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Corruption and Entrepreneurship: How Formal and Informal Institutions Shape Small Firm Behavior in Transition and Mature Market Economies

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This article explores the determinants of corruption in transition economies of the post-Soviet Union, Central-Eastern Europe, and Western industrialized states. We look in-depth at the East–West gap in corruption, and why entrepreneurs and small business owners become engaged in corrupt deals. Part of the answers lie in the country-specific formal and informal institutional make-up. The likelihood of engaging in corruption is influenced by the lower efficiency of financial and legal institutions and the lack of their enforcements. Also, viewing illegal business activities as a widespread business practice provides the rationale for entrepreneurs to justify their own corrupt activities. Moreover, closed social networks with family, friends, and national bureaucrats reduce the opportunism of the contracting party of the corrupt deal, thus providing breeding grounds for corruption.

Introduction

Transition economies' environments can be characterized as corrupt (Hellman, Jones, Kaufman, & Shankerman, 2000; Radaev, 2004; Rose, 2000). Particularly, corruption rates in most post-Soviet countries are among the highest in the world, and they continue to rise (Bjornskov & Paldam, 2002; Transparency International, 2008). Although there have been increases of corruption in advanced Western economies, there still exists a tremendous gap in corruption levels between East and West (Bjornskov & Paldam; Treisman, 2000;

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Uslaner & Badescu, 2004). However, surprisingly little is known about why corruption levels are significantly higher in transition economies than those in mature market economies. Against this background, this study sets out to fill this gap, that is, to explain the factors that are responsible for higher corruption levels in transition economies as compared with those in industrialized welfare states in Western Europe and North America. Our research makes several important contributions to the literature.

First, our study draws on the new institutional economics (Denzau & North, 1994; North, 1990, 1997, 2005; Williamson, 1975), a theoretical approach that has only been picked up recently in corruption research (Lambsdorff, 2002b, 2006). While previous work has mostly investigated the influence of formal institutional constraints on corruption, we consider the impact of both *formal institutions* and *informal institutions* on businesspeople's decisions to become involved in corruption.

Second, prior studies have mostly focused on public officers as bribe takers, trying to answer the question "why do officials in some countries misuse public office for private gain more frequently and for larger payoffs than officials in others?" (Lambsdorff, 2006; Treisman, 2000, p. 402). Yet, corruption involves both the bribe-payers and bribe-takers (Bardhan, 2003, 2006). Subsequently, a thorough investigation of corruption requires the analysis of the determinants of corrupt behavior of *entrepreneurs as bribe-payers*.

Third, while most prior work of the causes of corruption has been done on the macro level, our study puts emphasis on examining *micro-level determinants* of the business actor's decision to corrupt. That is, we employ an "economic microscope" (Birch, 1979, p. 24) approach, which helps to understand how actors behave at the micro level and, why exactly they become engaged in corruption. Additionally, we control for macro level antecedents of corruption. Using a large dataset with 2,576 entrepreneurs and small business owners in 20 transition and mature market economies, we employ hierarchical linear models, Heckman correction, and multiple imputation of missing values to test our hypotheses.

The rest of the article is structured as follows. First, we elaborate on the theoretical arguments and develop testable hypotheses. Then, we provide a description of the data source, variables, methods, and findings. Finally, we conclude with a discussion and implications for policy makers and firms.

Theoretical Background and Hypotheses

Economic activities cannot be analyzed without consideration of the formal and informal institutional context in which they occur (Baumol, 1990; Denzau & North, 1994; North, 1990, 1997, 2005; Williamson, 1975). Institutional frameworks interact with both individuals and organizations (March & Olsen, 1989; North; Powell & DiMaggio, 1991). Institutions influence the individual's decision making by signaling which choice is acceptable and determining which norms and behaviors are socialized into a given society (Ahlstrom & Bruton, 2002; Bruton, Fried, & Manigart, 2005; Peng & Heath, 1996, p. 500). Institutions thus have an impact on the cognitive and ethical considerations that shape human judgment and behavior (North; Scott, 1995), and they affect organizational behavior by constraining and defining which actions are acceptable and supportable both within and between organizations (Aldrich & Fiol, 1994). They provide "the rules of the game" under which individuals and organizations act and compete. They are a means of reducing uncertainty and transaction costs for economic transactions (Davis & North, 1971).

Formal institutions are those written or formally accepted rules and regulations which have been implemented to make up the economic and legal set-up of a given country. *Informal institutions* are traditions, customs, societal norms, "shared mental models," unwritten codes of conduct, ideologies, and templates (Baumol, 1990; Denzau & North, 1994; North, 1990) that "have never been consciously designed" but are still "in everyone's interest to keep" (Sugden, 1986, p. 54). Informal institutions can be viewed as "the old ethos, the hand of the past or the carriers of history" (Pejovich, 1999, p. 166) that are passed on from one generation to another through various transmission mechanisms such as imitation, oral tradition, and teaching.

The recent analysis of firm behavior in transition economies increasingly takes into account the nature of the institutional framework (Ahlstrom & Bruton, 2002, 2006; Ahlstrom, Bruton, & Lui, 2000; Bruton et al., 2005; Ledeneva, 1998; Smallbone & Welter, 2001). However, there are not many investigations done on the inter-relatedness between formal and informal institutions and the entrepreneur's likelihood of engaging in corruption. Rather, it has been shown that macro-level institutional constraints such as market entry barriers, export and import barriers, market competition regulations, trade and investment policies are positively related with corruption (see Ades & Di Tella, 1997, 1999; Broadman & Recanatini, 1999, 2002; Gatti, 1999; Gerring & Thacker, 2005). Our study contributes to this recent avenue of institutional research of corruption, by examining the relationship between the entrepreneur's decision to corrupt and economic and legal institutional restrictions of his or her environment. We argue that poor enforcement and lower efficiency of economic institutions (such as regulations of the entrepreneur's access to capital) and legal institutions (e.g., contract and property rights) foster the entrepreneur's likelihood of engaging in corruption.

However, prior research has not rigorously studied the impact of informal institutions on corruption (Husted, 1999; Jain, 2001; Lambsdorff, 2002b, 2006; Rose-Ackerman, 1999). To fill this gap, this study further sets out to investigate the link between informal institutions and the entrepreneur's decision to bribe. Paying attention to informal rules is important because of the impact they can have on formal institutional outcomes (Helmke & Levitsky, 2003; Kiwit & Voigt, 1995; North, 1990). If formal institutions produce similar outcomes in the presence or absence of a particular informal institution, then there is little need to study informal institutions. But, if the presence of an informal institution in a particular formal institutional context produces an outcome that is distinct from the outcome generated in its absence, then incorporating informal institutions is strengthened (Helmke & Levitsky).

Recent work argues that informal institutions interact with formal institutions in two ways, namely either complementing or substituting the latter (Helmke & Levitsky, 2003; Kiwit & Voigt, 1995; North, 1990). Informal institutions are complementary, if they create and strengthen incentives to comply with the formal rules that might otherwise exist only on paper (Helmke & Levitsky), thus providing solutions to the problems of the social interaction and coordination, and enhancing the efficiency of formal institutions (Axelrod, 1986; Baumol, 1990; March & Olsen, 1989; North). In contrast, substitutive informal institutions structure individual incentives in the way that they are incompatible with formal ones. Substitutive informal institutions exist in environments where formal institutions are either not routinely enforced, and state structures are weak and lack authority (Helmke & Levitsky; North; Radaev, 2004). For instance, in the post-Soviet Russia, managers draw on an extensive network of connections and relationships that are governed by informal norms of reciprocity ("You help me, I help you") (Ledeneva, 1998, p. 185) to find a way around formal procedures, such as arranging privileged conditions for loans, postponing payments, jumping of the queues, speeding up bank operations, or

settling business disputes (Guseva, 2007; Radaev). Similarly, networks with bureaucrats and firms largely substitute formal rules and regulations in China for obtaining plan-allocated goods and resources and channeling market information (Ahlstrom & Bruton, 2002, 2006; Xin & Pearce, 1996). They also help private firms to protect from lacking property rights, contract laws, and arbitrary enforcement of business regulations (Ahlstrom & Bruton; Ahlstrom et al., 2000; Bruton et al., 2005).

