Social Networks and Corruption

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Abstract

Social networks, as components of social capital, are often cited as contributing to economic and political performance. This paper discusses a less felicitous effect of social networks, defined here as relationships between individuals implying obligation and easing the flow of information: their role in determining the extent and nature of corruption. The connections that make up social networks serve as both substitutes and complements for money in corrupt transactions. As substitutes, they further favor-type but discourage extortion-type corruption, while leaving those without connections to pay higher bribes than they would in the absence of social networks. As complements, they help solve a holdup problem inherent to many corrupt exchanges, where undertaking a search for a corrupt official to bribe is a specific investment that must be made before exchange is possible. Empirical evidence is presented from post-communist Europe, where such social networks are a particular institutional legacy of the shortage economy under socialism.
1. Introduction

Social networks - defined here as relationships among individuals that imply obligation and ease the flow of information - are a type of social capital. As such, they have been incorporated by economists, political scientists, and sociologists into explanations of the surprising level of cooperation in society. Entrepreneurs secure supplier credit by trading with people they know and trust. Individuals opposed to authoritarian governments solve their collective action problems by prevailing on their friends and acquaintances to join them in the streets. University admissions committees address the information problem associated with the admissions process by relying on letters of recommendation from respected colleagues.

Beyond providing the felicitous functions generally emphasized in the literature, however, social networks facilitate a number of less desirable transactions. Firms colluding to control prices need to be sure that they will not be taken advantage of by their cartel partners. Fascists as well as democrats attempt to organize street protests. Admission to racial supremacist organizations may come only by recommendation.

In this paper, I explore the impact of social networks on one such undesirable phenomenon: corruption. A large recent body of literature emphasizes the economic and political

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1For a review of the variety of concepts grouped under the rubric of the term “social capital,” see Coleman (1990), chapter 12.
2Johnson et al (2000b) present evidence that entrepreneurs in postsocialist countries rely on relationships to secure supplier credit. In a series of papers, (e.g. Kranton and Minehart 2000), Rachel Kranton and Deborah Minehart explore the theoretical characteristics of buyer-seller networks. For a general overview of the large literature on business networks, see Kali (1999).
3Various authors have discussed the role of social networks in facilitating collective action. See, e.g., Putnam (1993), Tarrow (1998), and Granovetter (1973).
costs of corruption, including anemic economic growth (Mauro 1995), low investment by firms (Johnson et al. 2000a), and loss of support for democratic institutions (Tverdova and Anderson 2000). Despite the attention the topic has received from scholars, however, little consensus has formed as to why some countries should be so much more corrupt than others. Existing explanations for especially corrupt environments include the stresses of modernization (Huntington 1968), the loss of monopoly bribe-taking power by corrupt governments (Shleifer and Vishney 1993), and the absence of democratic government (Treisman 1999).4

The extent and virulence of corruption in the postsocialist world particularly deserves explanation. Ex ante, one might have expected corruption to decline with the end of communism. Communism was a system with few legitimate avenues for influence of government policy at the legislative stage of policy making; the culture of bribery developed in part because political influence could only be exercised at the enforcement stage (Di Franceisco and Gitelman 1984). Thus, the opening of the legislative process to influence through the ballot box and interest representation might have been expected to bring about a reduction in corruption. Also, one might have anticipated that greater job insecurity among political leaders would reduce bribe-taking behavior by office holders in postcommunist states, as corrupt democratic politicians always run the risk of being exposed and consequently losing reelection bids.

Social networks help to explain the nature and extent of corruption in the postsocialist

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4Rose-Ackerman (1999) provides an excellent survey of the literature on the determinants of corruption.
world. While present in all countries, social networks of the type discussed in this paper were especially important for individuals living under communism. In the language of Russia-watchers, blat (the “use of personal networks and informal contacts to obtain goods and services in short supply and to find a way around formal procedures” (Ledeneva 1998, p. 1)) was what allowed socialist economies to approximate an efficient distribution of resources. Such networks are an institutional legacy of communism, but exist today to serve different functions. Managing a state-owned restaurant in the socialist era, you would rely on ministry connections to acquire necessary kitchen supplies. Owning a restaurant in the postcommunist era, you might count on friends to give you a tax break that others need to pay a bribe to receive.

Social networks determine the nature and extent of corruption in two ways: First, by implying obligation to not act opportunistically, the connections that make up social networks substitute for money when dealing with corrupt officials. Thus, corrupt officials are less likely to demand of their friends the bribes that they charge strangers. Second, by easing the flow of information as well as implying obligation, social networks complement money when dealing with corrupt officials. In particular, social networks solve a “holdup” problem that occurs when individuals looking for an official to bribe must first engage in a costly search to find the right official.

The paper proceeds as follows. Section 2 presents evidence on the interaction between corruption and social networks in Eastern Europe and the (former) Soviet Union in both the
communist and postcommunist period. Section 3 explores the substitutability of connections and money in corrupt transactions, while section 4 examines their complementarity. Section 5 concludes.

2. Social Networks During Communism and After

In this section I present evidence on the relationship between social networks and corruption during and after the communist era in Eastern Europe and the (former) Soviet Union. As will be shown, the nature of the shortage economy under communism particularly facilitated the creation of social networks which influence the nature and extent of corruption in the postcommunist era.5 That said, a number of analyses have demonstrated that social networks and corruption interact in many other institutional environments,6 so the arguments in this paper should not be taken to apply only to the former East.

Technically, the Soviet system was a command political economy, with most prices set and allocation decisions made at the central level. In reality, bribery and social networks of various stripes played an important role in determining who would have access to what goods and services and at what price, even during the terror of the Stalin years (Hosking 2000, pp. 317-18). Bribery was endemic in all segments of Soviet society (Simis 1982). Blat (again, 5For a comprehensive analysis of the shortage economy under socialism, see Kornai (1980).
6For example, in a broad comparative study of corruption in several diverse political environments, Scott (1972) considers both “favors done from motives of personal loyalty” and “favors done for cash” (p. 5), while Oldenburg (1987) discusses the role of “middlemen” in facilitating bribes in the Indian state of Uttar Pradesh.
the use of informal networks to acquire goods or services in short supply) made the system work, allowing a more efficient allocation of resources than ever would have been possible had managers merely relied on central directives (Kramer 1977): goods and services were “rationed by the state but redistributed by blat” (Ledeneva 1998, p. 206).

To a considerable extent, connections and bribery acted as substitutes during the Soviet era. In a survey of 1161 Soviet emigres who left the USSR between 1977 and 1980, DiFranceisco and Gitelman (1984) asked respondents how they would have gone about influencing Soviet officials to provide a variety of favors. As shown in Table 1, college-educated respondents - presumably more likely to have contacts among the college-educated bureaucracy - more often mentioned connections, and less often mentioned bribes, than did less well-educated respondents.

