1367]	[8.4321]
euroassets	-25.0637***	-11.2695***	-12.0265***	-12.1465***	-7.4743***
	[2.3101]	[1.0824]	[0.8014]	[0.7413]	[1.1898]
eurofirm	-6.312	-51.4346	-47.7539	-45.0918	-34.4382
	[15.7377]	[51.1758]	[47.1858]	[47.9563]	[41.5978]
maturity			-0.0012	-0.0123	-0.0214
			[0.1153]	[0.1077]	[0.1024]
ln(loan size)			-14.3324***	-14.3538***	-14.1414***
			[2.0724]	[2.0414]	[2.0432]
ln(firmsize)		-27.8605***	-17.9032***	-17.8231***	-17.9039***
		[0.7100]	[1.2224]	[1.1555]	[1.1444]
profitability		-0.6352***	-0.5815***	-0.5782***	-0.6284***
		[0.0354]	[0.0477]	[0.0499]	[0.0604]
liquidity		-3.1649***	-3.6172***	-3.5948***	-2.9094***
		[0.3205]	[0.3571]	[0.3737]	[0.2680]
leverage		11.0275***	11.3729***	11.4231***	11.0456***
		[0.7323]	[0.5451]	[0.5396]	[0.5105]
tangibility		0.0406	0.0747	0.1177	0.1878
		[0.2411]	[0.1978]	[0.1628]	[0.1388]
price-to-book		-0.1976***	-0.1052**	-0.1052**	-0.1203**
		[0.0389]	[0.0491]	[0.0484]	[0.0551]
term loan		60.1981***	54.4821***	54.8234***	55.0619***
		[6.6124]	[6.0695]	[5.8648]	[5.8235]
bridge loan		-3.4072	-9.7393	-9.6873	-10.5723*
		[2.9722]	[6.1709]	[6.2472]	[5.8259]
purpose1		0.7623	5.1445**	4.6349*	5.6919**
		[2.0565]	[2.0629]	[2.3486]	[2.2014]
purpose2		-5.8431***	-4.6394**	-4.5241**	-4.0226*
		[1.7163]	[1.9680]	[1.9781]	[2.0044]
purpose3		18.7192***	25.2713***	25.1543***	25.8533***
		[1.3078]	[1.4214]	[1.4666]	[1.4350]
purpose4		-38.9621***	-35.3475***	-35.7858***	-33.9940***
		[3.5634]	[3.7549]	[3.4847]	[3.4247]
purpose5		29.3292***	19.8666	19.1051	19.948
		[10.1599]	[11.9364]	[11.9603]	[12.5734]
Control for					
Year dummy	Yes	Yes	Yes	Yes	Yes
Country dummy	Yes	Yes	Yes	Yes	Yes
Industry effects	No	No	No	No	Yes
Macroenvironment	No	No	No	Yes	Yes
Observations	13163	9119	8739	8739	8739
R-squared	0.1051	0.427	0.4442	0.4463	0.4509

Clustered and robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3-5. Effect of Political Connection on the Other Terms of Bank Loan

	(1)	(2)	(3)
	ln(maturity)	syndication	security
political connection	0.1987***	-0.4975***	-0.7277***
	[0.0587]	[0.1136]	[0.1963]
maturity		-0.0081***	0.0014**
		[0.0005]	[0.0007]
ln(loan size)	0.0401***	0.1557***	0.0159
	[0.0050]	[0.0109]	[0.0186]
ln(firm size)	0.0260***	0.1133***	-0.3129***
	[0.0056]	[0.0117]	[0.0201]
profitability	0.0013***	-0.0013	-0.0051***
	[0.0004]	[0.0008]	[0.0010]
liquidity	0.0249***	-0.0160*	0.0014
	[0.0052]	[0.0096]	[0.0121]
leverage	0.0387***	0.0632***	0.2619***
	[0.0121]	[0.0206]	[0.0451]
tangibility	-0.0015***	0.0109***	-0.0205***
	[0.0003]	[0.0010]	[0.0031]
price-to-book	0.0028***	0.0014	-0.0016
	[0.0007]	[0.0016]	[0.0019]
term loan	0.0839***	-0.1334***	-0.0001
	[0.0178]	[0.0396]	[0.0525]
bridge loan	-0.0577***	0.2473***	0.1059**
	[0.0173]	[0.0438]	[0.0479]
purpose1	-0.0328	0.3503***	0.3964***
	[0.0209]	[0.0522]	[0.0573]
purpose2	-0.5144***	1.2890***	-0.5418***
	[0.0266]	[0.1080]	[0.0940]
purpose3	0.2630***	0.2901	0.1859
	[0.0609]	[0.2769]	[0.2918]
purpose4	0.3644***	0.0708*	0.5070***
	[0.0140]	[0.0417]	[0.0476]
purpose5	-0.4511***	-1.2220***	-0.6635***
	[0.0208]	[0.0371]	[0.0523]
Control for			
Year dummy	Yes	Yes	Yes
Country dummy	Yes	Yes	Yes
Industry effects	No	No	No
Macroenvironment	Yes	Yes	Yes
Observations	13154	13154	6471
R-squared	0.2175	0.2713	0.2761

Clustered and robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3-6. Robustness of the Effect of Political Connection on the Cost of Bank Loan