However, no clear-cut empirical evidence exists on how informal institutions and their interaction with the existing formal institutions might be relevant for the business actor's decision to become involved in corruption. We argue that countries where actors draw disproportionately on "closed business networks" with kinship, friendship, and national bureaucrats to compensate for the shortage of formal institutions are breeding grounds for corruption, as they provide the proper environment for sealing and honoring corrupt deals (Husted, 1994, p. 20; Lambsdorff, 2002b; Rose-Ackerman, 1999, p. 92). Moreover, we suggest that culturally bounded social norms governed by the principle "the ends justifying the means" (Lefebvre, 2001) are nurturing grounds for corruption.

Formal Institutions

Economic Environment. Empirical evidence suggests that economic institutions in transition economies impose highly bureaucratic burdens on entrepreneurial firms, increasing uncertainty as well as operational and transactions costs of firms (Aidis & Adachi, 2007, pp. 395–396; Aidis, Estrin, & Mickiewicz, 2008; Berkowitz & Holland, 2001; Djankov, La Porta, Lopez de Silanes, & Shleifer, 2002; McMillan & Woodruff, 2002, p. 155). To exemplify, Russia's ranking for overall "easiness of doing business" is 106th out of 178 countries in 2008 (World Bank, 2008, p. 6). More specifically, regulatory burden and dealing with licenses constitute a quite strong impediment in most countries of the former Soviet block (World Bank, p. 33; Aidis & Adachi, p. 395; Hellman et al., 2000; Parker, 2007, p. 712). Businesspeople in transition economies are also confronted with incoherent and ever-changing business regulations (Aidis & Adachi; Aidis et al.). For instance, firms in the post-Soviet Union are often unable to calculate their present tax bills due to changing tax codes, thus having to bear high transaction costs when negotiating with officials from various governmental departments (Hellman et al.; Radaev, 2004).

Moreover, in transition economies, credits with favorable conditions are usually provided to large firms. As a rule, banks lack the willingness to finance the small business sector with small interest rates due to the problem of the collateral as well as liquidity constraints (which often result from insufficient equity capital provision and repayment delays) entrepreneurs and small- and medium-sized enterprises face (Hellman et al., 2000; McMillan & Woodruff, 2002; Smallbone & Welter, 2001; Soto, 2002; World Bank, 2008, p. 32). Getting a credit in Russia (Aidis & Adachi, 2007, p. 396) and most transition economies of the post-Soviet Union remains a quite strong constraint (World Bank, pp. 30–33). As a consequence, small firms often either have to resort to the informal credit market (e.g., to borrow money for their investments from family and friends), or they have to bribe bureaucrats in financial institutions to secure the access to capital (Guseva, 2007).

In short, entrepreneurs in transition economies look for opportunities whereby they can circumvent the unnecessary bureaucracy and unfriendly financial institutions to "get things done" (Hellman et al., 2000). By engaging in illegal deals to satisfy key decision makers, they anticipate better outcomes (higher benefits, lower transaction costs). These arguments suggest the first hypothesis:

Hypothesis 1a: Bureaucratic red tape, i.e., excessive time spent for interpreting regulations for business, will increase an entrepreneur's likelihood of becoming involved in corruption.

Hypothesis 1b: Less business-friendly financial institutions will increase an entrepreneur's likelihood of becoming involved in corruption.

Legal Environment. A stable legal framework and well-protected property rights promote planning, resource acquisition, and coordination, preventing *ad hoc* expropriation of the fruits of entrepreneurship (Baumol, 1990; Henrekson, 2007, p. 736, Parker, 2007, pp. 711–714, Shane, 2003, p. 222). However, since the break-up of the Soviet Union, entrepreneurs in most transition countries have witnessed the incapability of the courts and the police in enforcing property rights and legal decisions as well as efficiently resolving business disputes (Aidis & Adachi, 2007; Radaev, 2004; Volkov, 1999). Although governments in the former Soviet Union countries have adopted written legal frameworks similar to those of the more developed economies (United States or Western Europe), e.g., laws which relate to property, bankruptcy, contracts, commercial activities, and taxes, but they have proven inefficient in implementing them (Aidis et al., 2008; Feige, 1997, p. 26; Smallbone & Welter, 2001; Volkov).

In a survey among Russian entrepreneurs, it turned out that only few of the surveyed businesspeople would address the *arbitration court* to settle a business dispute officially. Rather, the majority of businesspeople would try to negotiate through informal means (Radaev, 2004, pp. 95–96). Among the reasons why entrepreneurs in Russia do not resort to the courts for resolving their business disputes is that the court is believed to be a corrupt institution that is widely used as an instrument of unfair competition to oust rivals. Moreover, courts are time consuming and costly. It may, e.g., cost a considerable percentage of the disputed sum to the business owner, which might be particularly expensive for entrepreneurs and small firms. Furthermore, there is no guarantee that the losses will be covered, and the courts' decisions will be enforced, even if one wins the courts' suit. Research suggests that in such environments, entrepreneurs usually invoke informal networks to compensate for failure of legal institutions by cajoling public officials, lawyers, and the police, using connections to "bend" rules, or paying bribes that break rules (Aidis & Adachi, 2007, p. 403; Radaev; Rose, 2000, p. 147).

Moreover, the performance of a criminal act depends on the anticipated costs of sanctioning, i.e., the expected value of the negative outcome (costs) and the probability of being caught, prosecuted, and sentenced (Becker, 1968). Entrepreneurs thus take into consideration the anticipated costs of the sanctioning and build that into their pricing when planning a corrupt deal. In environments characterized by the absence of the "rule of law," the entrepreneur expects the costs of sanctioning to be low. As a result, such environments may become breeding grounds for corruption. A similar argument is provided by Leitzel (1997, p. 125) who asserts that "to the extent that breaking rules entails some risk of a future punishment, including a loss of reputation, individuals will be more willing to run such risks in less stable settings. Similarly, the punishment that accompanies some forms of rule-breaking has been undermined during the transition." This leads to our second hypothesis:

Hypothesis 2: Inefficient court systems and law enforcement will increase an entrepreneur's likelihood of engaging in corruption.

Legal Alternatives to Bribes. It is argued that the presence of "arbitrariness" or "ambiguity" associated with the likelihood of gaining favorable treatment using bribes

discourages firms from getting involved in corruption (Habib & Zurawicki, 2002; Lee & Oh, 2007; Uhlenbruck, Rodriguez, Doh, & Eden, 2006; Wei, 1997). Especially in scenarios where multiple, overlapping government agencies yield discretionary power over a business, it is difficult to understand who to go to and whether payments would ensure a beneficial return.

If the outcomes of a corrupt deal are unpredictable, the entrepreneur will face large *ex-post* transaction costs, that is, the costs of the enforcement of the corrupt deal. Subsequently, he or she would "think twice" before engaging in corruption, because a failed corrupt transaction cannot be enforced legally (Lambsdorff, 2002b; Rose-Ackerman, 1999, pp. 92–96). Instead of becoming involved in a corrupt deal with uncertain outcomes, the business owner would be motivated to seek "legal alternatives" to bribery. Having legal alternatives to bribes means that if a government agent demands a bribe from the entrepreneur, the latter can go to another official (or to the bureaucrat's superior) to get the correct (legal) treatment without recourse to unofficial payments. The availability of legally valid alternatives may vary between countries (Lambsdorff, 2002a), depending on whether the whole institutional infrastructure has been corrupt or only some or single civil servants within it. In countries where legal alternatives to bribes are easily available and government is supportive, there will likely be less pressure to engage in corruption (Tjosvold, Peng, Chen, & Su, 2008). In contrast, businesspeople may perceive less opportunity for legal business deals in highly corrupt countries. Thus, we put forward our third hypothesis as follows:

> **Hypothesis 3:** The likelihood of becoming engaged in corrupt transactions decreases for an entrepreneur with the availability of legal alternatives to bribes.

Informal Institutions

Business Ethics and Social Norms. After the demise of the socialist system in the Soviet Union, dramatic changes in the political, economic, and legal institutional framework were made in the post-Soviet countries of transition. However, informal codes of conduct, norms, and values, which were learned and adopted during the socialist rule, did not change immediately (Helmke & Levitsky, 2003; North, 1990, p. 45; Radaev, 2004; Volkov, 1999). Subsequently, societies emerged in which informal institutions have not complemented but rather supplemented changes in the formal institutional environment (Guseva, 2007; Helmke & Levitsky; Ledeneva, 1998, p. 214).