Reliance on connections and bribes was not limited to dealing with government officials. The nature of the shortage economy meant that desired goods were often unavailable, unless one had the social or monetary resources to jump to the head of the queue. Using data from interviews with 2657 Soviet emigres, Sedik (1989) reports on the relative importance of bribes and connections in acquiring goods in short supply. Respondents were asked how much they had spent on “monetary side payments,” and how much money they had saved because of their connections. As Table 2 illustrates, depending on whether one considers tips to be monetary side payments or not, the money value of connections was either considerably greater or only slightly less than the value of monetary side payments.
The end of communism, the marketization of formerly socialist economies, and the advent of pluralist political institutions might have been expected to bring about a reduction in the role of connections and bribery. Certainly, there was less need to rely on such devices to obtain access to commercially available goods, as price liberalization ended the queue rationing fundamental to the socialist system. However, government officials continued to control access to a number of traditionally desired goods and services, even as they acquired “control rights” (Grossman and Hart 1986, Hart and Moore 1990) over various aspects of the new economy through licensing procedures, the right to conduct safety and health inspections, and other forms of regulation.7

Connections both substitute and complement money when dealing with corrupt officials in the postcommunist era. Through connections, some individuals are able to obtain for free what others have to pay a bribe to receive, or they receive it for less than the full bribe. Tables 3 and 4 show that startups in Poland, Slovakia, Romania, Ukraine, and Russia headed by former state-enterprise managers - who are presumably better connected than managers without prior management experience - are less likely to say that firms in the respondent’s sector needed to make “indirect or direct payments to government officials to obtain permissions, licenses and regulations.”8 Figure 1 provides further support for this proposition,

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7Such regulation, while certainly creating incentives for corruption, may have also served to address important market failures. For a discussion of the tradeoffs, see Acemoglu and Verdier (2000).

8My analysis of data from a survey administered by Johnson, McMillan, and Woodruff (see Johnson, McMillan, and Woodruff 2000a for details). I am grateful to Chris Woodruff for providing data from the survey. In Table 4, those who refused to answer were grouped together with those saying that firms paid bribes, on the assumption that managers paying bribes might be less likely to answer.
showing that among respondents to a survey administered in twenty postcommunist coun-
tries by EBRD and the World Bank, privatized or state-owned firms - which may be more likely to be headed by individuals acquainted with state bureaucrats - pay a full percentage point less of their revenues in bribes than do startup firms.9

As complements, connections provide crucial information about whom and how much to bribe, and about the reliability of the parties involved. Alena Ledeneva (1998, p. 41) recounts the observation of a businessman operating in the new Russia:

[T]o give a bribe, one has to know whom to bribe and how much is to be given. Such information can only be obtained informally: to give a bribe one has to be recommended as a reliable person to guarantee the safety of a bribe-taker, that is, blat relations mediate bribery.10

Similarly, in interviewing Russian enterprise directors, Leonid Khotin (1995) finds that Muscovites “who had good connections and knew how and whom to bribe” were able to obtain export licenses unavailable to enterprise directors in the provinces.

Table 5 provides evidence of both the complementarity and substitutability of connections and money in corrupt transactions. Respondents to a survey of 4778 individuals in the Czech Republic, Slovakia, Bulgaria, and Ukraine in 1997 and 1998 by Miller, Koshechkina, and Grodeland (1998) indicated substantial use of both connections and bribery when dealing

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9 While startups are more likely to be small firms, which pay higher bribes than do large firms, EBRD (1999, p. 124, fn 18) reports that startups pay more in bribes than privatized or state-owned firms even after controlling for firm size.

10 A member of an anticorruption commission from a postcommunist country stressed the same point to me in the context of a discussion about judicial corruption in his country.
with officials. Notably, a large percentage of respondents answered that both strategies would be employed, implying that neither connections nor money alone would be sufficient. Nonetheless, individuals in all four countries were more likely to respond that connections would be used than money paid, suggesting that some individuals are able to obtain the desired good or service through contacts alone.

Table 6, which presents results from the same survey, reinforces the point that the use of connections and bribes has not disappeared with communism. Indeed, an overwhelming majority of respondents in all four countries reported that connections and bribes were more important today than under communism.

3. Connections and Money as Substitutes

* Bribery in the former East is where money substitutes for friendship networks. *

Kim Lane Scheppelle (1999, p. 531)

3.1. Basic Model

There are various reasons, not all mutually exclusive, why a corrupt official might choose not to charge a bribe of a friend or acquaintance that he would demand of a stranger. He could be involved in a long-run relationship with the person in need of his services, and worry about losing his reputation for cooperativeness if he charges a bribe. He may have received
a favor in the past from the individual, and feel an obligation to reciprocate. He might expect to need the services of the individual in the future, and worry that reciprocation will not be forthcoming unless he acts charitably today. He could intrinsically value his friendship with the other person.

For the purposes of this paper, all these motivations can be captured in the assumption that social networks imply an obligation to not act opportunistically. In particular, assume in this section that there is a single bribe-taking government official who faces a continuum of individuals, normalized to unit mass in size, in need of some homogenous service which the official can provide. Let $\sigma \in [0, 1]$ refer to the extent of the social networks connecting the official to individuals desiring his service, where proportion $\sigma$ of the individuals are “friends” (or acquaintances) of the official, while proportion $(1 - \sigma)$ are “strangers.” The official is constrained to not charge bribes of friends, but maximizes his bribe income (net of the costs of corruption) from strangers.

The variable $\sigma$ is a reduced-form method of handling what may in reality be quite complex networks. Granovetter (1973), for example, speculates that individuals from different circles may be more likely to be connected through weak ties (acquaintances) than through strong ties (friends and family members). In our model, an increase in the ratio of weak to strong

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11Economic models of reciprocity fall into two general categories: those involving long-run relationships among individuals who know each other (e.g. Akerlof 1982, and Kranton 1996), and those assuming generalized reciprocity that might carry over to strangers as well as friends and acquaintances (e.g. Rabin 1993). This paper is more in the spirit of models in the first category. For empirical work on the role of reciprocal behavior in the formation of social networks in Russia, see Yakubovich (1999).

12For a recent formalization of the idea that social relationships have intrinsic value and constrain economic decisions, see Ash (2000).
ties would be represented by an increase in $\sigma$, if those weak ties increased the odds of any individual being connected to the official through some mutual contact without eliminating the obligation to not act opportunistically.

Note that there are two simplifying assumptions in this characterization of the relationship between social networks and corruption. First, we assume that from the official’s point of view, all individuals who are “friends” are equally deserving of his forbearance. We relax this assumption below when considering the endogenous size of social networks. Second, we assume that when dealing with friends the official cannot offer a partial discount from the full bribe. In Section 4 we part with this assumption when considering the role of social networks in solving a holdup problem inherent to corrupt transactions.

Individuals have an unknown willingness to pay for the service in questions, which we denote $v_i$. For simplicity, assume that $v_i$ is distributed uniformly over the unit interval. The qualitative results in this paper hold if we assume more generally that willingness to pay is distributed uniformly over the interval $[0, \alpha]$, i.e. they are invariant with respect to changes in the price elasticity of demand so long as the linear shape of the demand function is maintained. Unfortunately, no easy generalization to demand functions of other shapes seems possible.

The official, who makes a take-it-or-leave-it offer to each stranger, is unable to observe individuals’ willingness to pay, and so must charge the same bribe $b$ to all strangers. Thus, all strangers with $v_i \geq b$ will accept the official’s offer, while those with $v_i < b$ will reject it.
Considering the division of the population into friends and strangers, proportion \[\sigma + (1 - \sigma)(1 - b)\] of all individuals will receive the service from the official.

In this section, we distinguish between two types of corruption: “favors” and “extortion.” Favors occur when the official delivers a service he is not legally entitled to provide. Extortion occurs when the official demands a bribe in return for delivering a service he is legally obligated to provide. For example, a health inspector who looks the other way (for either pecuniary or friendship reasons) when a food processor has violated a health code provision is providing a favor. A health inspector who demands a bribe of a food processor in compliance with the health code is practicing extortion.\(^\text{13}\)

Anecdotally, both types of corruption are practiced by corrupt officials, though not necessarily the same ones. Miller et al (1997, pp. 615-16) report much greater mention among focus group members in the Czech Republic and Ukraine of bribery and connections when discussing negotiations with officials over “favors” than over “rights,” suggesting that the emphasis in the literature on extortion may be misplaced. Similarly, in a survey of enterprises in 22 postcommunist countries, Hellman, Jones, and Kaufmann (2000) present evidence of substantial “capture” of the administrative process by firms, as opposed to petty corruption by bureaucrats extracting bribes.