	(1)	(2)	(3)	(4)
	Region Control	Region Control	Region Control	Median Regression
political connection	-15.0242*	-15.2467*	-14.5883*	-16.4872*
	[8.0478]	[8.1367]	[8.4321]	[9.6240]
maturity	-0.0138	-0.0123	-0.0214	-0.2442***
	[0.1070]	[0.1077]	[0.1024]	[0.0427]
ln(loan size)	-14.2829***	-14.3538***	-14.1414***	-13.7231***
	[1.9874]	[2.0414]	[2.0432]	[0.8164]
developed	-138.7769***	-143.2940***	-144.8344***	
	[25.2166]	[25.4410]	[25.3489]	
euroassets		-12.1465***	-7.4743***	
		[0.7413]	[1.1898]	
eurofirm		-45.0918	-34.4382	
		[47.9563]	[41.5978]	
ln(firm size)	-18.0968***	-17.8231***	-17.9039***	-18.2240***
	[1.1176]	[1.1555]	[1.1444]	[0.7649]
profitability	-0.5869***	-0.5782***	-0.6284***	-0.4454***
	[0.0493]	[0.0499]	[0.0604]	[0.0477]
liquidity	-3.8411***	-3.5948***	-2.9094***	-0.3892
	[0.3857]	[0.3737]	[0.2680]	[0.6059]
leverage	11.8149***	11.4231***	11.0456***	26.7541***
	[0.5495]	[0.5396]	[0.5105]	[0.8316]
tangibility	0.1747	0.1177	0.1878	-0.8676***
	[0.1297]	[0.1628]	[0.1388]	[0.1289]
price-to-book	-0.1195**	-0.1052**	-0.1203**	-0.2069***
	[0.0482]	[0.0484]	[0.0551]	[0.0762]
term loan	55.0614***	54.8234***	55.0619***	52.1611***
	[6.0283]	[5.8648]	[5.8235]	[2.2005]
bridge loan	-9.989	-9.6873	-10.5723*	-18.6165***
	[6.2250]	[6.2472]	[5.8259]	[2.8180]
purpose1	5.1915**	4.6349*	5.6919**	-2.9797
	[2.4039]	[2.3486]	[2.2014]	[2.5414]
purpose2	-3.9568*	-4.5241**	-4.0226*	2.8508
	[1.9564]	[1.9781]	[2.0044]	[2.5139]
purpose3	25.3367***	25.1543***	25.8533***	26.2718***
	[1.4916]	[1.4666]	[1.4350]	[2.5754]
purpose4	-36.4715***	-35.7858***	-33.9940***	-11.5011***
	[3.4255]	[3.4847]	[3.4247]	[3.3764]
purpose5	19.1973	19.1051	19.948	28.3440**
	[11.8297]	[11.9603]	[12.5734]	[11.5092]
Control for				
Loan type	Yes	Yes	Yes	Yes
Loan purpose	Yes	Yes	Yes	Yes
Industry effects	No	No	Yes	Yes
Macroenvironment	Yes	Yes	Yes	Yes
Observations	8739	8739	8739	8739
R-squared	0.4441	0.4463	0.4509	0.2913

Clustered and robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3-7. Effect of Political Connection on the Cost of Debt at Deal Level

	(1)	(2)	(3)	(4)	(5)
political connection	-18.3241	-18.7408**	-17.3092*	-17.4912**	-16.8767**
	[12.0647]	[6.7972]	[8.6302]	[7.8008]	[7.5064]
maturity (weighted)			0.0572	0.0473	0.042
			[0.0364]	[0.0320]	[0.0337]
ln (loan size) (weighted)			1.3494***	1.3627***	1.4001***
			[0.1946]	[0.1855]	[0.2055]
ln(firm size)		-31.1839***	-32.6322***	-32.6329***	-32.6755***
		[1.5013]	[1.7743]	[1.7791]	[1.8232]
profitability		-0.6424***	-0.6109***	-0.6107***	-0.6664***
		[0.0383]	[0.0355]	[0.0346]	[0.0414]
liquidity		-2.9635***	-2.7421***	-2.6982***	-1.6478***
		[0.2798]	[0.2826]	[0.3074]	[0.2277]
leverage		11.0545***	8.8622***	8.8925***	8.1943***
		[0.7875]	[0.6275]	[0.5988]	[0.5625]
tangibility		0.04	0.1177	0.1585*	0.2278***
		[0.1746]	[0.1230]	[0.0858]	[0.0808]
price-to-book		-0.1549***	-0.0973***	-0.0992***	-0.0885***
		[0.0259]	[0.0225]	[0.0228]	[0.0259]
GDP-per-capita				0.0031*	0.0031*
				[0.0016]	[0.0016]
GDPgrowth				3.3413	3.6695
				[3.4008]	[3.3203]
inflation				3.0976	2.9529
				[1.9284]	[1.8501]
control-of-corruption				-34.8992**	-34.6694**
				[13.4252]	[13.1610]
Control for					
Year dummy	Yes	Yes	Yes	Yes	Yes
Country dummy	Yes	Yes	Yes	Yes	Yes
Industry effects	No	No	No	No	Yes
Observations	9375	6320	6005	6005	6005
R-squared	0.1031	0.3617	0.3937	0.3957	0.4044

Clustered and robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3-8. IV Estimation of the Effect of Political Connection on the Cost of Debt

	(1)	(2)	(3)
political connection	-12.9922***	-13.0616***	-14.1559***
	[4.1245]	[4.2696]	[4.5413]
maturity	2.4506***	2.6195***	8.4250***
	[0.2339]	[0.1262]	[0.5778]
ln(loan size)	-23.2667***	-23.6414***	-39.5742***
	[4.3151]	[4.0224]	[5.2627]
ln(firm size)	-17.4735***	-17.5587***	-16.9342***
	[1.6707]	[1.7067]	[1.6357]
profitability	-0.5554***	-0.5602***	-0.6393***
	[0.0374]	[0.0333]	[0.0358]
liquidity	-5.6247***	-5.7564***	-10.9405***
	[0.7151]	[0.6252]	[1.0952]
leverage	5.4298***	5.1911***	-2.2906**
	[0.6534]	[0.5598]	[0.9538]
tangibility	-0.1214	-0.0804	-0.1485
	[0.2808]	[0.2448]	[0.1941]
price-to-book	-0.3623***	-0.3840***	-1.1160***
	[0.0397]	[0.0519]	[0.0459]
term loan	5.5245	3.4695	-73.6744***
	[5.3168]	[6.0983]	[5.4158]
bridge loan	-6.1168	-4.821	38.9760***
	[3.9790]	[4.8122]	[2.4985]
purpose1	7.9080***	7.1650**	1.4654
	[2.6044]	[2.9814]	[2.5783]
purpose2	2.2952	2.7523	21.9290***
	[1.7386]	[1.9784]	[1.5258]
purpose3	36.1146***	36.2076***	49.2010***
	[2.9598]	[2.9191]	[3.4323]
purpose4	25.9172***	29.4243***	162.5221***
	[6.7029]	[4.1266]	[15.6546]
purpose5	5.8488	4.8698	-29.3497***
	[4.9666]	[4.4467]	[7.2146]
GDP-per-capita		0.0021	0.0022*
		[0.0013]	[0.0013]
GDPgrowth		-1.2165	-9.0407***
		[3.2753]	[3.0808]
inflation		2.6518	1.4447
		[2.2348]	[2.1427]
control-of-corruption		-1.7083	30.2037*
		[12.9088]	[15.3044]
Control for			
Year dummy	Yes	Yes	Yes
Country dummy	Yes	Yes	Yes
Industry effects	No	No	Yes
Observations	6015	6015	6015
R-squared	0.4424	0.4437	0.4531

