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Does Money Buy Credit?

Firm-Level Evidence on Bribery and Bank Debt

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Firm-Level Evidence on Bribery and Bank Debt[°]

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Abstract

This study examines how bribery influences bank debt ratios for a large sample of firms in 14 transition countries. We combine information on bribery practices from the BEEPS survey with firm-level accounting data from the Amadeus database. Bribery is measured by the frequency of extra unofficial payments to officials to “get things done”. We find that bribery is positively related to firms’ total bank debt ratios, which provides evidence that bribing bank officials facilitates firms’ access to bank loans. This impact varies with the maturity of the bank debt, as bribery contributes to higher short-term bank debt ratios but lower long-term bank debt ratios. Finally, we find that the institutional characteristics of the banking industry influence the relation between bribery and firms’ bank debt ratios. Higher levels of financial development constrain the positive effects of bribery, whereas larger market shares of state-owned banks have the opposite effect. The presence of foreign banks also affects the impact of bribery, although this effect depends on the maturity of firms’ bank debt.

JEL Codes: G32, K4, P2

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I. Introduction

Corruption is a major concern in emerging and developing countries because it influences growth, productivity, and foreign direct investment (Mauro, 1995; Wei, 2000; Méon and Weill, 2010). As bank credit has been shown to be a driving force for growth (e.g., Levine, Loayza and Beck, 2000), it is important to understand whether corruption affects economic development via the microeconomic channel of bank credit provided to firms.

This paper provides new empirical evidence of how corruption influences the level of bank credit at the firm level. The existing literature is ambiguous regarding the effect of corruption on bank credit. Based on the law and finance theory pioneered by La Porta et al. (1997), we would expect corruption to reduce bank credit. Namely, because more corruption indicates a lower quality of the legal institutions that protect banks and enforce contracts, corruption is likely to discourage banks from granting loans. A large body of empirical research supports the finding that poor law enforcement reduces bank credit, with some studies relying on rule of law measures (Bae and Goyal, 2011) and others on corruption measures (Weill, 2011).

However, viewing corruption solely within a judicial framework seems to be very restrictive. Corruption can also be present within the lending process, through bribing bank officials to obtain loans, as observed by Beck, Demirgüç-Kunt and Levine (2006).¹ Corruption in lending can contribute to a reduction in firms' bank debt due to the increasing cost of the loan for the borrower. In this case, a bribe amounts to a tax on borrowers, thus constituting an obstacle to credit. Nevertheless, corruption can also contribute to an increase in a firm's bank debt if the borrower proposes a bribe to a bank official to enhance his chances of obtaining a loan. Weill (2011) employs bank-level data from all over the world to show that corruption can enhance bank lending when levels of bank risk aversion associated with greater reluctance to grant loans are particularly high. Chen, Liu and Su (2013) find evidence of a positive impact of corruption on access to

¹ Two cross-country studies dealing with the causes of corruption in bank lending find links between bank competition and information sharing (Barth et al., 2009), and between media ownership and concentration (Houston, Lin and Ma, 2011).

bank credit in China, as they observe a positive link between a proxy for the amount of bribes provided by the firm and the importance of the firm's bank credit.

Surprisingly, this single-country study is to our knowledge the only work to investigate the effect of corruption on bank credit at the firm level. Several studies examine the impact of corruption on bank credit ratios at the aggregate country level (e.g., Weill, 2011; Jõeveer, 2013), but the evidence remains absent at the firm level, which is key to examining the channels of access to bank credit.

Our investigation aims to fill this gap by analyzing the effect of bribery on the bank debt of firms in transition countries. These countries provide an excellent opportunity to study the effects of bribery as corruption is still a major concern there (e.g., Javorcik and Wei, 2009). To answer our research question, we test the impact of bribery on bank debt ratios computed at the firm level for a sample of approximately 665,000 companies from 14 transition countries, including former communist countries of Central and Eastern Europe as well as Russia and Ukraine. This group of countries is characterized by substantial variation in terms of corruption, financial and economic development.

A major concern in analyzing the impact of bribery on bank debt ratios is the need to have firm-level information on both balance sheet items and bribery practices. As corruption is by nature a hidden phenomenon, information on bribery is generally collected on an anonymous basis to guarantee higher quality responses. However, firms remain reluctant to provide accounting data that would jeopardize anonymity.