Theoretically, the distinction between the two forms of corruption is that the official

\(^{13}\)This distinction roughly parallels Shleifer and Vishney’s (1993) distinction between “corruption with theft” and “corruption without theft.” In considering an official who must report on technology choice by an entrepreneur, Acemoglu and Verdier (2000) consider the possibility that a corrupt official can misreport a bad technology as good, or a good technology as bad. However, in their model the probability of getting caught being corrupt is related to whether or not the official takes a bribe, not the report that he makes.
must worry about being detected giving the service with a favor, whereas he must worry about being detected not giving the service with extortion. Assume that the costs of hiding provision or nonprovision are quadratic in nature, so that as the service is provided to more individuals it becomes increasingly difficult to avoid detection of misprovision. In particular, let the cost of hiding the fact that the service has been provided illegally be \( k[\sigma + (1 - \sigma)(1 - b)]^2 \), and the cost of covering up nonprovision of a service be \( k[1 - \sigma - (1 - \sigma)(1 - b)]^2 \), where \( k \in [0, 1] \).\(^{14}\) The variable \( k \) is a measure of the difficulty of covering up corrupt behavior, or alternatively, of the punishment if caught being corrupt.\(^{15}\)

Consider first the case where the official is providing a service not allowed by law. The official maximizes bribe revenue net of the cost of hiding the fact that he has provided the service illegally. Since any bribe greater than or equal to one results in no strangers receiving the service, the official chooses the optimum bribe between zero and one according to the following problem:

\[
\max_{b \in [0, 1]} b(1 - \sigma)(1 - b) - k[\sigma + (1 - \sigma)(1 - b)]^2
\]

(3.1)

The solution to this problem is presented in the first proposition.\(^{16}\)

**Proposition 1.** When providing a service not allowed by law, i.e. when granting favors, the
optimal bribe is $b_f^* = \frac{1+2k}{2[1+k(1-\sigma)]}$ if $\sigma \leq \frac{1}{2k}$ and $b_f^* = 1$ otherwise. The number of individuals receiving the service is $S_f = \frac{1+\sigma}{2[1+k(1-\sigma)]}$ if $\sigma \leq \frac{1}{2k}$ and $S_f = \sigma$ otherwise. Thus (for an interior solution), both the optimal bribe and the number of individuals receiving the service are increasing in the size of social networks.

**Proof.** See appendix. ■

The logic behind Proposition 1 is that when an official is providing a service illegally to friends for free and to strangers for a bribe, an increase in the size of social networks “uses up” the supply of permits in the sense that it becomes more expensive for the official to provide the service to strangers. Thus, the larger are social networks, the smaller the quantity of strangers who receive the service, and the higher the bribe paid by those who do.

In other words, social networks have distributional consequences. Social networks are beneficial for those who belong to them, as they constrain opportunistic behavior by corrupt officials, eliminating the need to pay a bribe to receive a desired service. But they are bad for those outside of the circle of friends and acquaintances, as they end up paying more than they would in the absence of the network. As we will see below, this is a general result which carries over to the case of extortion-type corruption.

Thus, larger social networks imply larger numbers of friends receiving the service in question, but a decreasing percentage of strangers who are able to pay the necessary bribe. Which effect dominates? The second half of Proposition 1 states that the first effect does.
Despite the increase in the bribe size, the total number of individuals receiving the service is larger, the larger are social networks. Again, note that it can be shown that this result is independent of the price elasticity of demand for the government service.

If policy is set correctly, so that providing a service illegally is costly from a social-welfare point of view, the impact of having officials connected by obligation to many individuals is unambiguously negative when officials are engaged in favor-type corruption. Larger social networks result in greater provision of a service that should not be provided, and require larger bribes from those who do pay them. Given the ubiquity of social networks used to obtain favors from government officials in postcommunist countries, Proposition 1 provides an explanation for two commonly observed features of postsocialist political economy: the disconnect between official government policy and actual policy implementation, and the large bribes paid by those who must pay them.

Now consider what happens when the official demands bribes from strangers in order to provide a service, such as a passport, to which the stranger is legally entitled. Again, the official will never charge a bribe greater than 1, and so solves the following problem:

$$\max_{b \in [0,1]} b(1 - \sigma)(1 - b) - k[1 - \sigma - (1 - \sigma)(1 - b)]^2$$  \hspace{1cm} (3.2)

The solution to this problem is summarized in Proposition 2. The proof, which is exactly analogous to the proof for Proposition 1, is omitted.
Proposition 2. When providing a service allowed by law, i.e. when practicing extortion, the optimal bribe is
\[ b^*_e = \frac{1}{2[1+k(1-\sigma)]}. \]
The number of individuals receiving the service is
\[ S_e = \frac{(1+\sigma)+2k(1-\sigma)}{2[1+k(1-\sigma)]}. \]Thus, as in the favor case, both the optimal bribe and the number of individuals receiving the service are increasing in the size of social networks.

Proof. Omitted. ■

Just as in the favor case, when the official is practicing extortion, the optimal bribe is increasing in the size of his social network. However, the rationale here is different. In the favor case, the official has an incentive to restrict supply since he should not be providing the service, and that incentive increases in the size of the social network. In contrast, in the extortion case, the official has an incentive to increase supply (i.e. to reduce \( b \)) since he is legally obligated to provide the service. However, that incentive declines in \( \sigma \): with large social networks he is already providing the bulk of the service that should be distributed, so restricting supply a bit is not difficult to hide.

Proposition 2 further states that, as in the favor case, the impact of a larger number of friends receiving the service for free outweighs the effect of a smaller proportion of strangers able to afford the necessary bribe: the number of individuals receiving the service is increasing in the size of the official’s social network. Here, however, the social-welfare implications are more ambiguous. Assuming that policy is set correctly, increasing the number of individuals receiving a service to which they are legally entitled and which they value is welfare-enhancing. But requiring greater bribes from those who must pay them is
welfare-reducing in two respects. First, many strangers who are unable to pay the bribe demanded of them value the service more than do friends who receive the service for free. Second, bribes have a tendency to leak out economies into Swiss bank accounts and Florida real estate, so there may be negative externalities associated with the transfer of cash from the individual to the official.

To determine whether the welfare-enhancing or welfare-reducing effect dominates, define welfare in the extortion case as:

\[ W_e = \sigma \int_0^1 v_i dv_i + (1 - \sigma) \int_{b_e^*}^1 (v_i - b_e^*) dv_i \]  

(3.3)

The first of the two terms in (3.3) is the total willingness to pay of friends, all of whom receive the service for free, while the second term is the total willingness to pay of all strangers able to afford the bribe, less the bribe that they must pay. For simplicity, assume that the negative externalities of transferring cash from the individual to the official completely offset the official’s utility from receiving bribes, and ignore any positive externalities associated with providing the service to either friends or strangers. In other words, this is a metric analogous to consumer surplus in standard welfare analysis.