In environments characterized by highly uncertain outcomes of formal institutions, entrepreneurial actions are often attributed to specific, informal "codes of conduct" (Ahlstrom & Bruton, 2002; Ahlstrom et al., 2000). Research argues that entrepreneurial behaviors in many transition economies are often shaped by the rules inherited from the Socialist period such as "the end justifies the means" (Lefebvre, 2001, pp. 36–42) and "what leads to success is always correct" (Ledeneva, 1998, p. 213). Societies have thus emerged in the former Soviet block where unwritten codes and social conventions dominate the law (Ledeneva, p. 214). If an individual adheres to the law, while he or she could benefit more by engaging in illegal transactions, then such a person is seen to behave "irrationally." If a businessperson was "cheated" by his partners, customers, or national officers, then it was his or her own fault because he or she was not "smart enough." It is the naivety and short-sightedness of the cheated individual and not the unfair treatment by others that is considered to be wrong (Lefebvre, p. 38). Comparing the "predominant ethical philosophy" of the Soviet and American people, Lefebvre

(pp. 36–42) concludes that the Soviets are more likely to circumvent the law to achieve the ends.

The embeddedness of corruption in certain environments can also be explained with the help of the social psychological construct of social proof, which helps people decide what is correct behavior. Also, Axelrod (1986, p. 117) asserts that people assess whether a behavior is correct based on the extent to which they see others performing it. In societies where the majority diverges from legal norms, an illegal behavior becomes quite rational or normal when pursued by the group. In the context of corruption, it means that the likelihood of becoming involved in corrupt transactions depends on the entrepreneurial perception of how many other individuals in the society are engaged in corrupt arrangements (Andvig, 1991; Andvig & Moene, 1990). If there are many, then the expectation to be socially sanctioned and the "moral costs" will be low for the entrepreneur since the very diffusion of corruption reduces the costs of engaging in it (Della Porta & Vanucci, 1999, p. 19). Myrdal (1968, p. 409) puts it succinctly, "Well, if everybody seems corrupt, why should I not be corrupt?" This is also consistent with a game theoretical perspective holding that the choice between corruption and non-corruption depends on the strategic interaction with the choices of other individuals. The more widespread corruption is, the lower the risks of being denounced for those who decide to become involved in illegal practices and the higher the price to be paid by those who remain honest and thus "get marginalized" (Della Porta & Vanucci, pp. 21–22). Individuals in the post-Soviet transition states justify their own corrupt behavior by the pervasive dissemination of corruption (Rose-Ackerman, 2001, p. 51). Companies that have not established such corrupt relationships (perhaps they are new to the country) may observe that bribery is prevalent and be reluctant to refrain from bribing because of the loss of competitiveness they will likely experience (Getz & Volkema, 2001).

Summing up, corruption may be facilitated due to two reasons. First, entrepreneurs who share the view that the "good" ends justify the means (Lefebvre, 2001) may be more willing to engage in corruption. The "good" ends may refer to economically better outcomes (e.g., receiving a public contract, saving on taxes, getting a license) which may be achieved via "dirty" means (bribing national bureaucrat). Second, the probability of corruption may be high in countries where the majority diverges from legal norms. These considerations lead us to our next hypothesis:

> **Hypothesis 4:** Widespread informal social norms and illegal business ethics which hold that ends justify the means will increase the entrepreneur's likelihood of engaging in corruption.

Closed Social Networks. In entrepreneurship research, it is widely perceived that there is a positive correlation between social networks and firm performance (Brüderl & Preisendörfer, 1998). However, a richer analysis of networks is needed. For example, Putnam, Leonardi, and Nanetti (2000) argue that networks can be perceived of as "bridging" networks that are porous and socially inclusive and/or "bonding" networks that tend to exclude outsiders. Bonding networks are typified by kinship. Such networks can reduce the transaction costs associated with the searching and finding business counterparts, defining contract conditions, and enforcing the agreement. As a consequence, they create an atmosphere of mutual trust and cooperation for business partners embedded in such social structures (Rose-Ackerman, 1999). Transactions between members of a kinship group or friendship are based on what Martin Raiser calls "ascribed trust" attributed to family, ethnic or other specific characteristics (Raiser, 1999, p. 4). However, bonding networks may have a negative impact (Putnam et al.). For example, they can bind

certain groups together in ways that are undesirable for society as a whole, e.g., by reinforcing the practices of favoritism, nepotism, or ethnic hatred. Banfield (1958) argues that in Southern Italy and Sicily, the high value placed on family loyalty would lead people to provide illegal favors and preferential treatments to relatives. This is also supported by Tanzi (1998, p. 4) who asserts that "it is social intimacy that creates the environment that promotes corruption." Similarly, in discussing institutional foundations of corruption in China, Schramm and Taube (2005, p. 92) describe the "Chinese guanxi networks" as embedding individuals in social structures that provide safeguards against opportunism and simultaneously facilitate corrupt transactions. Reciprocity and loyalty to the members' interests (at the expense of outsiders) guides current and future transactions. By the same token, Lipset and Lenz (1999) find that countries with higher familistic cultures[1] are more corrupt.

Similar effects of "closed" networks can be expected in the post-Soviet countries in transition, where informal personal ties help business actors to mobilize resources to cope with the transitional uncertainty (Ahlstrom & Bruton, 2006; Aidis & Adachi, 2007; Aidis et al., 2008, p. 661), but provide fertile grounds for corruption (Ledeneva, 1998; Radaev, 2004, pp. 96–99; Volkov, 1999). In transition economies, personal loyalties, reciprocity, and informal networks often take precedence. "Whom you know" determines the success of the economic actions: entrepreneurs without ties to banks and state bureaucrats have significant barriers to entry and face more difficulties when growing their businesses (Guseva, 2007, p. 2). Involvement in closed networks, which is based on what Guseva (p. 3) calls a "straightforward quid pro quo—you scratch my back and I will scratch yours," is a seedbed for corruption. Thus, we develop our next hypothesis as follows:

> **Hypothesis 5:** The entrepreneur's inclination to corrupt increases when business transactions are predominantly carried out with the people belonging to the closed social network (e.g., kinship, friendship, and ethnic groups).

Trustworthiness of National Bureaucrat as Honest Bribee. Research argues that there are two sides of trust that have important implications for corruption (Tonoyan, 2003; Tonoyan, Perlitz, & Wittmann, 2004). On the one hand, there is a "bright side" of trust that refers to the generalized trust toward anonymous others, which is found to undermine corruption (Bjornskov, 2003; Tonoyan; Uslaner & Badescu, 2004). Generalized trust can be understood as "mental models" of what can be expected when dealing with people that someone does not have personalized information about (Denzau & North, 1994). In this sense, Rothstein and Eek (2006, p. 5) define generalized trust as an "informal institution" or "established systems of beliefs about the behaviors of others." They suggest that in societies where most people can generally be trusted, many forms of mutually beneficial cooperation will take place that would not have been possible if this trust were lacking. If individuals trust most others to behave honestly, their likelihood of breaching the law (e.g., via engaging in corruption) will be low.

On the other hand, there is a "dark side" of trust, which refers to the particularized trust toward kin and friends that is found to support corruption and nepotism (Tonoyan, 2003; Tonoyan et al., 2004). Extending previous research, we consider the entrepreneur's

1. The authors capture the familistic culture as the percentage of respondents from the World Values Survey who agrees that one must always love and respect one's own parents, regardless of their qualities and faults, as well as the those who think that divorce is unjustifiable. Regression analyses show that countries with higher familistic values are more corrupt, after adjusting for per capita income.

trust toward the national bureaucrat to be an "honest bribee," that is, to deliver services as agreed after having taken the bribe, as another type of particularized trust which may seal corrupt deals.

An important restriction for performing a corrupt transaction is the anticipation of the contracting party's opportunistic behavior (Williamson, 1975) and the costs resulting from it. Research argues that opportunism is more likely to occur in corrupt transactions than in legal ones. Several reasons are identified for supporting this. First, the public bureaucrat may renege on the corrupt deal when the offered bribe is worth less than the reputational gain from its denunciation (Della Porta & Vanucci, 1999, p. 195). Second, the risk of opportunism is high because corrupt deals take place outside the law and are not legally enforceable (Husted, 1994, p. 20; Lambsdorff, 2002b, p. 227; Rose-Ackerman, 1999, p. 92). Third, the public bureaucrat may create situations where he can force the businessperson to pay higher bribes than initially agreed upon due to the latter's high sunk costs.