Clustered and robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

APPENDIX A
COUNTRY LIST AND GOVERNANCE INDICATORS

country	region	telecom corruption	voice and accountability	political stability and absence of violence	government effectiveness	regulatory quality	rule of law	control of corruption
Bosnia and Herzegovina	Europe	1.89	-0.13	-0.6	-1.15	-0.97	-0.66	-0.37
Bulgaria	Europe	2.13	0.38	0.56	-0.07	0.18	-0.27	-0.32
Czech Republic	Europe	1.41	0.96	0.78	0.72	0.73	0.83	0.43
Ecuador	South America	4.54	0.06	-0.4	-0.52	-0.05	-0.67	-0.83
Estonia	Europe	1.13	0.99	0.67	0.74	1.39	0.49	0.41
Ghana	Africa	2.27	-0.4	-0.05	-0.21	-0.02	-0.44	-0.34
Honduras	North America	5.14	-0.18	-0.28	-0.67	0.29	-0.85	-0.65
Hungary	Europe	1.31	1.11	1.04	0.92	1.12	0.76	0.71
India	Asia	3.69	0.34	-0.83	-0.16	-0.28	0.15	-0.27
Kenya	Africa	2.81	-0.91	-1.02	-0.73	-0.47	-1.11	-1.13
Malawi	Africa	3.25	-0.07	-0.13	-0.21	-0.01	-0.52	-0.39
Mexico	North America	5.50	-0.05	-0.5	0.34	0.67	-0.51	-0.47
Moldova	Europe	2.04	0.05	0.15	-0.31	-0.24	-0.28	-0.36
Pakistan	Asia	4.81	-0.74	-1.28	-0.63	-0.51	-0.79	-0.88
Poland	Europe	1.48	1.07	0.62	0.73	0.72	0.67	0.56
Romania	Europe	2.54	0.37	0.2	-0.33	0.36	-0.12	-0.35
Slovak Republic	Europe	1.51	0.73	1	0.25	0.21	0.21	-0.01
South Africa	Africa	1.61	0.76	-0.85	0.8	0.2	0.24	0.58
Tanzania	Africa	2.93	-0.5	-0.09	-0.53	-0.22	-0.43	-1.07
Turkey	Europe	2.07	-0.66	-1.09	-0.22	0.68	-0.06	-0.24
Uganda	Africa	3.13	-0.84	-1.27	-0.5	0.24	-0.62	-0.86

APPENDIX B
VARIABLE DESCRIPTION AND SOURCES

Variable	Name	Definition	Original Source
Utility Corruption	telecom corruption	Frequency of payments to telephone authorities 1=never 2=seldom 3=sometimes 4=frequently 5=mostly 6=always	World Business Environment Survey (WBES)
Regulatory governance index	regulatory governance	(G1+G2+G3+G4)/4	Calculated
	independence	a0*(a1+a2+a3)/3=G1	Calculated
		a0=1 if the regulatory agency is separated from the utility and from the communications ministry started work; =0 otherwise.	World Bank Telecommunications Regulation Survey (2001)
		a1=1 if the regulator's budget all comes from license fees or donors' contributions; =0 if from the government budget; =0.5 if from both types of sources.	
		a2 =1 if the minister or president cannot veto the regulator's decision; =0 if otherwise.	
		a3 =1 if the minister or president has not written policy guidelines during the past year; =0 if otherwise.	
	clarity of responsibility	(b1+b2+b3+b4+b5)/5=G2	Calculated
		b1=1 if the regulator approves fixed-line local telephone prices; =0 if otherwise.	World Bank Telecommunications Regulation Survey (2001)
		b2=1 if the regulator grants licenses in fixed-line local telephony; =0 if otherwise.	
		b3=1 if the regulator can decide how many licenses will be issued; =0 if otherwise.	
		b4=1 if the regulator can assign spectrum use; =0 if otherwise.	
		b5=1 if the regulator is in charge of resolving conflicts when two operators cannot agree on interconnection/access terms; =0 if otherwise.	
	accountability	(d1+d2)/2=G3	Calculated World Bank Telecommunications

			Regulation Survey (2001)
		d1=1 if the operator can appeal to the regulator when disagrees with regulators decision; =0 if otherwise.	
			Calculated
	transparency and participation	d2=1 if the other parties can appeal to the regulator when disagrees with regulators decision; =0 if otherwise.	World Bank Telecommunications Regulation Survey (2001)
		(c1+c2+c3+c4)/4=G4	
		c1=1 if all regulatory meetings open to the public in practice; =0 if otherwise.	
		c2=1 if regulatory decisions are publicly available; =0 if otherwise.	
	regulatory substance	c3=1 if regulator publish decisions in practice; =0 if otherwise.	Calculated
		c4=1 if regulator publish explanations of decisions in practice; =0 if otherwise.	
	tariff setting		
Regulatory substance index			Calculated
		(S1+S2+S3+S4)/4	World Bank Telecommunications Regulation Survey (2001)
		(h1+h2+h3+h4+h5)/5=S1	
		h1=1 if the fixed-line local telephony prices are regulated; =0 if otherwise.	
		h2=1 if the cellular telephony prices are regulated; =0 if otherwise.	
		h3=1 if the domestic long-distance telephony prices are regulated; =0 if otherwise.	
	quality of service standards		
		h4=1 if the international long-distance telephony prices are regulated; =0 if otherwise.	Calculated
		h5=1 if the internet service providers telephony prices are regulated; =0 if otherwise.	World Bank Telecommunications Regulation Survey (2001)
		(j1+j2+j3+j4+j5)/5=S2	
		j1=1 if the law requires that all entrants receive the same technical	

		terms and conditions for access/interconnection; =0 if otherwise.	
		j2=1 if the law requires that all entrants receive the same prices for access/interconnection; =0 if otherwise.	
		j3=1 if the regulator actually collects the performance indicator for call completion rates by operator; =0 if otherwise.	
	accountants ratio	j4=1 if the regulator actually collects the performance indicator for faults/faults repair; =0 if otherwise.	Calculated
	periodically review	j5=1 if the regulator actually collects the performance indicator for geographical coverage rates; =0 if otherwise.	World Bank Telecommunications Regulation Survey (2001)
Tariff level	fee	S3 = the number of accountants divided by the telecommunications industry's total revenue, and standardized to the country with the highest ratio.	Calculated
	subscription fee	S4=1 there is a set period of time between regulator reviews; =0 if otherwise.	Calculated from ITU Statistical Year Book 2005
	connection fee		
		=(subscription fee + connection fee)/2	
		12*monthly subscription fee/gdp per capital	
		12*connection fee/gdp per capital	
Competition	competition	The logarithm of number of operators	World Telecommunication Regulatory Database published annually on ITU website
Privatization	privatization	=1 fixed line telecommunications operator is wholly privatized; =0.5 if partially privatized; =0 if monopoly.	Idem
Telecom Quality, General Infrastructure Obstacle and Corruption in General:			
Telecom Quality	telecom quality	Quality of telephones 1=very bad 2=bad 3=slightly bad 4=slightly good 5=good 6=very good	WBES