Proposition 3 states that an increase in the size of the official’s social network is welfare-enhancing, despite the higher bribes that must be paid by those who fall outside of the official’s circle.
**Proposition 3.** When providing a service allowed by law, i.e. when practicing extortion, the total welfare of individuals after bribes is \( W_e = \frac{1}{2} - \frac{3(1-\sigma) + 4k(1-\sigma)^2}{8[1 + k(1-\sigma)]^2} \). Thus, the total welfare of individuals after bribes is increasing in the size of social networks, as increased provision of the service to friends outweighs the impact of higher bribes demanded of strangers.

**Proof.** See appendix.

Taken together, Propositions 1 through 3 shed light on a long-standing debate among scholars of the political economy of transition. Many analysts have suggested that turnover among the political and bureaucratic elite is the *sine qua non* of economic reform. Fish (1998), for example, finds that among transition countries, defeat of the Communist Party in the founding election of the postsocialist era is a powerful determinant of economic reform, regardless of whether or not any successor party to the Communist Party subsequently regains power. With respect to corruption in particular, Shleifer (1997) explains in part the empirical observation that shops in Russia have a greater problem with corruption than shops in Poland by citing the greater propensity of politicians from the previous regime, possessing low human capital, to have kept their jobs in Russia.

This paper suggests an alternative, though related, explanation. Turnover of government officials may indeed be important, but not because those officials have poor human capital. Rather, social networks developed during communism are more likely to be maintained if officials have retained their positions in the postsocialist era. Relationships and reputations...
take time to form, and new relationships are less likely to carry with them accumulated obligations.

Whether maintaining these “lumps of social capital” (Stiglitz 1999, p. 9) is conducive or not to economic reform and government performance depends on the type of corruption involved. If favor-type corruption is prevalent, as the empirical work discussed above suggests, low turnover of officials from the ancien regime can doom the most well-intentioned economic reform, as friends benefit from misapplication of government policy while strangers pay higher bribes. More generally, low turnover of officials under any regime can result in misapplication of government policy.

In contrast, when the services that officials provide are mostly of the legal variety, social networks can keep corruption in check, though at the expense of higher bribes for those without friends in the right places. By restricting opportunistic behavior, social networks result in less extortion-type corruption overall, but greater levels of extortion against those without connections.

Indeed, the potential for some positive as well as negative impact of social networks on corruption suggests that, at least with respect to corruption, the debate on elite and bureaucratic turnover may be misplaced. As the following section demonstrates, traditional anticorruption measures have the beneficial effect of encouraging social networks when they are useful, and discouraging them when they are not.

\footnote{On the role of patience in building reputations, see Fudenberg and Levine (1989).}
3.2. Endogenous Social Networks

We now drop the assumption that all friends and acquaintances are created equal. Rather, we focus on the possibility that the government official will opt to ask some of his friends for a bribe rather than provide the service for free. To capture the heterogeneity of ties, define a new variable $\gamma_i \in [0, 1]$ to be the official’s (discounted future) utility from giving the service for free to individual $i$. Further, define $\Sigma \in [0, 1]$ to be the size of the official’s initial social network. The $(1 - \Sigma)$ individuals who are unknown to the official will have $\gamma_i = 0$, since the official receives no utility from giving away a service to a stranger. Assume, however, that the $\Sigma$ individuals in the official’s social network have friendship distributed uniformly on $[\phi, 1]$. The variable $\phi$ is a measure of the strength of the official’s obligation to individuals in his network, where a high $\phi$ implies that his ties are generally strong, whereas a low $\phi$ indicates that many of his ties are weak. If $\phi$ represents the opportunity cost of foregoing a long-run relationship, then a large $\phi$ might be consistent with ties in a favor-based economy. Conversely, a small $\phi$ would correspond to networks in a market economy, where outside options are readily available.\(^\text{18}\)

The timing of events is as follows: The official first determines which of his friends will receive the service for free, i.e. he chooses a $\sigma \leq \Sigma$. He then chooses an optimal bribe for the remaining $(1 - \sigma)$ of the population.

Focus first on the favor case. In order to obtain a closed-form solution to this two-step

\(^{18}\text{Alternatively, a high } \phi \text{ might capture the nature of social networks in a traditional kin-based society, while a low } \phi \text{ would represent ties in a highly mobile modern society.}
problem, we must simplify the official’s problem defining the optimal bribe, (3.1) above, by assuming linear rather than quadratic costs of corruption:

$$\max_{b \in [0,1]} b(1 - \sigma)(1 - b) - k[\sigma + (1 - \sigma)(1 - b)]$$

(3.4)

While less plausible than assuming increasing marginal costs, this formulation allows us to focus on the endogenous size of social networks, the variable of interest in this section. The solution to (3.4), which is independent of the size of social networks, is $b^*_lf = \frac{1+k}{2}$.

Thus, the official will choose which of the individuals in his initial social network $\Sigma$ will receive the service for free by solving:

$$\max_{\sigma \in [0,\Sigma]} \sum \int_{1-\sigma(1-\phi)}^{1} \frac{1}{1 - \phi} \gamma_i d\gamma_i + b^*_lf(1 - \sigma)(1 - b^*_lf) - k[\sigma + (1 - \sigma)(1 - b^*_lf)]$$

(3.5)

The second term of this expression is merely the bribe revenue from those outside of the official’s endogenous network, while the third term is the cost of giving away and selling services. The first term is the utility the official receives from providing the service for free to his friends. Giving to proportion $\phi/\Sigma$ of his $\Sigma$ friends, who have $\gamma_i$ distributed over $[\phi, 1]$, means that he is providing the service for free to all $\gamma_i$ within the interval $[1 - \frac{\sigma(1-\phi)}{\Sigma}, 1]$. Thus, for example, if he chooses $\sigma = 0$, he is providing the service for free to all $\gamma_i \in [1, 1]$, i.e. to nobody, while if he chooses $\sigma = \Sigma$, he is giving the service to all $\gamma_i \in [\phi, 1]$, i.e. to everyone in his initial network. This is a concave maximization problem, the solution to
which is presented in Proposition 4:

**Proposition 4.** When providing a service not allowed by law, i.e. when granting favors, the optimal endogenous social network size \( \sigma_f^* = \Sigma \cdot \frac{3 - 2k - k^2}{4(1 - \phi)} \) if \((3 - 2k - k^2) \leq 4(1 - \phi)\), and \( \sigma_f^* = \Sigma \) otherwise. Consequently (for an interior solution), increasing the costliness of favor-type corruption reduces the size of social networks.

**Proof.** See appendix. □

The key result in Proposition 4 is that, for an interior solution, the endogenous social network size \( \sigma_f^* \) is decreasing in \( k \). Thus, measures that increase the costliness of corruption, such as improved monitoring of government inventories, more comprehensive audits of bureaucratic decisions, stronger whistle-blowing laws, and larger fines and prison sentences for corrupt officials, will result in the atrophy of social networks when the official is practicing favor-type corruption. The intuition is straightforward: facing greater costs from illegally providing a service, the official will choose to abandon some of his friends to the “market.”