If corrupt deals are not legally enforceable, then alternative methods of assuring compliance must be designed (Rose-Ackerman, 1999, p. 96). Put differently: how can the costs of the potential opportunism be reduced in corrupt transactions after the bribe has been paid? We argue that this can be done either by engaging in social networks (based, e.g., on kinship or friendship), as mentioned in a previous section, or by drawing on trust. That is, the particularized trust between the bribe-payer and bribe-receiver may serve as an informal enforcement mechanism of the corrupt deal. The higher the trust toward the public bureaucrat, the higher the predictability of the corrupt deal, and thus the higher the likelihood of engaging in corruption. These considerations lead us to the following hypothesis:

> **Hypothesis 6:** The higher the reputation of the public bureaucrat to stick to the deal after having taken a bribe, the higher the entrepreneur's likelihood of engaging in corruption.

Methods

Data and Variables

The database employed in this study is "The World Business Environment Survey (WBES) 2000," a survey conducted by the World Bank Group to measure the impact of the political, economic, and legal institutional make-up on the firm performance. We use a sample based on 2,576 firm responses from 20 transition and mature market economies. The WBES questions have been employed and validated by different scholars (for recent studies see, e.g., Uhlenbruck et al., 2006). Additional information on the dataset can be accessed at http://info.worldbank.org/governance/wbes/index2.html.

For a descriptive overview of corruption and its antecedents, 20 countries are classified into different regions. Among the transition economies, Russia (n = 470) and less investigated economies from the Trans-Caucasus (Armenia, Azerbaijan, Georgia; n = 350) and Central Asia (Kyrgyzstan, Kazakhstan, Uzbekistan; n = 334) are selected to compare them with more developed and better studied countries from Central-Eastern Europe (Czech Republic, Hungary, Poland, Slovakia, Slovenia, Estonia, and Lithuania; n = 871). Industrialized states from Western Europe (Germany, United Kingdom, France, Sweden; n = 363) and North America (United States and Canada; n = 201) are used as a comparator group to transition countries. The respective WBES questions for the dependent and independent variables as well as their measurement scales are displayed in Table 1.

Table 1

Variables and Their Measurement Scale

Variable/index	Number of variables	Question	Measurement-scale/ index analysis
1 Corruption	1	"It is common for firms in my line of business to have to pay some irregular 'additional payments' to get things done." (1—Never; 6—Always)	6-point-scale
2 Financial institutions	Standardized index constructed from two variables	"How problematic are these different financing issues for the operation and growth of your business: 1. Bank paperwork and bureaucracy 2. Need special connections to banks/financial institutions"	Eigenvalue (EV): 1.49 Explained variance: 74.5% Cronbach's alpha: 0.66
3 Legal institutions	Standardized index constructed from seven variables	"Please rate the overall quality and efficiency of services delivered by the following public agencies or services: 1. judiciary/courts 2. police 3. In resolving business disputes, do you believe your country's court system to be: 3.1) fair and impartial; 3.2) honest; 3.3) quick; 3.4) consistent; 3.5) enforce decisions; 3.6) protect property rights"	Eigenvalue (EV): 3.88 Explained variance: 48.8% Cronbach's alpha: 0.85
4 Time for red tape	1	"Please estimate percentage of senior management's time per year typically spent in dealing with government officials about the application and interpretation of laws and regulations" 1-"up to 1%"; 2-"1 to 5%"; 3-"6 to 10%"; 4-"11 to 25%"; 5-"26 to 50%"; 6-"more than 50%"	6-point-scale
5 Legal alternatives to bribes	1	"If a government agent acts against the rules I can usually go to another official or to his superior and get the correct treatment without recourse to unofficial payments" (1—Never; 6—Always)	6-point-scale
6 Competitor's unfair play	1	"Please judge how problematic the following practices of your competitors are for your firm? They do not pay duties or observe trade regulations" 1—Minor/moderate/major obstacle; 0—No obstacle	Dummy variable
7 Shadow economy	1	"Estimate the percentage of total sales the typical firm in your area of activity keeps 'off the books' ". 1–0%; 2–1% to 10%; 3–11% to 20%; 4–21% to 30%; 5–31% to 40%; 6–41% to 50%; 7–51% to 75%; 8–>than 75%	8-point-scale (in %)
8 Investments from family and friends	1	"Does your firm's financing come from family and friends over the last year?" 1 "Yes"; 0 "Other"	Dummy variable
9 Trust toward public officer	1	"If a firm pays the required 'additional payment,' the service is usually delivered as agreed." (1—Never; 6—Always)	6-point-scale
10 Firm size	1	"How many full-time employees work in your firm?" Small: 1 to 50 Medium: 51–500 Large: 500+	Dummy variable (0:"large enterprises")
11 Firm industry	1	"How would you classify the main industry of your firm?" Manufacturing; construction; service sector	Dummy variable (0 "service sector")
12 Firm ownership	1	"How was your firm established?" 1 "Originally private, from the time of start up" 0 "Other" (privatized state-owned firms/private subsidiary of a formerly state-owned firm/other)	Dummy variable
13 GDP per capita	1	GDP per capita, at current prices and current PPP US dollars, 2000	Interval measurement
14 Duration of democracy	1	Country democratic between 1950 and 1995 (1 = Yes, 0 = No)	Dummy variable

Sources: Variables 1 to 12: The World Business Environment Survey (WBES) 2000; Variable 13: UNECE Statistical Division; Variable 14: La Porta, Lopez-de-Silanes, Shleifer, & Vishny (1999), Treisman (2000).
GDP, gross domestic product; PPP, purchasing power parity.

Dependent Variable. Objective measures of corruption are rare, because it is an illegal activity. Instead, research argues that subjective measures represent an acceptable alternative for measuring corruption (Kaufmann, Kraay, & Mastruzzi, 2005; Lambsdorff, 2004; Tanzi, 1998). The dependent variable is measured by the question "It is common for firms in my line of business to have to pay some irregular 'additional payments' to get things done." It is a 6-point scale variable that runs from "never" (the lowest level) to "always" (the highest level).[2] Moreover, a high correlation (up to 0.7) between subjective measures of corruption (provided by Transparency International or World Bank surveys) and rare objective measures of corruption (International Crime Victim Surveys) exists (Hunt, 2004, p. 9). The external validity of our dependent variable is tested. For this purpose, correlation analyses between the dependent variable and the two most often used aggregated measures of corruption, namely the "Corruption Perception Index" (CPI) and the World Bank "Control of Corruption" in 2000 and 2008 index are done. The correlation values are very high, ranging from 0.81 to 0.84, thus pointing to a high external validity of the dependent variable of this study.

Independent Variables. For Hypothesis 1, the quality of financial institutions is measured using an index that is based on two survey questions that ask for the (1) extent to which bank paperwork and bureaucracy, and (2) the need to have special connections to banks and other financial institutions can be considered as problems for business operations and growth. This index has been utilized using "principal component analysis" (PCA). It explains about 74% of variance and shows a measurement accuracy of 0.66 (Cronbach's alpha) (Table 1). Another question from the WBES that asks about the percentage of the senior management's time spent on dealing with government officials for the application and interpretation of laws (red tape) is used to measure the transaction costs resulting from the compliance with legal rules and regulations ("bureaucratic red tape"). It is a 6-point-scale variable which runs from the lowest value 1 ("up to 1%") to the highest value 6 ("more than 50%").

Hypothesis 2 refers to the country's legal institutions. For this, an index which summarizes seven questions characterizing the efficiency of the courts and police in upholding contract and property rights in business disputes, enforcing legal decisions as well as being fair, impartial, quick, and consistent is compiled using PCA. The Eigenvalue of the second index is 3.88; it explains about 49% of variance and demonstrates a very high reliability of 0.85 (Cronbach's alpha).

For Hypothesis 3, the variable "legal alternatives to bribes" is employed using the survey question "If a government agent acts against the rules I can usually go to another official or to his superior and get the correct treatment without recourse to unofficial payments." It is a 6-point-scale variable, with the lowest value 1 ("never") and the highest value 6 ("always").

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2. The variable for "frequency of corruption" in the WBES (2000) does not tell us *what kind of corruption* has been estimated by businesspeople. Therefore, *a standardized index for petty corruption* is constructed using principal component analysis which subsumes *seven types of corrupt payments*, namely "corrupt payments to telephone agencies" (first), "corrupt payments to tax authorities" (second), "corrupt payments to licensing authorities" (third), "corrupt payments to customs" (fourth), "corrupt payments to courts" (fifth), "corrupt payments to law authorities" (sixth), and "corrupt payments to gain governmental contracts" (seventh). The Eigenvalue of the index is 4.126, it explains roughly 60% of the variance and has a pretty high reliability (Cronbach's alpha = 0.882). The Pearson correlation statistics between this index and our dependent variable is very high ($r = .73$). The "frequency of corruption" variable seems to be an indicator capturing different facets of "petty corruption." However, we do not use this index in the regression analysis because of the missing values for roughly half of the respondents.