General infrastructure obstacle	infrastructure obstacle	General infrastructure (telephone, electricity, water, roads, land) constraint for the operation and growth of business 1=no obstacle 2=minor obstacle 3=moderate obstacle 4=major obstacle	Idem
Corruption in General	corruption in general	Common for firms to pay some irregular "additional payments" to get things done 1=never 2=seldom 3=sometimes 4=frequently 5=mostly 6=always	Idem
Firm Level Control Variables:			
Ownership	government	=1 if government-owned; =0 if otherwise.	WBES
	foreign	=1 if it has foreign ownership; =0 if otherwise.	Idem
Firm Size	size	Logarithm of firm value of sales	Idem
Exports	export	1=yes 0=no	Idem
Sector	manufacturing	1=yes 0=no	Idem
	service	1=yes 0=no	Idem
	agriculture	1=yes 0=no	Idem
	construction	1=yes 0=no	Idem
Location	major	1=capital or major city; 0=other small city.	Idem
Country Level Control Variables:			
GDP per capita	GDP	GDP per capita in PPP adjusted international dollars, averaged over 1995-1999	World development indicators from IMF
GDP growth	GDP growth	Growth rate of GDP, averaged over 1995-1999	Idem
Inflation	inflation	Log difference of Consumer Price Index	International financial statistics (IFS)

Robustness Tests **-- Country-specific variables that are used as Control Variables[85]:**			
Voice and accountability	voice and accountability	Measuring the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.	The Worldwide Governance Indicators (WGI) project
Political stability and absence of violence	political stability	Measuring perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including domestic violence and terrorism	Idem
Government effectiveness	government effectiveness	Measuring the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies	Idem
Regulatory quality	regulation quality	Measuring the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development	Idem
Rule of law	rule of low	Measuring the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence	Idem
Control of corruption	control of corruption	Measuring the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests	Idem
IV Regression -- Instrumental Variables:			
Ethnic Fractionization	ethnic	An index of ethnolinguistic and religious fractionalization	Anthony Annett , *Social Fractionalization, Political Instability, and*

[85]Definition for the country governance indicator measurement is directly from Melissa Thomas, “What do the worldwide governance indicators measure?” 2007, SSRN working paper: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1007527

			the Size of Government, IMF Staff Papers, 2002, Vol. 48, No. 3
Independence	year-of-independence	Logarithm of number of years	Vikipedia.com
Geographic Location	abs_latitude	Logarithm of absolute value of latitude	Vikipedia.com

APPENDIX C
DATA DEFINITION AND DESCRIPTION FOR DEPENDENT AND EXPLANATORY VARIABLES[86]

[86]Definitions for loan purposes are from Dealscan parameters definition.

Variable	Name	Definition	Original Source
Political Connection	Political Connection	A firm is considered to be politically connected if it has at least one member of its board of directors (BOD), including the chairman of the board, the CEO, and the president, vice president or secretary of the board, being a member of the national parliament, a head of state, or a government minister.	Faccio (2006) Worldscope https://www.cia.gov/library/publications/world-leaders-1/pdf-version/pdf-version.html
Bank Loan Variables:			
Spread or Interest Rate	Spread	Interest margin over LIBOR	Dealscan
Maturity	Maturity	The number of months for the life of the loan facility	Dealscan
Ln(Loan size)	Loan size	The natural log of the amount of the loan made in U.S. dollars	Dealscan
Security	Security	=1 if loan facility is secured; =0 otherwise.	Dealscan
Syndicate	Syndicate	=1 if loan facility is syndicated; =0 otherwise.	Dealscan
Loan Type	Term loan	An installment loan. Amounts repaid may not be re-borrowed. The funds are typically drawn down all at once, although the loan may have a series of takedowns or a delayed takedown period.	Dealscan
	Lines of credit	An unfunded commitment that the borrower may drawdown, repay, and re-borrow.	
	Bridge Loan	A short-term commitment, made in anticipation of a longer term financing.	
Loan Purpose	Purpose 1	Debt repayment - A loan to refinance or consolidate existing debt prior to maturity.	Dealscan
	Purpose 2	Working capital - Used by the borrower to fund inventory purchases, accounts receivable and short-term operations.	
	Purpose 3	Takeover – A loan to support the acquisition of a specified asset or company; Acquisition line - A loan for unspecified asset acquisitions. Though the loan may contain limits on the size and scope of the acquisition, the borrower typically has latitude over which assets to purchase; Recap - A loan to support a material change in a company's capital structure. Often made in	

		conjunction with other debt or equity offerings.	
	Purpose 4	CP backup - A commitment to back a company's commercial paper program. It is typically a revolving credit, a 364-day facility, or a letter of credit. The commitment may be drawn down if the borrower is unable to roll-over or refinance maturing commercial paper;	
	Purpose 5	LBO/MBO - Acquisition of a company primarily with debt and based on the acquired company's assets. A LBO typically has a high leverage multiple with 75% or more of the cost financed by debt.	
	Purpose 6	Project finance - A non-recourse loan to finance a specific project. The loan usually has a construction phase followed by permanent financing.	
		General corporate purpose - Catch-all purpose that can be used for various activities related to general operations, working capital and purchases. It may include roll-over of maturing debt.	
Firm Variables:			
Ln(Firm Size)	Firm size	The natural log of total assets or total sales in constant U.S. dollars	Worldscope
Industry	SIC	2-digit SIC code	Worldscope
Profitability	Profitability	The ratio of operating income over assets, ROA or profit margin	Worldscope
Leverage	Leverage	The ratio of total debts over equity	Worldscope
Liquidity	Liquidity	The ratio of current assets over current debts	Worldscope
Tangibility	Tangibility	The ratio of property, plant and equipment to total assets	Worldscope
Price-to-Book Ratio	Price-to-book	The ratio of market value of ordinary and preferred equity plus the book value of debt, divided by the sum of book value of equity plus book value of debt	Worldscope
Country Level Control Variables:			
GDP per capita	GDP-per-capita	GDP per capita in PPP adjusted international dollars	World development indicators from IMF
GDP growth	GDPgrowth	Growth rate of GDP	Idem

Inflation	inflation	Log difference of Consumer Price Index	International financial statistics (IFS)
Control of corruption	control of corruption	Measuring the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests	Idem

APPENDIX D
COUNTRY LIST AND MACRO-ENVIRONMENT INDICATORS[87]

[87]The indicators GDP, GDPgrowth, Inflation, Control-of-Corruption are calculated at the mean over period 1997-2006.