To appreciate the implications of this result, now consider what happens when extortion rather than favors are involved. Again, we modify the official’s problem in the previous section (3.2) by assuming linear costs:

\[
\max_{b \in [0,1]} b(1 - \sigma)(1 - b) - k[1 - \sigma - (1 - \sigma)(1 - b)]
\]  

(3.6)

Plugging the optimum bribe \( b^*_{te} = \frac{1-k}{2} \) into the official’s problem defining the optimum
endogenous social network:

$$\max_{\sigma \in [0, \Sigma]} \Sigma \int_{1 - \frac{\sigma(1 - \phi)}{k}}^{1} \frac{1}{1 - \phi} \gamma_i d\gamma_i + b^*_{ie} (1 - \sigma) (1 - b^*_{ie}) - k[1 - \sigma - (1 - \sigma)(1 - b^*_{ie})]$$

we arrive at Proposition 5, the proof of which is exactly analogous to that of Proposition 4:

Proposition 5. When providing a service allowed by law, i.e. when practicing extortion, the optimal endogenous social network size $\sigma^*_e = \Sigma \cdot \frac{3 + 2k - k^2}{4(1 - \phi)}$ if $(3 + 2k - k^2) \leq 4(1 - \phi)$, and $\sigma^*_e = \Sigma$ otherwise. Consequently (for an interior solution), increasing the costliness of extortion-type corruption increases the size of social networks.

Proof. Omitted.

In contrast to Proposition 4, Proposition 5 says that when extortion is involved, social networks increase in size (or more precisely, remain intact) as corruption becomes more costly. Since anti-corruption measures make withholding legal services more costly, the official will be more inclined to maintain his social networks by offering the service for free to his friends.

These results, while simple, have a significant policy implication. While social networks facilitate corruption in various ways (the following section considers yet another possibility), they do have the effect of restraining corrupt behavior by officials practicing extortion-type
corruption (even while making the effect of that corruption worse for those outside of the networks). Thus, a meat-axe approach to bureaucratic reform that entails the widespread replacement of government officials, and thus the elimination of social networks, is likely to carry sizeable costs as well as benefits. Propositions 4 and 5 suggest that anticorruption efforts might be better focused on improving incentives for existing officeholders. By supporting social networks when they are helpful and undermining them when they are not, traditional anti-corruption measures result in better governance than does bureaucratic replacement.

Finally, observe what Propositions 4 and 5 say about the development of social networks under communism. The dependence on other individuals for help in obtaining goods and shortages in short supply meant that long-run relationships could not be cheaply jettisoned, implying that $\phi$ was high during the socialist period. As Propositions 4 and 5 indicate, social networks are endogenously larger, the higher is $\phi$. Thus, the model in this section provides a theoretical foundation for the empirical observation that connections often substituted for money under communism. The persistence of these networks in the postcommunist era can be attributed to the accumulation of obligations from favors done previously, the fact that the fixed cost of establishing relationships had already been sunk, and the decline in state law-enforcement capacity (represented in our model as a drop in $k$) that accompanied the power vacuum left by the demise of the Communist Party.
4. Connections and Money as Complements

4.1. Basic Model

Among the universe of conceivable economic transactions, it is hard to imagine any more subject to the problems associated with ex post opportunism and incomplete contracting than corruption. For obvious reasons, contracts are never negotiated or signed by the parties to a corrupt transaction. Reputations fail to discipline opportunistic behavior because of the “imperative of secrecy” (Shleifer and Vishney 1993, pp. 611-15). Corrupt officials often maintain a monopoly over provision of a desired service, making impossible the exercise of an outside option by bribing somebody else to provide the service.\(^{19}\)

Social networks help to solve these problems. In particular, by providing information about whom to bribe and by restricting opportunistic behavior, social networks help to overcome a classic ”holdup” problem, whereby individuals refuse to make a “specific investment” (Williamson 1975) in finding a corrupt official to bribe, anticipating that the costs of that search will not be taken into account in any subsequent negotiations over the size of the bribe.

For concreteness, consider an individual who desires a service of value \(v\) which a corrupt official can provide. (In keeping with the literature on incomplete contracting, we begin by considering the case where the official knows the value of the service to the individual.) However, the individual is unaware of the identity of the corrupt individual who could satisfy

\(^{19}\)The host of issues associated with the incomplete contracting literature is surveyed in Tirole (1999).
her demand, as corrupt transactions are kept secret. Thus, for example, there might be a
member of parliament willing to sell his vote on an upcoming tax bill, but for political and
legal reasons he is unable to publicize that fact, and for logistical or informational reasons
is unable to approach the individual directly. If the individual engages in a search for the
corrupt official, she finds him with probability $\theta$. However, with probability $(1 - \theta)$, she
contacts the wrong person, incurring a cost of $f$. Most obviously, the variable $f$ might be
a fine or prison sentence associated with trying to bribe an honest official, but it could also
represent time lost, the embarrassment of having a bribe thrown back in one’s face, etc.

Should the individual find the corrupt official, she will negotiate with him over the ex
post surplus, which is the value $v$ of the service to the individual. (For simplicity, we assume
that there is no cost to the official of providing the service.) Define $\beta$ to be the bargaining
power of the official, so that the individual pays a bribe of $\beta v$. Anticipating this ex post
negotiation, the individual will choose ex ante to engage in the search if:

$$\theta(v - \beta v) - (1 - \theta)f \geq 0$$

i.e. if:

$$v \geq \frac{(1 - \theta)f}{\theta(1 - \beta)} \quad (4.1)$$

Thus, the individual will be less likely to search for a corrupt official to bribe, the less
certain it is her search will be successful, the greater the cost of contacting the wrong official,
and the greater the bargaining power of the official. As in the typical holdup story, the problem is one of commitment. If the official could commit ex ante to charging a bribe that would take into account the individual’s search costs, both he and the individual would be better off. But it is hard to imagine a mechanism that could provide that commitment while simultaneously protecting the official from detection.

In contrast, consider the calculus employed by an individual who employs her social network in pursuit of someone to bribe. While this individual may not know the official directly, she may know someone who knows the official, or who has negotiated the same bureaucracy successfully in the past. Define $q$ to be the cost - in terms of time, obligation to reciprocate in the future, etc. - of identifying this official. The individual will choose to employ her social network in advance of her cause if:

$$ (v - \beta v) - q \geq 0 $$

or:

$$ v \geq \frac{q}{(1 - \beta)} \quad (4.2) $$

While a holdup problem is still possible, even with social networks, comparing (4.1) and (4.2) reveals it will be less likely if $q < \frac{(1-\theta)f}{\theta}$. Thus, social networks will be employed more often in environments where they are relatively inexpensive to use, where the bureaucracy is opaque, and where the costs of an unsuccessful search for someone to bribe are large.
This simple framework helps to elucidate the varying roles of social networks in different situations involving bribery. In many countries, traffic violations are settled on the spot by agreeing to pay half the “fine” directly to the police officer. (Obviously, no receipt is provided.) In contrast, bribes to secure admission to a university, which are unfortunately not unknown in postcommunist countries, are typically negotiated through an intermediary. With a traffic officer, it is clear who can provide the necessary relief; if the police are well known to accept bribes, there is little risk to approaching the officer oneself. In contrast, university bureaucracies are large and complex. The person who can arrange for one’s son to receive a good score on his admissions exam may not be the same as the one who actually administers the test.

Equations (4.1) and (4.2) also suggest that social networks may fill a role beyond providing information. Social networks may ease the holdup problem if the official exploits his bargaining power less when approached by or through an acquaintance, and if that forbearance is anticipated ex ante. Indeed, as the following section demonstrates, the role of social networks in implying obligation to not act opportunistically may be more important than their informational function in preventing the holdup problem when individuals’ willingness to pay for a service varies and is unknown to a corrupt official. Our observations about the role of social networks when the individual’s willingness to pay is known are summarized in the following proposition:

**Proposition 6.** When the official is unable to commit ex ante to a particular bribe, and is
providing a service of known value, individuals will search for a corrupt official to bribe if 
$v \geq \frac{(1-\theta)f}{\theta(1-\beta)}$, while connected individuals will use their connections if 
v \geq \frac{q}{(1-\beta)}$. Consequently, the holdup problem is more likely to be solved if the cost of using connections is low relative to the risk of punishment from contacting the wrong official, and if officials exploit their bargaining power less when dealing with friends and acquaintances than when dealing with strangers.