For Hypothesis 4, illegal business norms are measured by two items. The first one looks at "competitors' unfair play" and captures the firm owner's perception of how problematic the practice of their competitors not to pay duties or not to observe trade regulations is for his or her business. A dummy variable is employed: "1" stands for competitors' unfair play representing "minor, moderate or major obstacles" and "0" describes that the competitors' business ethics are not considered to be an obstacle. The second question measures the extent of the shadow economy activities in one's field of industry: "Recognizing the difficulties many enterprises face in fully complying with taxes and regulations, what percentage of total sales would you estimate the typical firm in your area of activity keeps off the books?" The corresponding 8-point-scale variable runs from the lowest value 1 for "0%" to the highest value 8 for "more than 75%" of the total sales that are kept off the book. Both questions reflect violations of the law and capture illegal business norms prevailing in the business community.

Hypothesis 5 seeks to examine the link between corruption and social networks. For this purpose, a variable is used to measure the share of investment in the firm made by family and friends, describing the entrepreneur's "closed" network. It is captured via a dummy variable that takes the value "1," if the firm's financing comes from family and friends, and the value "0," if it has other sources of financing. It is worth noting that the respective dummy variable is only a crude empirical measurement of the underlying theoretical concept for closed networks with family and friends, since it may be an indication for the low availability of external sources of finance from conventional sources (such as banks, venture capitalists, etc.) for business owners. However, we assume that this source of informal financing might be more common in countries with a "high level of family-based social capital" (Arum & Müller, 2004, p. 35), where actors are engaged in dense networks with family and friends. It is also similar to Lipset and Lenz's (1999) operationalization of the construct "familism" for studying corruption as well as Tonoyan's (2003) operationalization of the importance of friends and the likelihood of engaging in corruption using the World Values Survey (2000).

For Hypothesis 6, trust toward public officer to act as an "honest bribee" is measured using the survey question "if a firm pays the required 'additional payment,' the service is usually delivered as agreed." The corresponding 6-point variable runs from the lowest value 1 "never" to the highest value 6 "always."

Control Variables. Control variables refer to firm size, firm ownership, and firm industry (micro level) as well as per capita income and duration of democracy (macro level).

Small enterprises usually operate in a competitive market, and they do not have networks to exert political pressure on a public officer demanding a bribe. In contrast, large enterprises may be able to better protect themselves from corruption by using their political power to influence government actors (Hellman et al., 2000; Tanzi, 1998, p. 584; UN, 2007). Firm size is categorized as small (1–50 employees), medium (51–500 employees), and large (>500 employees), based on the number of full-time employees reported in the WBES. Large firms, which comprise only 10% of the whole sample, are used as a comparator group to entrepreneurial firms and small- and medium-sized enterprises (SMEs).

Government agencies target privately owned enterprises for more bribes because they typically perform better than state-owned enterprises (Djankov & Murrel, 2002; Megginson & Netter, 2001). Moreover, state-owned enterprises are treated better by government agencies because of their contacts and networks (Djankov & Murrel; Shleifer, 1998; Shleifer & Vishny, 1994). Firm ownership is a dummy variable with the value "1" for enterprises that are private and the value "0" for "other types" of ownership.

It is possible that some industries, such as oil, gas, and construction, that are more prone to corruption since there is a frequent interplay between businesspeople and government to win contracts and permits (see Tanzi, 1998). Corruption also flourishes because of the less transparent business transactions in these areas. The firm industry (manufacturing, construction, and service) is controlled for.

At the macro level, there is a negative association between corruption and economic development (Tanzi & Davoodi, 2001; Treisman, 2000). It is argued that "economic development increases the spread of education, literacy, and depersonalized relationships—each of which should raise the odds that an abuse will be noticed and challenged" (Treisman, p. 406). Gross domestic product (GDP) per capita (UNECE, 2000) is used to capture economic development. It is also suggested that greater civic engagement leads to closer monitoring of public officials in democratic countries; thus, decreasing corruption. More specifically, a long, uninterrupted duration of democracy is important since it reflects the stability of the overall democratic system (Treisman, p. 407). Duration of democracy is a dummy variable that captures whether the country has an uninterrupted tradition of democracy from 1950 to 1995 (value "1") or not (value "0").

Multiple Imputation of Missing Values. Several important steps are followed to ensure the appropriate methodology and an accurate analysis. First, the method of multiple imputation of missing values is employed to solve the missing data problem in the sample survey data. Its aim is to substitute the missing values with the values computed using the observed variables. The basic idea of the data analysis with multiple imputation is to create a small number (e.g., 5–10) of data copies, each of which has the missing values suitably imputed (King, Honaker, Joseph, & Scheve, 2001; Royston & Divison, 2004; Rubin, 1996). Using the instructions by Royston and Divison (2004), 10 data copies, a relatively high value chosen to account for larger fractions of missing information, were produced. Estimates of the parameters of the independent variables were averaged across these 10 copies, and they finally provided us with a single estimate. Standard errors are computed according to the "Rubin rules," (Royston & Divison) devised to allow for the between- and within-imputation components of variation in the parameter estimates.

Multi-Level Modeling. Multi-level analysis is a statistical method that can simultaneously handle measurements at the different levels of analysis (Goldstein, 1995; Luke, 2004; Raudenbush & Bryk, 2002). It is employed for 20 countries to examine the impact of both firm- and country-level determinants of corruption.

Information from multiple levels is used for several specific reasons in this analysis of corruption. First, the need for theoretical explanations spanning multiple levels of analysis is an issue in corruption research, where prior work has examined corruption using mostly macro-level factors. Second, multi-level analysis allows us to explore causal heterogeneity (Western, 1998), thus determining whether the causal effect of lower-level predictors is conditioned or moderated by higher-level predictors such as the country's culture. The major supposition of contextual analysis is that the contextual effect arises due to the social interaction within an environment. The environment may be spatially defined, e.g., in terms of "social networks" or in terms of countries (here: transition versus mature market economies). The common assumption is that environmental factors interact with individual factors to shape firm behavior. Third, ignoring the multi-level character of the data violates the ordinary least squares assumptions that the errors are independent, causing an underestimation of standard errors (*t*-test statistics will be too high). This generates Type I errors implying that independent variables will appear significant when, in fact, they are not (Raudenbush & Bryk, 2002; Snijders & Bosker, 1999).

Heckman Correction Model. The Heckman correction model is used to correct for the "sample selection bias" (Heckman, 1979), which is caused by the variable measuring the entrepreneur's "trust toward public officer as an honest bribee." The corresponding question in the survey is as follows: "If a firm pays the required 'additional payment,' the service is usually delivered as agreed." However, technically, the inclusion of this variable in traditional regression models would generate a "sample selection bias," since this variable has been observed only for a restricted, nonrandom sample. This restricted sample refers to those respondents who have confirmed that "it is common for typical firms in their industries to have to pay 'additional payments' to get things done."

Ignoring the sample selection bias would lead us to the overestimation of the predicted values, thus generating misleading conclusions about the significance of the independent variables (Heckman, 1979). The Heckman estimation is a two-stage (equation) model. The first equation, the selection, predicts the probability of having either perceived corruption (value 1) in one's field of business or not (value 0). The second equation, which refers to the main estimation model, includes the inverse Mill's ratio (which is estimated from the predicted probability of having perceived corruption in one's field of business from the first equation) and the variable measuring the entrepreneur's level of trust toward the national bureaucrat to deliver services as agreed after having taken the bribe.

Results

Descriptive Statistics

Means, standard deviations, and the correlation values of dependent and independent variables are listed in Table 2. The correlation statistics suggest no problem of multi-collinearity.

The results from the descriptive analysis, as shown in Table 3, can be subsumed as follows. We observe strong differences in corruption levels between the examined regions. The highest level of corruption is noticed in Trans-Caucasus (3.25), followed by Central Asia (3.03), Russia (2.68), and Central-Eastern Europe (2.49). In contrast, North America

Table 2

Descriptive Statistics and Correlations

Variable	Mean	SD	1	2	3	4	5	6	7	8	9
1 Corruption	2.58	1.57	1								
2 Legal institutions	0.00	1.97	0.28*	1							
3 Financial institutions	0.00	1.22	0.26*	0.20*	1						
4 Time for red tape	2.52	1.38	0.16*	0.19*	0.13*	1					
5 Legal alternatives to bribe	3.74	1.67	0.21*	0.30*	0.15*	0.06*	1				
6 Competitor's unfair play	2.17	1.20	0.21*	0.14*	0.21*	0.11*	0.11*	1			
7 Shadow economy	3.31	2.50	0.24*	0.16*	0.14*	0.05	0.11*	0.17*	1		
8 Investments from family/friends	0.16	0.37	0.16*	0.13*	0.09*	0.02	0.07	0.13*	0.20*	1	
9 Trust toward public officer	2.62	1.26	–0.12*	0.06	0.02	0.01	0.05	0.00	0.03	0.02	1

* $p < .01$
Note: Variables 1 to 8, N = 2,576; Variable 9 N = 1,568.
Source: The World Business Environment Survey (WBES) 2000; own calculations.