Country	Firm Obs	Political Connection	GDP-per-capita	GDPgrowth	Inflation	Control-of-Corruption
Australia	1451	0	25704	3.4645	3.1261	1.9846
Brazil	151	0	4085	2.8079	7.9205	-0.0831
Canada	722	10	30848	3.1667	2.2527	1.9858
Denmark	73	5	42522	2.3077	2.2308	2.3076
Finland	20	0	29929	3.9500	1.3000	2.3825
France	412	10	30066	2.0332	1.7464	1.4439
Germany	348	5	29358	1.4986	0.5099	1.9558
Greece	74	2	19997	4.1579	3.3553	0.5539
Hong Kong, China	1574	0	23444	4.2808	-1.6881	1.2947
India	282	2	607	7.1268	5.1232	-0.3213
Indonesia	45	5	1144	5.1600	9.3800	-0.9328
Ireland	68	8	44496	5.5526	3.1053	1.6382
Italy	98	0	26918	0.9898	2.4592	0.6002
Japan	2027	19	34205	1.6584	-1.2639	1.2375
Malaysia	355	63	4339	4.9617	4.2847	0.3585
Mexico	90	3	5901	3.5914	10.3871	-0.3649
Netherlands	106	0	31459	2.3774	2.7453	2.1080
New Zealand	92	0	20195	2.8478	2.0543	2.2638
Norway	80	0	50968	2.8625	5.2250	2.1278
Philippines	194	24	1009	3.8716	6.3578	-0.4696
Singapore	300	19	24236	5.0094	0.2414	2.2683
South Korea	185	0	13218	5.0541	1.8865	0.2863
Spain	154	2	23019	3.7564	3.8718	1.3345
Sweden	116	5	33085	2.9504	1.4215	1.4215
Switzerland	92	5	41522	1.6701	0.8866	2.1475
Thailand	207	56	2206	2.7719	1.8517	-0.1986
Turkey	125	0	5117	5.4880	31.9360	-0.1498
United Kingdom	622	163	30694	2.6535	2.4166	2.0453
USA	12236	3	36768	3.2560	2.1682	1.7090

LIST OF REFERENCES

Abed, George T. and Gupta, Sanjeev. “Governance, corruption and economic performance,” Washington, D.C.: International Monetary Fund, 2002, Chapter 18.

Ades, Alberto and Di Tella, Rafael. “Rents, competition and corruption,” American Economic Review, 1999, 89 (4), 982– 993.

Agrawal, Anup, and Charles R. Knoeber. “Do some outside directors play a political role?” Journal of Law and Economics, 2001, 44, 179-198.

Ai, Chunrong and Sappington, David E. M. “Incentive regulation and elecommunications service quality” Journal of Regulatory Economics, 2004, 26(3), 263-285.

Ai, Chunrong and Sappington, David E. M. “The impact of state incentive regulation on the U.S. telecommunications industry” Journal of Regulatory Economics, 2002, 22(2), 133-160.

Bae, Kee-Hong, and Goyal, K. Vidhan. “Creditor rights, enforcement, and bank loans,” Journal of Finance, forthcoming.

Barclay, Michael.J., and Smith, Clifford.W, Jr. “The maturity structure of corporate debt,” Journal of Finance, 1995, 50, 609-631.

Bardhan, Pranab. “Corruption and development: a review of issues,” Journal of Economic Literature, 1997, 35, 1320-1346.

Baron, David P. “Design of regulatory mechanisms and institutions,” In Handbook of Industrial Organization, edited by Richard Schmalensee and Robert Willig, Amsterdam: North-Holland, 1989, 1347-444.

Baron, David P. and Myerson, Roger B. “Regulating a monopolist with unknown cost,” Econometrica, 1982, 50, 911-930.

Barth, James R.; Caprio, Gerard Jr., and Levine, Ross. “Bank supervision and regulation: what works best?” Journal of Financial Intermediation, 2004, 13, 205-248.

Barth, James R.; Caprio, Gerard Jr., and Levine, Ross. “Rethinking bank regulation: till angels govern,” Cambridge University Press, Cambridge, 2006.

Beck, Thorsten; Demirgüç-Kunt, Asli and Levin, Ross. “Bank supervision and corruption in lending,” Journal of Monetary Economics, 2006, 53, 2131-2163.

Becker, Gary S and Stigler, George J. “Law enforcement, malfeasance, and compensation of enforcers,” Journal of Legal Studies, 1974, 3(1), 1-19.

Becker, Gary S. “Crime and punishment: an economic approach,” Journal of Political Economy, 1968, 76 (2), 169-217.

Bertrand, Marianne, Mullainathan, Sendhil. “Enjoying the quiet life? corporate governance and managerial preferences,” Journal of Political Economy, 2003, 111, 1043-1075.

Bertrand, Marianne, Mullainathan, Sendhil. “Is there discretion in wage setting? a test using takeover legislation,” Rand Journal of Economics, 1999, 30, 535-554.

Bertrand, Marianne; Kramarz, Francis; Schoar, Antoinette and Thesmar, David. “Politicians, firms and the political business cycle: evidence from France,” Working paper, 2006, University of Chicago.

Bharath, Sreedhar.T., Sunder, Jayanthi, Sunder, Sunder V. “Accounting quality and debt contracting,” Accounting Review, 2008, 83, 1-28.

Boubakri, Narjess; Cosset, Jean-Claude and Guedhami, Omrane. “Privatization in developing countries: performance and ownership effects,” Developing Policy Review, 2008, 26, 275-308.

Boubakri, Narjess; Cosset, Jean-Claude, and Saffar, Walid. “Political connections of newly privatized firms,” Journal of Corporate Finance, forthcoming.

Braeutigam, Ronald R. “Optimal policies for natural monopolies,” In Handbook of Industrial Organization, edited by Richard Schmalensee and Robert Willig. Amsterdam: Elsevier, 1989.