Proof. Omitted. ■

4.2. Asymmetric Information

We now part with the assumption in Proposition 6 that the official can observe an individual’s willingness to pay. As in Section 3, consider a population of individuals of unit mass, with willingness to pay for the service $v_i$ unknown to the official and distributed uniformly over [0, 1]. Proportion $\sigma$ of these individuals are friends (or friends of friends, etc.) of the official, while proportion $(1 - \sigma)$ are strangers. As in the case where willingness to pay is known, friends incur a cost of $q$ in finding the corrupt official, while strangers bear a cost of $\frac{(1-\theta)f}{\theta}$. Both $q$ and $\frac{(1-\theta)f}{\theta}$ are greater than zero, so there is some cost that both friends and strangers must incur before they can bribe the official, and $q < \frac{(1-\theta)f}{\theta}$, so it is cheaper for friends to use their connections than to search on their own.

As in Proposition 6, assume no cost to the official of providing the government service, and assume that the official knows whether or not an individual has approached him through
a connection. Since the only characteristic the official can observe of those who find him is whether they are friends or not, he chooses one bribe for friends and one for strangers.

How many individuals will search for the corrupt official if social networks provide useful information, i.e. assure that \( q < \frac{(1-\theta)f}{g} \), but imply no obligation to not act opportunistically? Proposition 7 establishes that no equilibrium exists such that any individuals, within or without the official’s social network, will choose to search.

**Proposition 7.** When the official is unable to commit ex ante to a particular bribe, and is providing a service of unknown and heterogeneous value, no perfect Bayesian equilibrium exists such that a positive quantity of individuals will incur any cost finding a corrupt official to bribe.

**Proof.** See appendix. ■

This is a surprising result. After all, the fact that the official charges the same bribe to all individuals for informational reasons must mean that some of those individuals will anticipate an ex post surplus large enough to justify the costs of a search. To see why this is not an equilibrium, consider the following example. If the official believes that all friends with \( v_i \geq \frac{1}{2} \) have incurred the cost \( q \) of using their networks to find him, he will choose the \( b \) between \( \frac{1}{2} \) and 1 that solves:

\[
\max b \sigma (1 - b)
\]

The solution to this problem is \( b^* = \frac{1}{2} \). Anticipating this, all friends with \( v_i \geq \frac{1}{2} + q \) will
choose to use their connections. But then the official’s beliefs that friends with \( v_i \geq \frac{1}{2} \) will employ their social networks must be incorrect. Since this argument holds for any beliefs the official might have, there is no equilibrium involving corruption.

Thus, when we introduce asymmetric information into the model, the informational advantage provided by social networks is no longer sufficient to overcome the temptation of the official to act as a monopolist ex post. However, the other characteristic of social networks - the obligation to not treat friends opportunistically - can still prevent the holdup problem. Consider again the case where the official believes that all friends with \( v_i \geq \frac{1}{2} \) have contacted him. This belief can be correct if all friends believe that the official will “reimburse” them the cost \( q \) of finding him. Note that this is a knife-edge result: if either less or more than \( q \) is provided, then again we have no equilibrium. But of all the possible undercharges that an official might provide to someone in his social network, two seem most plausible: charging nothing at all, as in Section 3, and deducting any up-front costs associated with getting to the official.

The following proposition formalizes and generalizes this idea:

**Proposition 8.** When the official is unable to commit ex ante to a particular bribe, but is constrained by his social relationships to charge friends and acquaintances \( \rho \) less than he would if he were profit maximizing, and is providing a service of unknown and heterogeneous value, a perfect Bayesian equilibrium exists with all friends with \( v_i \geq v \) using their connections if \( \rho = \max(\frac{1}{2}, v) + q - v \).
Proof. See appendix. ■

In essence, an obligation to not act opportunistically substitutes for the credible commitment that in more routine economic transactions would be provided by contracts and public reputations.

5. Conclusion

Social networks, by implying obligation to not act opportunistically and by providing information, encourage illegal services to be provided to friends, though they discourage the withholding of legal services. They result in higher bribes for those outside of the network. They facilitate corrupt transactions by solving a holdup problem that would otherwise keep individuals from searching for corrupt officials to bribe. In playing these roles, social networks help to explain the nature and extent of corruption in various parts of the world, including Eastern Europe and the former Soviet Union, where networks of the type discussed in this paper are an institutional legacy of socialism.

One might ask why, if social networks are so ubiquitous in the former East, they have not done more to promote collective action among the general population. Protests and demonstrations in the postrevolutionary transition period have been notable only by their absence. One possible answer is that networks embody more specific than general human capital (Becker 1964). Long practice has granted those in the former East with great capacity to use friends and acquaintances to acquire goods and services in short supply. There has
been much less experience working with others in Rotary Clubs, churches, and Community Concert committees, and consequently less development of the civic skills which promote democratic association (Verba, Schlozman, and Brady 1995, ch. 11).

Nonetheless, to say that social networks do not automatically produce political association is not the same as saying that they have no political consequences. The distributional effect of social networks, as we have seen, is to improve the lot of those with connections at the expense of those who do not. When distributional consequences are involved, politics is usually not far behind. Indeed, to a scholar of political economy, the idea that firms might fight over government appointments so that they do not have to pay the bribes that their competitors do sounds eminently plausible, as does the corollary that political leaders might expect something in return for the appointment. Patronage networks and social networks might be two sides of the same coin.
6. Appendix

6.1. Proof of Proposition 1

By inspection, (3.1) is a concave maximization problem, so the first-order condition will be sufficient for a solution so long as we have an interior solution. The first-order condition is

\[(1 - 2b^*_f)(1 - \sigma) + 2k[\sigma + (1 - \sigma)(1 - b^*_f)](1 - \sigma) = 0,\]

where \(b^*_f\) is the optimal bribe when the official is granting favors. Simplifying gives us:

\[b^*_f = \frac{1 + 2k}{2[1 + k(1 - \sigma)]}\]

which is less than or equal to one for \(\sigma \leq \frac{1}{2k}\). For \(\sigma > \frac{1}{2k}\), we have a corner solution with \(b^*_f = 1\).

The number of individuals receiving the service is \(S_f = \sigma + (1 - \sigma)(1 - b^*_f)\). Plugging in and simplifying gives us \(S_f = \frac{1 + \sigma}{2[1 + k(1 - \sigma)]}\) if \(\sigma \leq \frac{1}{2k}\) and \(S_f = \sigma\) otherwise.