Table 3

Descriptive Statistics by Regional Groups[†]

Variable	Trans-Caucasus	Central Asia	Russia	New European Union member states	Western Europe	North America	ANOVA[‡]
1 Corruption	3.25	3.03	2.68	2.49	2.03	1.78	F = 40.67**
	(1.94)	(1.41)	(1.55)	(1.49)	(1.26)	(1.19)	
2 Financial institutions	–0.04	0.18	0.15	–0.06	–0.11	–0.13	F = 4.55**
	(1.39)	(1.35)	(1.25)	(1.15)	(1.09)	(1.07)	
3 Legal institutions	0.24	0.23	1.11	–0.22	–0.74	–1.16	F = 64.37**
	(2.18)	(2.11)	(1.6)	(1.75)	(1.77)	(1.98)	
4 Time for red tape	2.47	2.98	3.01	2.41	1.98	2.06	F = 39.03**
	(1.47)	(1.39)	(1.39)	(1.27)	(1.2)	(1.34)	
5 Legal alternatives to bribe	3.69	3.87	3.97	3.71	3.49	3.69	F = 4.14**
	(1.67)	(1.64)	(1.51)	(1.61)	(1.88)	(1.82)	
6 Competitor's unfair play	2.54	2.34	2.25	2.27	1.68	1.47	F = 37.72**
	(1.26)	(1.23)	(1.17)	(1.2)	(1.)	(.83)	
7 Shadow economy	3.57	3.05	3.52	3.55	2.95	2.29	F = 11.71**
	(2.63)	(2.11)	(2.21)	(2.74)	(2.51)	(2.03)	
8 Investments from family/friends	0.26	0.12	0.14	0.16	0.11	0.14	F = 8.27**
	(.44)	(.33)	(.35)	(.37)	(.31)	(.35)	
9 Trust toward public officer	2.58	2.66	2.61	2.49	3.06	2.67	F = 5.66**
	(1.25)	(1.32)	(1.15)	(1.26)	(1.34)	(1.12)	

** $p < .01$

[†] For country classification see "Data and Variables" section.

[‡] Results from one-way analysis of variance (ANOVA).

Note: Means and standard deviations in parentheses. Variables 1 to 8, N = 2,576; Variable, 9 N = 1,568

Source: The World Business Environment Survey (WBES) 2000; own calculations.

(United States and Canada) and Western Europe demonstrate the lowest spread of corruption (1.78 and 2.03, respectively).

A strong East–West gap also becomes evident when looking at the means of the two indices utilized, namely the (perceived) efficiency of financial and legal institutions. When comparing parameter signs of the index measuring the quality of the financial institutions, one notices the differences between Central Asia and Russia, and the remaining regions. Entrepreneurs and small business owners in Central Asia perceive the quality of financial institutions as the worst, while one does not observe statistically significant deviations among the new European Union (EU) member states, Western Europe, and North America. The quality of the legal institutions is perceived as impeding for firm's operation and growth in Trans-Caucasus (0.24), Central Asia (0.23), and Russia (1.11), while it is judged to be efficient for Central-Eastern Europe, Western Europe, and North America.

Compared with other country groups, entrepreneurs and small business owners from Central Asia and Russia seem to spend the most time with governmental officials on questions regarding the interpretation and application of rules and regulations. However, there is little difference between the amount of time spent on "red tape" in Trans-Caucasus and Central-Eastern Europe. Transaction costs that result from the compliance with legal rules and regulations are the lowest in Western Europe and North America.

Previous work has hypothesized that the existence of legal alternatives to bribes may vary between countries (Lambsdorff, 2002a). However, this is not supported by our descriptive findings, since one does not observe statistically significant differences between the respective regions with regard to "legal recourse to bribe."

Companies not paying duties or not observing trade regulations (as a proxy variable for "competitors' unfair play") are most common in Trans-Caucasus (2.54) and least common in North America (1.47). When looking at the "activities in the shadow economy," the second proxy for illegal business ethics, one notices a clear "East–West" gap. The spread of shadow economy activities is the lowest in Western Europe (2.95) and North-America (2.29), while it is the highest in Trans-Caucasus (3.57), the new EU member states (3.55), and Russia (3.52).

The question about the percentage of the firm's financing coming from family and friends (a measure of closed networks with kinship and friendship) is answered by only 18% of the respondents affirmatively. Above all, this source of firm investment is used mostly in the Trans-Caucasus (0.26) and the new EU member states (0.16).

It is crucial to have a "trustworthy" bribe-taker who delivers services "as agreed" in return for a bribe to seal successfully a corrupt deal. Public officers are perceived as being most trustworthy corrupt partners in the former Soviet block in Central Asia (2.66), Trans-Caucasus (2.58), and Russia (2.61) as well as Central-Eastern Europe (2.49). Interestingly, businesspeople from North America (2.67) consider national bureaucrats as honest bribe-takers almost to the same extent as their counterparts in the former Socialist countries do.

Results from Multi-Level Estimations[3]

Null Model as a Basic Model with Random Intercepts. The null model (0) is an analysis of variance model with random intercepts, which contains only the dependent variable but

3. The statistical package GLLAMM, generalized linear latent and mixed models (Rabe-Hesketh, Pickles, & Skrondal, 2005), is used for multilevel estimations. We run our calculations using adaptive quadrature and specifying 10 integration points.

no explanatory variables except the intercept. It is used as a "yardstick," i.e., a baseline for the estimation of "explained" versus "unexplained" variances in comparison with models, when explanatory variables are added. The variance in a two-level analysis consists of two parts, the firm-level variance and the country-level variance.

Partitioning the total unexplained variance of the dependent variable into variance within countries (level 1 variance) and variance between countries (level 2 variance) in the null model provides useful preliminary information about whether it is worth considering two levels of analysis when examining corruption. Looking at the highly significant *t*-values of the level 1 intercept (35.7) and the level 2 intercept (3.0) in the null model shows that it is useful to differentiate between micro and macro levels of analysis when exploring corruption. However, the understanding of the roots of corruption requires a more elaborate analysis at the micro level than the macro level, since the major part of the partitioned variance of 85.5% (=2.156 × 100 / [2.156 + 0.366]) accounts for within-country variance, while only the remaining 14.5% (=0.366 × 100 / [2.156 + 0.366]) accounts for between-country variance.

Model 1 with Micro-Variables. Model 1, as shown in Table 4, tests hypotheses 1–5 for the study. Hypothesis 1a, which suggests that excessive time spent for interpreting regulations will increase corruption, could be supported. The variable for "time for bureaucratic red tape" is significant ($t = 4.62$, $p < .001$). Hypothesis 1b states that entrepreneurs will engage in corruption if banks and other money lenders are perceived as bureaucratic and less business-friendly. The corresponding variable "perception of financial institutions" in Model 1 is significant at a 1% level ($t = 7.37$, $p < .001$). This means that efficient financial institutions with minimum paperwork and bureaucracy as well as no need for maintaining special connections decrease the probability of corruption. Also, hypothesis 2, which proposes that inefficient legal system and weak enforcement of property rights will increase corruption, could be confirmed. The corresponding variable is found to be highly significant ($t = 6.21$, $p < .001$). Also, the last hypothesis under the formal institutions category, hypothesis 3, which states that the availability of legal alternatives (or legal recourse) to bribes for entrepreneurs will decrease corruption, could not be rejected. The variable "legal alternatives to bribe" is statistically significant ($t = 5.97$, $p < .001$). Thus, countries where entrepreneurs can find a legal alternative (such as going to an honest superior of the public bureaucrat asking for bribe) reduce the pressure for corruption.