Brown, Ashley C.; Stern, Jonn, and Tenenbaum, Bernard with Gencer, Defne. “Handbook for Evaluating Infrastructure Regulatory Systems,” 2006, the World Bank, Washington, D.C.

Campos, Javier; Estache, Antonio and Trujillo, Lourdes. “Processes and accounting matter for regulators: learning from Argentina’s railways privatization,” Journal of Network Industries, 2003, 4, 3-28.

Carey, Mark and Nini, Greg. “Is the corporate loan market globally integrated? a pricing puzzle,” Journal of Finance, 2007, 62, 2969-3007.

Carrera, Jorge; Checchi, Daniele and Florio, Massimo. “Privatization discontent and its determinants: evidence from Latin America,” IZA discussion papers, 2005, No.1587.

Chen, Jim. “The legal process and political economy of telecommunications reform” Columbia Law Review, 1997, 97(4), 835-873.

Chiang, Eric P., Hauge, Janice A. and Jamison, Mark A. “Subsidies and distorted markets: do telecom subsidies affect competition?” Public Utility Research Center, Department of Economics, University of Florida, 2007.

Chiu, Ming Ming, and Sung Wook Joh. “Loans to distressed firms: political connections, related lending, business group affiliations, and bank governance,” Working paper, 2004, Chinese University of Hong Kong.

Claessens, Stijn; Feijen, Erik, and Laeven, Luc. “Political connections and preferential access to finance: The role of campaign contributions,” Journal of Financial Economics, 2008, 88, 554-580.

Clarke, George R.G. “Bridging the digital divide: how enterprise ownership and foreign competition affect internet access in Eastern Europe and Central Asia,” World Bank Policy Research Paper, 2001, No. 2629.

Clarke, George R.G. and Xu Lixin Colin. “Privatization, competition, and corruption: how characteristics of bribe takers and payers affect bribes to utilities,” Journal of Public Economics, 2004, 88, 2067-2097.

Correa, Paulo; Melo, Marcus; Mueller, Bernardo and Pereira and Carlos. “Regulatory governance in Brazilian infrastructure industries,” Quarterly Review of Economics and Finance, 2008, 48, 202-216.

Cull, Robert and Xu, Colin Lixin. “Institutions, ownership, and finance: the determinants of profit reinvestment among Chinese firms,” Journal of Financial Economics, 2005, 77, 117-146.

Degeorge, François, Patel, Jayendu and Zeckhauser, Richard. “Earnings management to exceed thresholds” Journal of Business, 1999, 71(1), 1-33.

Dinç, I. Serdar. “Politicians and banks: political influences on government-owned banks in emerging countries,” Journal of Financial Economics, 2005, 77, 453-479.

Djankov, Simeon; Caralee McLiesh and Andrei Shleifer. “Private credit in 129 countries,” Journal of Financial Economics, 2007, 84, 299-329.

Djankov, Simeon; Rafael La Porta; Florencio Lopez-de-Silanes, and Andrei Shleifer. “The law and economics of self-dealing,” Journal of Financial Economics, 2008, 88, 430-465.

Donald, Stephen G. and Sappington, David E. M. “Choosing among regulatory options in the United States telecommunication industry” Journal of Regulatory Economics, 1997, 227-243.

Eriksson, Ross C., Kaserman, David L. and Mayo, John W. “Targeted and untargeted subsidy schemes: evidence from post divestiture efforts to promote universal service.” Journal of Law and Economics, 1998, 41, 477-502.

Estache, Antonio, Laffont, Jean-Jacques and Zhang, Xinzhu. “Universal service obligations in LDCs: The effect of uniform pricing on infrastructure access” Journal of Public Economics, 2006, 90, 1155-1179.

Estache, Antonio. “PPI partnerships vs. PPI divorces in LDCs,” Review of Industrial Organization, 2006, 29, 3-26.

Estache, Antonio; Goicoechea, Ana and Trujillo, Lourdes. "Utilities reforms and corruption in developing countries," World Bank Policy Research Working Paper, 2006, No. 4081.

Esty, Benjamin and Megginson, William L. "Creditor rights, enforcement, and debt ownership structure: Evidence from the global syndicate loan market," Journal of Financial and Quantitative Analysis, 2003, 38, 37-59.

Esty, Benjamin. "When do foreign banks finance domestic projects? New evidence on the importance of legal and financial systems," Working paper, 2004, Harvard Business School.

Faccio, Mara. "Politically connected firms," American Economic Review, 2006, 96, 369-386.

Faccio, Mara. "The characteristics of politically connected firms," Working Paper, 2007, Purdue University.

Faccio, Mara; Masulis, W. Ronald and McConnell, J. John. "Political connections and corporate bailouts," Journal of Finance, 2006, 61, 2597-2635.

Fan, P.H. Joseph, Wong, T.J., Zhang, Tianyu. "Politically-connected CEOs, corporate governance and post-IPO performance of China's newly partially privatized firms," Journal of Financial Economics, 2007, 84, 330-357.

Fan, Simon C; Lin, Chen and Treisman, Daniel. "Political decentralization and corruption: evidence from around the world," Journal of Public Economics, 2009, 93, 14-34.

Ferguson, Thomas and Voth, Hans-Joachim. "Betting on Hitler: the value of political connections in Nazi Germany," Quarterly Journal of Economics, 2008, 123(1), 101-137.

Fisman, Raymond and Gatti, Roberta. "Decentralization and corruption: evidence across countries," Journal of Public Economics, 2002, 83 (2), 325–345.

Fisman, Raymond. "Estimating the value of political connections," American Economic Review, 2001, 91, 1095-1102.

Friedman, Eric; Johnson, Simon; Kaufmann, Daniel and Zoido-Lobaton, Pablo. "Dodging the grabbing hand: the determinants of unofficial activity in 69 countries," Journal of Public Economics, 2000, 76 (3), 459-493.

Gabel, Richard. "Development of separations principles in the telephone industry". East Lansing, Michigan: Michigan State University Institute of Public Utilities, 1967.

Garbacz, Christopher, and Thompson, Herbert G, Jr. "Estimating telephone demand with state decennial census data from 1970 – 1990: update with 2000 data." Journal of Regulatory Economics, 2003, 24, 373–78.

Gasman, Lawrence 1998. "Universal service: the new telecommunications entitlements and taxes" Cato Policy Analysis, 1998, No.310.