By inspection, both \(b^*_f\) and \(S_f\) are increasing in \(\sigma\) so long as we are at an interior solution. ■
6.2. Proof of Proposition 3

Plugging \( b^* = \frac{1}{2[1+k(1-\sigma)]} \) into (3.3) gives us:

\[
W_e = \sigma \int_0^1 v_i dv_i + (1 - \sigma) \int_0^1 \left( v_i - \frac{1}{2[1+k(1-\sigma)]} \right) dv_i
\]

\[
= \sigma \left( \frac{v_i^2}{2} \right)_0^1 + (1 - \sigma) \left( \frac{v_i^2}{2} \right)_0^1 \left( \frac{1}{2[1+k(1-\sigma)]} \right) - \left( \frac{1}{2[1+k(1-\sigma)]} \right) [v_i]_0^1 \left( \frac{1}{2[1+k(1-\sigma)]} \right)
\]

\[
= \frac{\sigma}{2} + (1 - \sigma) \left( \frac{1}{2} - \frac{1}{8[1+k(1-\sigma)]^2} \right) - \left( \frac{1}{2[1+k(1-\sigma)]} \right)^2 + \left( \frac{1}{2[1+k(1-\sigma)]} \right)^3
\]

\[
= \frac{1}{2} - \frac{1 - \sigma}{2} \left( \frac{1}{8[1+k(1-\sigma)]^2} \right) - \frac{4(1-\sigma)[1+k(1-\sigma)]}{8[1+k(1-\sigma)]^2} + \frac{2(1-\sigma)}{8[1+k(1-\sigma)]^2}
\]

\[
= \frac{1}{2} \left[ \frac{3(1-\sigma) + 4k(1-\sigma)^2}{8[1+k(1-\sigma)]^2} \right]
\]

To see that the total welfare of individuals after bribes is increasing in the size of social networks, observe that:

\[
\frac{\partial W_e}{\partial \sigma} = \frac{3 + 8k(1 - \sigma)}{8[1+k(1-\sigma)]^2} - \frac{[3(1 - \sigma) + 4k(1-\sigma)^2]((k)}{4[1+k(1-\sigma)]^3}
\]

\[
= \frac{[3 + 8k(1-\sigma)][1+k(1-\sigma)]}{8[1+k(1-\sigma)]^3} - \frac{[3k(1 - \sigma) + 4k^2(1-\sigma)^2]((2)}}{8[1+k(1-\sigma)]^3}
\]

\[
= \frac{3 + 5k(1 - \sigma)}{8[1+k(1-\sigma)]^3} > 0
\]

\[\blacksquare\]
6.3. Proof of Proposition 4

Substituting $b^*_f = \frac{1+k}{2}$ into (3.5) gives us:

$$\max_{\sigma \in [0, \Sigma]} \int_1^{1-\frac{\sigma(1-\phi)}{N}} \frac{1}{1-\phi} \gamma_i d\gamma_i + \left( \frac{1+k}{2} \right)(1-\sigma)\left( \frac{1-k}{2} \right) - k[\sigma + (1-\sigma)\left( \frac{1-k}{2} \right)]$$

Solving out the integral produces:

$$\max_{\sigma \in [0, \Sigma]} \sigma - \left( \frac{1-\phi}{2\Sigma} \right)\sigma^2 + \left( \frac{1+k}{2} \right)(1-\sigma)\left( \frac{1-k}{2} \right) - k[\sigma + (1-\sigma)\left( \frac{1-k}{2} \right)]$$

By inspection, this is a concave maximization problem. The first-order condition is:

$$1 - \frac{(1-\phi)}{\Sigma} \sigma^*_f - \frac{(1+k)(1-k)}{4} - k + \frac{k(1-k)}{2} = 0$$

where $\sigma^*_f$ is the optimal endogenous social network. Simplifying gives us:

$$\sigma^*_f = \Sigma \cdot \frac{3-2k-k^2}{4(1-\phi)}$$

which is less than or equal to $\Sigma$ if $(3-2k-k^2) \leq 4(1-\phi)$. (Recall that $k \in [0, 1]$, so it cannot be the case that $(3-2k-k^2) > 0$.) Otherwise, we have a corner solution with $\sigma^*_f = \Sigma$.

By inspection, $\frac{\partial \sigma^*_f}{\partial k} < 0$, so long as we are at an interior solution.
6.4. Proof of Proposition 7

Note that a perfect Bayesian equilibrium with a positive quantity of individuals choosing to search requires that a) the official have correct beliefs about which types choose to search (the official’s information set will be on the equilibrium path so long as some types choose to search, so we need not consider equilibrium refinements), and b) the players’ strategies be sequentially rational.

Observe that we can treat the two groups separately, since once they reach the official there is no opportunity for friends to misrepresent themselves as strangers, and vice versa. For simplicity, in what follows we focus on friends. The proof for strangers is exactly analogous.

In particular, we will show that for any \( v \in [0, 1) \), no perfect Bayesian equilibrium exists such that all \( v_i \geq v \) will choose to search for a corrupt official to bribe. Note that we can restrict our attention to cases where all \( v_i \) above a certain level search, and all \( v_i \) below do not, since if it is optimal for \( v_m \) to search, it will be optimal for any \( v_n > v_m \).

Thus, in a perfect Bayesian equilibrium, the official will have beliefs that he is facing types uniformly distributed over \([v, 1]\). Since he will never charge less than \( v \), knowing that he can get at least \( v \), upon observing that some have utilized their connections to find him, he will solve:

\[
\max_{b \in [v, 1]} b\sigma(1 - b)
\]
where $\sigma$ is the proportion of the population connected to the official through social networks. The solution to this problem is:

$$b^* = \max\left(\frac{1}{2}, v\right)$$

Analyze first the case where $v \leq \frac{1}{2}$, so that $b^* = \frac{1}{2}$. Anticipating this bribe, those individuals who choose to search will have $v_i$ such that:

$$(v_i - \frac{1}{2}) - q \geq 0$$

$$\iff v_i \geq \frac{1}{2} + q$$

i.e. $v = \frac{1}{2} + q$. But this is a contradiction, so this cannot be a perfect Bayesian equilibrium.

Now examine the case where $v > \frac{1}{2}$, so that $b^* = v$. Anticipating this, those individuals who choose to search will have $v_i$ such that:

$$(v_i - v) - q \geq 0$$

$$\iff v_i \geq v + q$$
i.e. $v = v + q$. But this is clearly a contradiction for any $q > 0$. So there exists no perfect Bayesian equilibrium in which a positive quantity of types search for a corrupt official to bribe. ■

7. Proof of Proposition 8

As in Proposition 7, we can restrict our attention to perfect Bayesian equilibria in which all connected individuals with $v_i \geq v$ choose to utilize their contacts. (Since by assumption there is no opportunity for friends to misrepresent themselves as strangers, or vice versa, we can treat the two groups separately. Unconnected individuals will continue to face the same problem as in Proposition 7.)

In a perfect Bayesian equilibrium, beliefs on the equilibrium path are correct, so the official will believe he is facing types uniformly distributed over $[v, 1]$. Normally, he would never want to charge less than $v$, knowing that he could get at least $v$, but he is constrained to charge $\rho$ less to individuals to whom he is connected than he otherwise would. Thus, when facing those individuals who have come to him through a contact, he chooses a bribe $b^*_c$ such that:

$$b^*_c = \arg\max_{b \in [v, 1]} b\sigma(1 - b) - \rho$$

where $\sigma$ is the proportion of the population connected to the official through social
networks. The solution to this problem is:

\[ b_c^* = \max \left( \frac{1}{2}, v \right) - \rho = b^* - \rho \]

Analyze first the case where \( v \leq \frac{1}{2} \). Connected individuals will anticipate that \( b_c^* = (\frac{1}{2} - \rho) \), and will choose to utilize their contacts if they have \( v_i \) such that:

\[ v_i - (\frac{1}{2} - \rho) - q \geq 0 \]

i.e. \( v = (\frac{1}{2} - \rho) + q \). Consequently, a perfect Bayesian equilibrium will exist with all connected individuals with \( v_i \geq v \) utilizing their contacts so long as:

\[ \rho = \frac{1}{2} + q - v \]