Hypotheses 4 and 5 propose the relationship between informal institutions and corruption. The findings suggest that informal institutions are crucial determinants of corruption. Specifically, hypothesis 4 argues that the existence of illegal business ethics will increase corruption among entrepreneurs. The first proxy for illegal business ethics measures the entrepreneur's judgment of how problematic the practice of their competitors of not paying duties or not observing trade regulations is for their businesses ("competitor's unfair play" variable in Model 1). The second proxy captures the extent to which shadow economical activities prevail in the economy, thus depicting the estimated percentage of total sales the typical firm keeps "off the book" ("shadow economy" variable). Both variables are found to be significant (competitor's unfair play $t = 2.96$, $p < .001$; shadow economy $t = 7.03$, $p < .001$). Our results thus suggest that those individuals who break the law by not paying duties and keeping "off the book" a significant share of their sales are highly likely to disobey the law by engaging in corrupt transactions. These two findings support hypothesis 4. Moreover, hypothesis 5, which holds that corruption is linked to "closed" social networks, could also be confirmed. The beta-coefficient of the variable "investment from family and friends" is significant ($t = 2.19$,

Table 4

Multilevel Estimation on Corruption (Combined Results from Multiple Imputation of Missing Values from 10 Datasets)

	Model 0 country random effect			Model 1 Model 0 + individual factors		
	Coef.	SE	*t*-value	Coef.	SE	*t*-value
Intercept	2.543	0.139	18.32**	1.130	0.181	6.26**
Formal institutions						
Index 1: perception of financial institutions				0.187	0.025	7.37**
Index 2: perception of legal institutions				0.104	0.017	6.21**
Time for red tape				0.100	0.022	4.62**
Legal alternatives to bribe				0.110	0.018	5.97**
Informal institutions						
Business ethics 1: competitor's unfair play				0.086	0.029	2.96**
Business ethics 1: shadow economy				0.091	0.013	7.03**
Social networks: investments from family/friends				0.189	0.086	2.19*
Firm characteristics (control variables)						
Firm ownership: private				0.289	0.067	4.34**
Firm size: small enterprises				0.071	0.105	0.68
Firm size: medium enterprises				0.074	0.095	0.78
Firm industry 1: construction				0.251	0.091	2.75**
Firm industry 2: manufacturing				0.025	0.063	0.40
Variance Components						
σ^2 Individual level	2.156	0.060	35.7**	1.803	0.050	35.75**
σ^2 Country level	0.366	0.122	3.0**	0.224	0.077	2.92**
Number of observations (Level 1, Level 2)		2576, 20			2576, 20	

Notes: Statistical significances at ** $p < .001$ and * $p < .05$ levels.
Source: The World Business Environment (WBES) Survey 2000; own calculations.
SE, standard error.

$p < .001$). Closed social networks built on informal personal ties, loyalty, and reciprocity provide the right context for corruption to flourish in transition economies.

Model 1 introduces firm level control variables in addition to the key independent variables associated with hypotheses 1–5. Among control variables, firm ownership is highly significant, implying that firms that were established privately from the start-up time are more vulnerable to corruption than firms with other ownership structures (e.g., former state-owned enterprises, private subsidiaries of state firms and so forth). Moreover, firms in the construction sector turn out to be more corrupt than their counterparts from the service sector. However, the dummy for firm size is insignificant in Model 1, implying no differences between SMEs and large enterprises in terms of their vulnerability to corruption, after adjusting for the efficiency of institutions and country-random intercepts.

Model 2 with Macro-Variables. Model 2 adds two macro-level indicators as control variables. GDP per capita has a strong negative effect on corruption, thus explaining cross-country variations in corruption to a large extent. However, the impact of the democracy duration on corruption could not be confirmed (Table 5).

Table 5

Multilevel Estimation on Corruption (Combined Results from Multiple Imputation of Missing Values from 10 Datasets)

	Model 2 Model 1 + macro effects			Model 3 Model 2 + trust toward officer + Heckman correction		
	Coef.	SE	*t*-value	Coef.	SE	*t*-value
Intercept	1.741	0.236	7.39**	2.674	0.561	4.76**
Formal institutions						
Index 1: perception of financial institutions	0.190	0.025	7.50**	0.167	0.052	3.18**
Index 2: perception of legal institutions	0.102	0.017	6.06**	0.108	0.031	3.54**
Time for red tape	0.097	0.022	4.49**	0.072	0.028	2.55**
Legal alternatives to bribe	0.111	0.019	5.97**	0.087	0.038	2.31**
Informal institutions						
Business ethics 1: competitor's unfair play	0.082	0.029	2.80**	0.052	0.036	1.44
Business ethics 1: shadow economy	0.089	0.013	6.93**	0.088	0.021	4.24**
Social networks: investments from family/friends	0.193	0.086	2.24*	0.256	0.099	2.60**
Trust toward public officer as an honest bribee				−0.110	0.024	−4.64**
Firm characteristics (control variables)						
Firm ownership: private	0.307	0.067	4.60**	0.060	0.072	0.84
Firm size: small enterprises	0.045	0.105	0.43	0.156	0.123	1.27
Firm size: medium enterprises	0.058	0.095	0.61	0.155	0.114	1.36
Firm industry 1: construction	0.250	0.091	2.73**	0.253	0.095	2.66**
Firm industry 2: manufacturing	0.025	0.063	0.40	−0.054	0.068	−0.80
Mills' Lamda (for Heckman correction)				0.682	0.535	1.27
Country level indicators						
GDP per capita/1000	−0.051	0.018	−2.76**	−0.054	0.017	−3.10**
Democratization	0.470	0.409	1.15	0.604	0.366	1.65
Variance components						
σ^2 Individual level	1.803	0.050	35.74**	1.276	0.046	27.8**
σ^2 Country level	0.114	0.042	2.73**	0.079	0.032	2.5**
Number of observations (Level 1, Level 2)		2576, 20			1568,20	

* $p < .05$, ** $p < .001$

Note: Regression diagnostics shows no residuals that exceed +2.5 or −2.5. *The Cook-Weisberg test for heteroscedasticity*, which tests the null hypothesis that the variance of the residuals is homogenous, first points out that there is an indication of heteroscedasticity. However, after a *Box-Cox transformation* of the dependent variable we get rid of the heteroscedasticity. Checking the *Variance Inflation Factor* for multicollinearity gives no reason to worry. Also *the Linktest* and *the Regression Specification Error Test* for omitted variables do not indicate that we have a specification error.

Source: The World Business Environment Survey (WBES) 2000; own calculations.

When comparing variances in Model 2 (with all explanatory factors) and Model 0 with (no explanatory factors), one observes that the explained sum of square (R2) is 16.4% (1–1.803/2.156) on the firm level, while it is much higher, namely 68.7% (1–0.114/0.366), on the country level.

Model (3) with a Heckman Correction Equation. The last hypothesis, hypothesis 6, is tested in Model 3. It states that the reputation of a bureaucrat as an honest bribee, i.e., someone who sticks to the deal after having taken a bribe, will increase the entrepreneur's likelihood to engage in corruption. To examine this, a Heckman correction model is employed.[4] Looking at the Heckman equation, it becomes clear that the predictability of corrupt transaction in the future increases the likelihood of becoming engaged in corruption. The variable "trust toward public officer as an honest bribee" is statistically significant ($t = -4.64$, $p < .001$), a result which is consistent with Lambsdorff's (2002a) finding. This confirms hypothesis 6.

Sensitivity Analysis

We conducted sensitivity analyses of the findings to the multiple imputation of missing values and the number of countries. Regressions without multiple imputation of missing values and regressions with a maximum possible number of countries in the WBES (57 in total), using independent variables of this study, produce nearly identical findings, thus confirming the robustness of our results (the respective tables are available upon request).[5]

Discussion

This study makes several important contributions to research on corruption, particularly among entrepreneurs. The first one is that, unlike prior studies where the focus has been on bribe takers, this study explores the determinants of corruption from the perspective of entrepreneurs as bribe payers. Only an investigation of both sides involved in corrupt arrangements will contribute to a better understanding of corruption and thus enable us to combat it efficiently (Bardhan, 2006).

Second, this is a more elaborate analysis of institutional factors for corruption than previous work. Generally, institutional investigations of corruption are scarce.

4. The table for the results from the probit estimation of the sample selection process in Heckman equation is available upon request.