To solve this issue, we combine firm-level accounting data from the Amadeus database with firm-level data on bribery practices from the BEEPS (Business Environment and Enterprise Performance Survey) database.² Relying on the latter database, we measure bribery as the frequency of additional unofficial payments to officials to “get things done”. We cannot directly match firms from both databases, as BEEPS information is anonymous. Therefore, we compute the mean of the bribery measure for each cell defined at the intersection of five characteristics: country, BEEPS survey wave (three waves covering 1999-2001, 2002-2004, 2005-2007), industry (2-digit ISIC code), firm size (micro, small, medium and large firms), and location size (capital,

² Kochanova (2012) adopts the same approach in her work on the impact of bribery on firm performance in transition countries.

city with a population over 1 million, and others). We then assign this bribery measure to each firm-level observation from the Amadeus database belonging to the same cell. As a consequence, we assume that all firms in the same cell practice the same level of bribery. This hypothesis is in accordance with the literature on corruption. Svensson (2003) and Fisman and Svensson (2007), among others, stress that bribery practices are industry- and region-specific, and firm size has also been shown to impact bribery (e.g., Safavian, Graham and Gonzalez-Vega, 2001; Beck, Demirgüç-Kunt and Levine, 2006).

In addition to gaining information on both firm-level characteristics and bribery practices, the use of the merged dataset presents the advantage of reducing endogeneity concerns between bank debt and bribery. First, as the bribery measure is computed for cells of firms and comes from a different data source than bank debt ratios, it is unlikely that bank debt ratios computed at the individual firm level have an impact on the bribery measure. Second, the panel structure of our dataset allows us to control for firm-level fixed effects and thus remove all time-invariant unobservable effects that could potentially affect both bribery and bank debt ratios.

This work contributes to the literature in four important respects. First, we provide the first cross-country analysis on the impact of bribery on firms' bank debt using micro-level data. We therefore contribute to the understanding of institutional factors that influence the level of firms' bank indebtedness. While many works analyze the effect of institutional determinants on financial structure (e.g., Giannetti, 2003; Fan, Titman and Twite, 2012), they all use country-level variables, which suffer from aggregation when linked to firm-level financial variables.

Second, we contribute to the literature on the effects of corruption in transition countries. A large set of studies confirms the persistence and economic consequences of corruption in these countries even though cross-country differences can be observed (e.g., Shleifer and Treisman, 2004, on Russia). In her study dealing with the determinants of capital structure in transition countries, Jõeveer (2013) examines the impact of corruption on debt ratios. Our analysis goes a step further, as we employ a disaggregated measure of bribery and consider a broader sample of countries including Russia and Ukraine, two countries characterized by much greater corruption than CEE countries, and we also use more recent data.

Third, we examine whether the effects of bribery on firms' bank debt differ depending on the maturity of that debt. When bank credit is analyzed as a whole, the differences between short-term and long-term bank credit are not taken into account, even though this may be an important consideration. First, short-term and long-term bank credit are not subject to the same requirements by banks, with the latter requiring more careful screening of firms. As a consequence, the mechanisms through which corruption affects firms' bank debt can work differently for these two types of credit. Second, short-term bank credit is much more common than long-term bank credit for firms in transition countries (De Haas and Peeters, 2006). However, long-term bank credit plays a more significant role in supporting economic growth, as it finances investment. The literature on the impacts of financial development on growth refers in particular to long-term bank credit when analyzing the role of banks as a coordinating device that allocates capital to efficient uses (Beck, 2013). Therefore, whether bribery influences short-term bank credit and long-term bank credit differently is an important question because the macroeconomic implications differ according to the type of credit.

Fourth, we investigate the potential effect of bribery by examining the interactions of bribery with institutional factors of the banking industry. Financial development can influence the impact of bribery on firms' bank debt by easing or tightening such indebtedness. Moreover, bank owners can influence this relation as corruption in lending might be more or less prevalent depending on bank ownership. As a consequence, the influence of bribery on firms' bank debt may be conditional on the institutional environment of banks and hence can differ across countries.

The remainder of the paper is organized as follows. Section II presents the data and the methodology. Section III discusses the results, and section IV provides the conclusions of this work.

II. Data and methodology

II.1 Firm- and county-level variables

Our sample includes approximately 665,000 companies from 14 Central and Eastern European countries which are covered widely by both the Amadeus and BEEPS databases: Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, and Ukraine. This selection of countries is of particular interest for our research question as they have somewhat similar histories of transition to market economies, while exhibiting heterogeneous institutional and economic development.