Glaeser, Edward L. and Goldin, Claudia, eds. "Corruption and reform: lessons from America's economic history," National Bureau of Economic Research Conference Report. Chicago and London: University of Chicago Press, 2006, 386.

Glaeser, Edward, and Raven Saks. "Corruption in America," NBER Working Paper No. w10821, 2004.

Graham, J.R., Harvey, C.R. "The theory and practice of corporate finance: evidence from the field," Journal of Financial Economics, 2001, 60, 187-243.

Graham, R. John; Li, Si, and Qiu, Jiaping. "Corporate misreporting and bank loan contracting," Journal of Financial Economics, 2008, 89, 44-61.

Gutièrrez, Luis H. "The effect of endogenous regulation on telecommunications expansion and efficiency in Latin America," Journal of Regulatory Economics, 2003, 23(3), 257-286.

Hall, David; Lobina, Emanuele and Motte, Robin. "Public resistance to privatization in water and energy," Development in Practice, 2005, 15, 286-301.

Hazlett, Thomas. W. "Universal service: telephone subsidies: what does $7 billion buy?" analysis Group Policy Paper, 2006.

Heckman, James.J., Ichimura, Hidehiko, and Todd, Petra, E. "Matching as an econometric evaluation estimator: evidence from evaluating a job training programme." Review of Economic Studies, 1997, 64, 605.

Heckman, James.J., Ichimura, Hidehiko, and Todd, Petra, E. "Matching as an econometric evaluation estimator," Review of Economic Studies, 1998, 65, 261-294.

Holt, Lynne and Jamison, Mark A. 2007. "Re-evaluating FCC policies concerning the lifeline and link-up programs." Journal on Telecommunications and High Technology Law, 5(2), 393-412.

Houston, Joel; Itzkowitz, Jennifer and Naranjo, Andy. "Borrowing beyond borders: the geography and pricing of syndicated bank loans," Working paper, can be downloaded from: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=969735

Jamison, Mark A. "The role of costing as a ratemaking tool in an environment of dynamic change." In "The Institutionalist Approach to Public Utilities Regulation", ed. Edythe Miller and Warren J. Samuels, 2002, 250-275. East Lansing: Michigan State University Press.

Johnson, Shane A. "Debt maturity and the effects of growth opportunities and liquidity risk on leverage," Review of Financial Studies, 2003, 16, 209-236.

Johnson, Simon, and Todd Mitton. "Cronyism and capital controls: evidence from Malaysia," Journal of Financial Economics, 2003, 67, 351-382.

Johnson, Simon; Kaufmann, Daniel; McMillan, John and Woodruff, Christopher. “Why do firms hide? Bribes and unofficial activity after communism,” Journal of Public Economics, 2000, 76 (3), 495-520.

Kaufmann, Daniel; Kraay, Aart and Mastruzzi, Massimo. “Governance matters V:aggregate and individual governance indicators,” World Bank Policy Research Working Paper, 2006, No. 4012.

Kaufmann, Daniel; Kraay, Aart and Mastruzzi, Massimo. “Governance matters V: aggregate and individual governance indicators for 1996-2005,” World Bank Policy Research Working Paper, 2006, No. 4012.

Kessides, Ioannis. “Infrastructure regulation: promises, perils and principles,” Washington D.C.: AEI-Brookings Joint Center for Regulatory Policy, 2003.

Khwaja, Asim Ijaz and Main, Atif. “Do lenders favor politically connected firms? rent provision in an emerging financial market,” Quarterly Journal of Economics, 2005, 120(4), 1371-1411.

Knack, Stephen and Azfar, Omar. “Are larger countries really more corrupt?” World Bank Policy Research. 2002, Working Paper No.2470.

Kroszner, Randall S., and Thomas Stratmann. “Interest group competition and the organization of congress: Theory and evidence from financial services’ Political Action Committees,” American Economic Review, 1998, 88, 1163-1188.

Krueger, Anne O. “The political economy of the rent-seeking society,” American Economic Review, 1974, 64 (3), 291-303.

Krueger, O. Anne. “The political economy of the rent-seeking society,” American Economic Review, 1974, 64, 291-303.

Kunicova, Jana. “Are presidential systems more susceptible to political corruption?” unpublished manuscript, Yale University, Department of Political Science, 2001.

Laffont, Jean-Jacques and N’Guessan, Tche´tche´. “Competition and corruption in an agency relationship,” Journal of Development Economics, 1999, 60, 271-295.

Laffont, Jean-Jacques and Tirole, Jean. “Using cost observation to regulate firms,” Journal of Political Economy, 1986, 94, 614-641.

Laffont, Jean-Jacques and Tirole, Jean. “A theory of incentives in procurement and regulation,” Cambridge, MA: MIT Press, 1993.

Laffont, Jean-Jacques. “Regulation and development,” Cambridge and New York: Cambridge University Press, 2005.

LaPorta, Raphael; Lopes-de-Silanes, Florencio; Shleifer, Andrei and Vishny, Robert. “The quality of government,” Journal of Law, Economics and Organization, 1999, 15(1), 222–279.

LaPorta, Raphael; Lopes-de-Silanes, Florencio; Shleifer, Andrei. “Government ownership of banks,” Journal of Finance, 2002, 57(1), 256–301.

Lederman, Daniel; Loayza, Norman, Soares, Rordrigo R. “Accountability and corruption: political institutions matter,” World Bank Policy Research Working Paper, 2001, No.2708.

Leff, Nathaniel H. “Economic development through bureaucratic corruption,” American Behavioral Scientist, 1964, 8 (3), 6-14.

Leuz, Christian and Oberholzer-Gee, Felix. “Political relationships, global financing, and corporate transparency: evidence from Indonesia,” Journal of Financial Economics, 2006, 81, 411-436.

Levy, Brian and Spiller, Pablo T. “Regulations, institutions, and commitment: comparative studies of telecommunications,” Cambridge: Cambridge University Press, 1996.

Levy, Brian and Spiller, Pablo T. "The institutional foundations of regulatory commitment: a comparative analysis of telecommunications regulation," Journal of Law, Economics and Organization, 1994, 10(2), 201-46.

Li, Wei and Xu, Lixin Colin. “Liberalization and performance in telecommunications sector around the world,” Mimeo, the World Bank, 2001.

Loeb, Martin and Magat, Wesley A. “A decentralized method of utility regulation,” Journal of Law and Economics, 1979, 22, 399-404.

Mauro, Paolo. “Corruption and growth,” Quarterly Journal of Economics, 1995, 110 (3), 681 – 712.