5. First, regressions without multiple imputation of missing values are run to examine the extent to which empirical results are sensitive to the treatment of missing values. The significance of all independent variables has been supported in the main Model 2. There are only minor changes in Model 3 with Heckman correction and strongly reduced number of respondents, where the effects of transaction costs (time for red tape), legal alternatives to bribe, and "business ethics 1" become insignificant. Second and most importantly, while the WBES (2000) sample consists of 80 countries, the focus of this study was on 20 transition and mature economies. We expanded the number of countries from 20 to 57, thus analyzing the maximum number of countries possible in the WBES (2000) to ensure that our findings are not sensitive to the selection of countries (23 countries could not be analyzed because of missing information on predictors of corruption). Here again, no multiple imputation of missing values has been done. In the main Model 2, all effects could be corroborated at 1% significance level, which is another indication of robustness of the empirical results of this study. Even more, the coefficients of firm size dummies for "small" and "medium" enterprises become significant (at 5% level) in this new sample for 57 countries.

Few recent institutional analyses of corruption have investigated the effects of constraints resulting from formal institutions (such as market entry barriers for new firms and multinational corporations, trade barriers, and industrial policies) on corruption (e.g. Broadman & Recanatini, 1999, 2002; Gerring & Thacker, 2005). Others have focused on the transaction costs considerations accompanying the arrangement and enforcement of corrupt deals (Husted, 1994; Lambsdorff, 2002b; Rose-Ackerman, 1999). But, the distinctiveness of this study is that it not only investigates the association between corruption and the efficiency of country-specific formal institutions, but also informal institutions and trust, which are assumed to be an integral part of the decision-making of businesspeople. In doing so, it explicitly recognizes that entrepreneurs have to be examined as embedded in a social context (Granovetter, 1985), channeled and facilitated by their positions in social networks with family, friends, and national bureaucrats.

Third, to ensure appropriate analysis, we utilized several econometric methods such as multiple imputation of missing values (King et al., 2001; Royston & Divison, 2004; Rubin, 1996), the Heckman correction model for solving the "sample selection bias" (Heckman, 1979), and the sensitivity analysis to check the sensitivity of results to the choice of twenty countries. Most importantly, hierarchical linear models (Luke, 2004; Raudenbush & Bryk, 2002) are used to examine the impact of both micro-level and macro-level determinants of corruption, while previous work has largely focused on the country-level antecedents of corruption.

After more than a decade of the transformation from central to market economy, corruption is still deeply entrenched in the transition economies of the former Soviet bloc. A key underlying issue is the overall quality of the formal and informal institutional make-up. Governments in countries such as Russia, Armenia, Azerbaijan, Georgia, Kazakhstan, the Kyrgyz Republic, and Uzbekistan should consider that an effective institutionalization of the legal and financial frameworks is a precondition that must be fulfilled to reduce corruption. Taking legal framework as an example, there is a need to improve the implementation and enforcement of the law as well as the protection of contract and property rights to resolve business disputes impartially, efficiently, and quickly. Regarding the financial infrastructure, environments need to be created where the access to capital (including legal rules regulating it) is made easier and where the process of applying for capital becomes transparent for entrepreneurs. Introducing more competition and transparency in the provision of capital between banks and other financial institutions would reduce the incentives of those extorting bribes in exchange for awarding financial capital.

Formal anti-corruption institutions have been installed in several transition countries. For instance, Azerbaijan is a signatory to the United Nations Convention against Corruption. Georgia passed a law to increase the independence of the courts in February 2005. In Russia, the "Federal Financial Monitoring Services" has been reorganized to monitor transactions exceeding a value of U.S. $100,000 (Transparency International, 2002). Moreover, numerous initiatives of international organizations and advocacy groups have produced guidelines providing businesses with the necessary tools to ensure that their employees comply with the regulatory frameworks and principles of sound business practices (cf. OECD, "Guidelines for Multinational Enterprises" (2000); Transparency International, "Business Principles for Countering Bribery" (2002)). Recognizing that small enterprises have characteristics that clearly distinguish them from large companies, the UN recently started a program on the "Small Business Development and Corruption," revising the existing initiatives to adapt them to the specific needs of the small business sector (United Nations, 2007).

However, an appropriate understanding of corruption also necessitates paying attention to informal institutions that are required for arranging and enforcing corrupt deals. The entrepreneur's probability of engaging in corruption is high if he has a high level of particularized trust toward the national bureaucrat to stick to the promised deal. Decreasing corruption thus would require policy measures that could destabilize corrupt agreements, e.g., via fostering opportunism of the corrupt deal either on the part of the public bureaucrat or the entrepreneur. For example, Lambsdorff and Nell (2006) propose a legal approach for destabilizing corrupt deals based on an asymmetric design in the implementation of legal sanctions. Introducing regular staff rotation in the public administration could be another precautionary measure against corruption since it would undermine building the particularized trust between the bureaucrat and the businessperson.

Although more costly to influence and change, there is also a need to develop more favorable social environments. The entrepreneurs' likelihood of engaging in corruption in the transition countries is shown to be linked to the culturally bounded and deeply rooted social norms that justify that "if others behave illegally, so can I" (Lefebvre, 2001). The probability of engaging in corrupt deals also correlates strongly with other types of violations of law such as not paying duties, not observing trade regulation, and/or becoming widely engaged in unofficial (shadow) economy. Besides, a relationship exists between corruption and social networks with family and friends. Although the linkage between corruption and networks remains underdeveloped theoretically, it seems to be positively associated with networks that are closed to outsiders (Anderson, 1995; Rose-Ackerman, 1999; Schramm & Taube, 2005; Tonoyan et al., 2004). Such networks reduce the transaction costs associated with the searching of contract partners, as well as initiating and enforcing corrupt deals. Therefore, they simultaneously provide breeding grounds for corruption.

It is important to note that "path dependency" (David, 1985; North, 1990) may help explain a country's current level of corruption (Andvig, 1991; Bardhan, 2006). If a country starts with a high initial level of corruption, it may get "locked in" in this equilibrium, where it is difficult to move into another with a lower level of corruption. The challenge for policy makers is to find the mechanisms that orchestrate the shift from one state to another (Bardhan, 2003, p. 10), given the prevalence of informal institutions that support corruption. Changing society's deeply rooted social norms through education and training, building and supporting civil society, and strong mass media is possible only in the long run. Through sustained public campaigns, a critical mass of businesspeople and public officials has to be convinced of the economic and social costs of corruption. Ultimately, developing effective anti-corruption reforms requires paying attention to the country-specific formal and informal institutions that jointly provide the contexts for businesses and entrepreneurs to flourish.

Limitations and Future Research

Some caveats have to be borne in mind when interpreting the empirical results. First, the association between corruption and some of its predictors (e.g., shadow economy, financial and legal institutions) is fraught with the endogeneity problem (Greene, 2000). For instance, one could argue that it is not shadow economy that creates breeding grounds for corruption. Rather, costs from corruption in the government may drive entrepreneurs and small business owners to operate in the shadow economy (Soto, 2002). Similarly, the causality between other formal institutions (such as contract and property rights enforcement) and corruption may not run from the inferior quality of these

institutions to (high) corruption, but rather the other way around. The problem of endogeneity could not be solved in this study because of the missing "instrument variables" in the WBES (2000). Future work should ideally determine the direction of causality, while drawing on different sources of data and utilizing appropriate instrumental variables.

Our model found several micro-level variables and one macro-level variable as a predictor of corruption. Yet, the variance explained by that one variable, GDP per capita, is high. This knowledge is not satisfactory because the mechanism of why rich countries are less corrupt than poorer ones is not clear from these data. It could be that the higher risk of exposure of the public bureaucrats as well as a higher probability of getting caught and punished for business actors in richer countries are reasons for a lower corruption. Also, higher civil service wages may reduce the incentive for corruption (Treisman, 2000). Besides, more economically developed countries might have greater freedom of the press, civic engagement, and political stability, all which mitigate corruption. Future research could examine the mechanism that underlies the link between economic development and corruption.

As shown by our results, transition economies in Central-Eastern Europe and the post-Soviet Union cannot be treated as a set of uniform countries. For instance, Estonia and Slovenia rather resemble Western European countries in terms of the spread of corruption and their institutional profile (efficiency of financial institutions, informal codes of conduct, etc.), despite sharing many similarities with the remaining transition economies. Although there is a good justification for the use of multi-country samples to understand institutional factors that are similar across different countries in transition and their effects on entrepreneurship, there is also a need for more in-depth (case) studies of individual countries. For instance, it would be a worthy undertaking to investigate why corruption levels are so different between Slovakia and the Czech Republic, despite the fact that they were a part of one country ("Czechoslovakia") in the recent past. For this, it would be important to study similarities and differences in these countries' history, religion, and the design of economic policies supposed to affect entrepreneurship after the onset of the transition from Socialist to market economies more than 15 years ago.

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