The primary source of firm-level data is the Amadeus database from Bureau Van Dijk, which contains financial data on companies from all European countries. This database has standardized income statement and balance sheet data, and includes virtually all registered firms.³ We use three variables to measure bank debt: the ratio of short-term bank debt to total assets (*Short-Term Bank Debt*), the ratio of long-term bank debt to total assets (*Long-Term Bank Debt*), and their sum (*Total Bank Debt*). By considering these three variables, we are able to analyze the overall effect of bribery not only on aggregate firm bank debt but also on the different maturities of that debt.

To select firm-level control variables, we follow the existing literature on the determinants of capital structure (Li, Yue and Zhao, 2009; Fan, Titman and Twite, 2012; Jõeveer, 2013). Firm size is measured by the logarithm of real sales (*Size*).⁴ We expect a positive relation between firm size and bank debt, as greater size is associated with a lower bankruptcy risk from the bank's perspective. The ratio of tangible fixed assets to total assets indicates the tangibility of assets (*Tangibility*). A positive relation is also expected with firms' bank debt, as the tangibility of assets is associated with higher collateral value, which facilitates access to bank loans. Nevertheless, these results can differ between short-term bank debt and long-term bank debt. Tangible assets are

³ To obtain the longest available data series, we use several editions of Amadeus. Appendix A reports some steps in assembling and processing Amadeus data prior to merging it with the BEEPS data and performing a regression analysis.

⁴ These results barely change when using total assets instead of sales.

generally financed by long-term means, with equity or long-term bank debt. As a consequence, firms with greater shares of tangible assets should have lower levels of short-term bank debt on their balance sheet, as they are less dependent on such debt for financing.

Profitability is measured by the ratio of profit before tax to total assets (*Profitability*).⁵ The expected effect of profitability on bank debt is ambiguous. Banks value greater profitability when making credit decisions as profitability reduces bankruptcy risk, suggesting that profitability should be associated with higher levels of bank debt. However, the pecking-order theory suggests that firms prefer to finance their activities with internal funding rather than bank debt. As a result, more profitable firms should ask for less bank debt than other firms. Finally, we consider growth opportunities defined by the industry-level median of real sales growth (*Growth Opportunities*).⁶ We expect a negative relation for this variable, in line with the view that managers of firms with better growth opportunities aim to minimize agency conflicts between stockholders and bondholders. Therefore, firms with better growth opportunities are expected to rely less on bank debt.

Macroeconomic conditions are related to the ratio of bank loans to total assets; thus, following previous studies (e.g., Jõeveer, 2013), we include the annual growth rate of GDP per capita (*GDP Growth*) as one of the control variables in our estimations.

In addition to GDP growth, we also use three other country-level variables to examine whether the institutional environment of a country influences the relation between bribery and firms' bank debt. Financial development is measured by the ratio of private credit granted by deposit money banks and other financial institutions to GDP, from World Bank data (*Private Credit*).⁷ This variable is commonly used in cross-country studies on financial development to represent the development of financial intermediaries (e.g., Djankov, McLiesh and Shleifer, 2007). Foreign ownership of banks

⁵ Our results are robust to other measures of profit such as operational profit/loss or net income.

⁶ We do not include the market to book value ratio, which is tested as a potential determinant in many studies of the capital structure of firms, as our sample mainly includes unlisted firms.

⁷ We also use an alternative measure of financial development, the ratio of domestic credit granted to the private sector to GDP, obtained from EBRD, and this measure provides similar results which are not reported here.

is measured by the asset share of foreign-owned banks, from EBRD (*Foreign Ownership*). State ownership of banks is measured by the asset share of state-owned banks, obtained from EBRD (*State ownership*). Appendix B provides exact definitions and data sources for all of the variables.

II.2 Bribery measure

To measure bribery, we use the BEEPS database compiled from a joint survey conducted by the European Bank for Reconstruction and Development (EBRD) and the World Bank.⁸ This database consists of a stratified random sample of anonymous firms from Central and Eastern Europe and the former Soviet Union countries. We use three waves of the survey completed in 2002, 2005 and 2008. The questionnaires are designed so that each wave covers the three preceding years. The BEEPS database contains questions regarding various aspects of the business environment, firm activities, market orientation, etc. The major criticism of BEEPS is the relatively high rate of non-responses to particular questions and the likelihood of a perception bias in those responses. To mitigate these limitations, we use the most neutral question to measure bribery, which was formulated consistently across the three survey waves: *“Thinking about officials, would you say the following statement is always, usually, frequently, sometimes, seldom or never true: “It is common for firms in my line of business to have to pay some irregular “additional payments/gifts” to get things done with regard to customs, taxes, licenses, regulations, services etc.”* Firms’ responses are captured in a categorical variable ranging from 1 to 6. We rescale this variable to a [0, 1] measure, where higher values correspond to more frequent involvement in bribery. Although this question seems to measure bureaucratic corruption in a broad sense, we believe that it effectively captures bribery practices taking place between firms and banks. This conjecture is supported by the fact that in the 2005 wave, the frequency of bribing to “get things done” is positively and significantly correlated with the response “It is necessary to make informal payments to get bank loans” to the question “If your firm did not apply for a