On the other hand, if \( v > \frac{1}{2} \), so that \( b_c^* = (v - \rho) \), connected individuals will utilize their contacts to find a corrupt official if:

\[ v_i - (v - \rho) - q \geq 0 \]  \( (7.1) \)

i.e. \( v = (v - \rho) + q \). Consequently, a perfect Bayesian equilibrium will exist with all
connected individuals with \( v_i \geq y \) using their contacts if:

\[
\rho = q \quad (7.2)
\]

Combining (7.1) and (7.2), we can state that there exists a perfect Bayesian equilibrium with all connected types \( v_i \geq y \) utilizing their contacts so long as:

\[
\rho = \max \left( \frac{1}{2}, y \right) + q - y
\]
References


Table 1: Use of Bribery and Connections to Influence Officials in Soviet Union, by Educational Level

<table>
<thead>
<tr>
<th></th>
<th>Bribery</th>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoid service in Afghanistan</td>
<td>2.2</td>
<td>6.7</td>
</tr>
<tr>
<td>Primary or less</td>
<td>3.7</td>
<td>8.2</td>
</tr>
<tr>
<td>Secondary</td>
<td>2.2</td>
<td>14.9</td>
</tr>
<tr>
<td>At least some college</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avoid work in remote area</td>
<td>22.5</td>
<td>18.5</td>
</tr>
<tr>
<td>Primary or less</td>
<td>22.1</td>
<td>37.7</td>
</tr>
<tr>
<td>Secondary</td>
<td>16.7</td>
<td>43.9</td>
</tr>
<tr>
<td>At least some college</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secure college admissions</td>
<td>34.8</td>
<td>15.7</td>
</tr>
<tr>
<td>Primary or less</td>
<td>32.2</td>
<td>33.6</td>
</tr>
<tr>
<td>Secondary</td>
<td>25.3</td>
<td>37.6</td>
</tr>
<tr>
<td>At least some college</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Get better apartment</td>
<td>19.7</td>
<td>9.6</td>
</tr>
<tr>
<td>Primary or less</td>
<td>18.5</td>
<td>11.6</td>
</tr>
<tr>
<td>Secondary</td>
<td>18.0</td>
<td>17.6</td>
</tr>
<tr>
<td>At least some college</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Percent suggesting use of bribery or connections to deal with problem involving Soviet officials, by highest educational level achieved. Adapted from DiFranceisco and Gitelman (1984), Table 8. N=1161.
Table 2: Payment for Goods in Short Supply in USSR

<table>
<thead>
<tr>
<th></th>
<th>Northern USSR</th>
<th>Southern USSR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without tips</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monetary side payments</td>
<td>36.29</td>
<td>21.12</td>
</tr>
<tr>
<td>Money value of connections</td>
<td>75.23</td>
<td>78.06</td>
</tr>
<tr>
<td>With tips</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monetary side payments</td>
<td>93.21</td>
<td>96.56</td>
</tr>
<tr>
<td>Money value of connections</td>
<td>75.23</td>
<td>78.06</td>
</tr>
<tr>
<td>N</td>
<td>1609</td>
<td>1048</td>
</tr>
</tbody>
</table>

“Money value of connections” is the amount of money saved through the use of connections. Tips added to monetary side payments in bottom set of results. Payments and savings are in 1977 rubles. Adapted from Sedik 1989, Tables 1.1 and 1.2.
Table 3: Bribe Payment by Startups Headed by Former and Non-Former State Enterprise Managers

<table>
<thead>
<tr>
<th></th>
<th>% former SEM saying pay bribes</th>
<th>% non-former SEM saying pay bribes</th>
<th>N former SEM</th>
<th>N non-former SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>14</td>
<td>22</td>
<td>58</td>
<td>176</td>
</tr>
<tr>
<td>Slovakia</td>
<td>31</td>
<td>49</td>
<td>39</td>
<td>195</td>
</tr>
<tr>
<td>Romania</td>
<td>12</td>
<td>20</td>
<td>68</td>
<td>209</td>
</tr>
<tr>
<td>Ukraine</td>
<td>80</td>
<td>93</td>
<td>15</td>
<td>41</td>
</tr>
<tr>
<td>Russia</td>
<td>63</td>
<td>96</td>
<td>8</td>
<td>23</td>
</tr>
</tbody>
</table>

Percent answering that firms in their sector pay bribes. Sample restricted to those answering question. Author’s calculations.

Table 4: Bribe Payment (Including Refusal to Answer) by Startups Headed by Former and Non-Former State Enterprise Managers

<table>
<thead>
<tr>
<th></th>
<th>% former SEM saying pay bribes or refusing to say</th>
<th>% non-former SEM saying pay bribes or refusing to say</th>
<th>N former SEM</th>
<th>N non-former SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>14</td>
<td>23</td>
<td>58</td>
<td>179</td>
</tr>
<tr>
<td>Slovakia</td>
<td>31</td>
<td>50</td>
<td>39</td>
<td>199</td>
</tr>
<tr>
<td>Romania</td>
<td>12</td>
<td>22</td>
<td>68</td>
<td>213</td>
</tr>
<tr>
<td>Ukraine</td>
<td>94</td>
<td>97</td>
<td>49</td>
<td>97</td>
</tr>
<tr>
<td>Russia</td>
<td>86</td>
<td>99</td>
<td>22</td>
<td>65</td>
</tr>
</tbody>
</table>

Sample expanded to include those refusing to answer, with those answering that firms in their sector pay bribes grouped together with those refusing to answer. Author’s calculations.
Figure 1: Bribes as Percentage of Revenues by Firm Type

Adapted from EBRD (1999), chart 6.11.
Table 5: Use of Contacts and Bribes in Post-Communist Eastern Europe and Ukraine

<table>
<thead>
<tr>
<th>Suppose a person asks an official for something to which he/she is entitled by law. To get a successful outcome, it is likely that he/she would:</th>
<th>Czech Republic</th>
<th>Slovakia</th>
<th>Bulgaria</th>
<th>Ukraine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach official through contact</td>
<td>76</td>
<td>87</td>
<td>86</td>
<td>90</td>
</tr>
<tr>
<td>Offer a small present</td>
<td>62</td>
<td>80</td>
<td>84</td>
<td>91</td>
</tr>
<tr>
<td>Offer money or an expensive present</td>
<td>44</td>
<td>62</td>
<td>72</td>
<td>81</td>
</tr>
<tr>
<td>N</td>
<td>1003</td>
<td>1056</td>
<td>1519</td>
<td>1200</td>
</tr>
</tbody>
</table>

Percent reporting yes. Adapted from Miller *et al* 1998, Table 5.

Table 6: Increase After Communism in Use of Contacts and Bribes in Eastern Europe and Ukraine

<table>
<thead>
<tr>
<th>Compared to the period under communism, do you think it is now more likely that people in your country would:</th>
<th>Czech Republic</th>
<th>Slovakia</th>
<th>Bulgaria</th>
<th>Ukraine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach official through contact</td>
<td>77</td>
<td>87</td>
<td>79</td>
<td>88</td>
</tr>
<tr>
<td>Offer a small present</td>
<td>64</td>
<td>83</td>
<td>82</td>
<td>88</td>
</tr>
<tr>
<td>Offer money or an expensive present</td>
<td>50</td>
<td>69</td>
<td>76</td>
<td>80</td>
</tr>
<tr>
<td>N</td>
<td>1003</td>
<td>1056</td>
<td>1519</td>
<td>1200</td>
</tr>
</tbody>
</table>

Percent reporting yes. Adapted from Miller *et al* 1998, Table 7.