Megginson, William L. and Sutter, Natalie L. “Privatization in developing countries,” Corporate Governance: An International Review, 2006, 14(4), 234-365.

Morck, K. Randall; Stangeland, A. David and Yeung, Bernard. “Inherited wealth, corporate control, and economic growth,” NBER working paper, 1998, No. 6814. (Published in “Concentrated Corporate Ownership, NBER, University of Chicago Press, 2000.)

Mueller, Milton L. “Universal service in telephone history: a reconstruction.” Telecommunications Policy, 1993, 17, 352-369.

Myers, C. Stewart. “Determinants of corporate borrowing,” Journal of Financial Economics, 1977, 5, 147-175.

Noam, Eli M. “Universal service and common carriage survive the telecommunications act of 1996?” Columbia Law Review, 1997, 97(4), 955-975.

Noll, Roger. “Economic perspectives on the politics of regulation,” In Handbook of Industrial Organization, edited by Richard Schmalensee and Robert Willig, Amsterdam: North-Holland, 1989, 1254-1282.

Noll, Roger. “Priorities for telecommunications reform in Mexico,” SIEPR Policy Paper, 2007, No. 06-035.

Parker, David and Kirkpatrick, Colin. “Privatization in developing countries: a review of the evidence and the policy lessons,” Journal of Development Studies, 2005, 41, 513-541.

Peltzman, Sam. “Toward a more general theory of regulation,” Journal of Law and Economics, 1976, 19(2), 211-40.

Qian, Jun, Philiip, E. Strahan. “How laws and institutions shape financial contracts: the case of bank loans,” Journal of Finance, 2007, 62(6), 2083-2834.

Rajan, G. Raghuram and Zingales, Luigi. “The great reversals: The politics of financial development in the twentieth century,” Journal of Financial Economics, 2003, 69, 5-50.

Riordan, Michael H. “Universal residential telephone service” Handbook of Telecommunications Economics, 2002, Volume 1, Chapter 10.

Roberts, E. Brian. “A dead senator tells no lies: Seniority and the distribution of federal benefits,” American Journal of Political Science, 1990, 34, 31-58.

Roller, Lars-Hendrik and Waverman, Leonard. “Telecommunications infrastructure and economic development: a simultaneous approach” the American Economic Review, 2001, 91(4), 909-923.

Ros, Agustin J. “Does ownership or competition matter? The effects of telecommunications reform on network expansion and efficiency,” Journal of Regulatory Economics, 1999, 15, 65-92.

Rose-Ackerman, Susan. “Corruption: A study in political economy,” Academic Press, New York, NY, 1978.

Rose-Ackerman, Susan. “The economics of corruption,” Journal of Public Economics, 1975, 4 (2), 187-230.

Rosston, Gregory L.; Savage, Scott J. and Wimmer, Bradley, S. “The effects of private interests on regulated retail and wholesale prices” Journal of Law and Economics, 2008, 51(3), 479-501.

Sapienza, Paola. “The effects of government ownership on bank lending,” Journal of Financial Economics, 2004, 72(2), 357-384.

Sevensson, Jakob. “Eight questions about corruption,” Journal of Economic Perspective, 2005, 19, 19-42.

Shirley, Mary M. “Why is sector reform so unpopular in Latin America,” The Independent Review, 2005, 10, 195-207.

Shleifer, Andrei and Vishny, Robert W. “Corruption,” Quarterly Journal of Economics, 1993, 108, 599-617.

Shleifer, Andrei and Vishny, W. Robert. “Politicians and firms,” Quarterly Journal of Economics, 1994, 109, 995-1025.

Spiller, Pablo T. “A positive political theory of regulatory instruments: contracts, administrative law or regulatory specificity?” Southern California Law Review, 1996, 68, 477-515.

Stern, Jon and Cubbin, John. “Regulatory effectiveness: The impact of regulation and regulatory governance arrangements on electricity industry outcomes,” World Bank Policy Research Working Paper, 2005, Working Paper No. 3536.

Stern, Jon and Holder, Stuart. “Criteria for assessing the performance of regulatory systems,” Utility Policy, 1999, 8, 33-50.

Stern, Jon. “Economic regulation in central and eastern Europe,” Economics of Transition, 1994, 2, 391-398.

Stigler, George. “The theory of economic regulation,” Bell Journal of Economics and Management Science,1971, 2, 3-21.

Stohs, M., Mauer, D.C. “The determinants of corporate debt maturity structure,” Journal of Business, 1996, 69, 279-312.

Stulz, M. René. “The limits of financial globalization,” Journal of Finance, 2005, 60(4), 1595-1638.

Sufi, Amir. “Information asymmetry and financing arrangements: evidence from syndicated loan,” Journal of Finance, 2007, 62(2), 629-668.

Trebilcock, Michael. “What makes poor countries poor? the role of institutional capital in economic development,” 1996. University of Toronto, Law and Economics Program.

Treisman, Daniel. “The causes of corruption: a cross-national study,” Journal of Public Economics, 2000, 76 (3), 399-457.

Ure John. “Telecommunications privatization: evidence and some lessons,” Telecommunications Research Project Working Papers, 2003, University of Hong Kong.

Wallsten, Scott. “An econometric analysis of telecom competition, privatization, and regulation in Africa and Latin America,” Journal of Industrial Economics, 2001, 49 (1), 1-19.

Wallsten, Scott. “Of carts and horses: regulation and privatization in telecommunications reforms.” Journal of Policy Reform, 2003, 6 (4), 217-231.

Wallsten, Scott; Clarke, George; Haggarty, Luke; Kaneshiro, Rosario; Noll, Roger; Shirley, Mary and Xu, Colin Lixin. “New tools for studying network industry reforms in developing countries: the telecommunications and electricity regulation database,” Review of Network Economics, 2004, 3(3), 248-282.

Wei, Shang-Jin. “Natural openness and good government,” World Bank Policy Research, 2000, Working Paper No. 2411.

BIOGRAPHICAL SKETCH

Liangliang Jiang was born in Liaoning province, China. She is the only child of her parents. She grew up in northeast China, and went to college in Shanghai. She earns her bachelor's degree in international finance from the University of Shanghai for Science and Technology in Shanghai, and her master's degree in financial economics from University of Maine, Orono, Maine, United States.

Liangliang came to Gainesville in 2005 to pursue a Ph.D. in economics from the University of Florida. Her area of interest is industrial organization, public economics and financial economics. Liangliang received her Ph.D. in the summer of 2009.

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