⁸ The data, questionnaire, and other documentation are available at <http://www.ebrd.com/pages/research/economics/data/beeeps.shtml>. Another source of these data is the WBES (World Bank Enterprise Survey), available at <https://www.enterprisesurveys.org>.

loan, what were the main reasons”. Unfortunately, the 2002 and 2008 waves do not contain similar questions.

In spite of the richness and uniqueness of the BEEPS dataset, it cannot be used alone in our research because it does not include questions on firms’ financial structures that were consistently formulated over waves.⁹ Therefore, we only use information on bribery from the BEEPS.

To link bribery measures from the BEEPS and financial firm-level information from Amadeus, we borrow the merging approach from Kochanova (2012).¹⁰ We define cells on the intersection of the following characteristics:

- Country.
- Time period, corresponding to the three waves of the BEEPS: 1999-2001, 2002-2004, 2005-2007.
- Industry: two digit ISIC rev. 3.1 industry classification.
- Firm size: micro (1-10 workers), small (11-49 workers), medium and large (more than 50 workers) firms.
- Location size: capital, city with a population above 1 million, and all others.

We require that each cell include at least 4 observations, and the dataset contains a median of 6 observations per cell, an average of 8.9 observations per cell, and a standard deviation of 7.95. For each cell, we compute the mean bribery from the BEEPS and assign it to every firm observation from Amadeus within the same cell. We thus assume that all firms from the same cell face the same level of local bribery. The existing research on bureaucratic corruption justifies the use of such a merging criterion. For instance, Svensson (2003) and Fisman and Svensson (2007) argue that the levels of bribery are industry and region-specific. They notably stress that firms from different

⁹ The BEEPS contains a few questions related to loans. For example, the 2008 wave includes questions “At this time, does this establishment have a line of credit or a loan from a financial institution?” and “Referring only to this most recent loan or line of credit, what was its value at the time of approval?” While about 52% of firms respond positively to the first question, only 77% of firms report the size of the loan. However, the 2002 and 2005 waves did not include a question on loan size. Moreover, the responses for 2002 do not enable separation between loans obtained from private individuals and those obtained from financial institutions. These changes in the questionnaire limit the ability to analyze the three waves together.

¹⁰ For other papers attempting to merge the two databases, see Anos-Casero and Udomsaph (2009) and Commander and Svejnar (2011), for example.

industries depend differently on public officials, as they require different amounts of licenses and permits due to the specific characteristics of their activity. In our case, however, as we cannot identify regions from the BEEPS, we use the size of the location in the merging criterion.¹¹ Firm size can also impact the level of bribery that affects firms. Safavian, Graham and Gonzalez-Vega (2001) show that large firms can be more vulnerable to rent-extracting officials in Russia. Beck, Demirgüç-Kunt and Levine (2006) observe a negative relation between firm size and the degree to which the corruption of bank officials is considered an obstacle to the operation and growth of the business.

The final dataset consists of unbalanced panel data for 9 years, 1999-2007, where the level of bribery remains constant over three time periods: 1999-2001, 2002-2004 and 2005-2007.

The use of the merged dataset for our analysis has several advantages. First, it contains rich data linking bribery and firm-level characteristics. Second, the panel structure of the data allows us to control for unobservable firm-specific characteristics and to reduce time-invariant endogeneity between firms' financial structure and bribery. Third, the bribery measure from the BEEPS averaged within cells should contain less perception bias and measurement error, as these will be averaged out across firms. The disadvantage of this approach is that we do not observe firm-specific bribery practices.

Table 1 reports descriptive statistics for all of the variables. The mean values of firms' short-term and long-term bank-debt ratios are 5.01% and 2.41%, respectively. As expected, long-term bank debt is lower than short-term bank debt for transition countries due to banks' reluctance to grant loans for long periods. According to Jõeveer (2013), debt ratios overall are much smaller in European transition countries than in developed countries, which can largely be explained by substantially lower levels of financial development in the former countries.

Table 2 displays the frequency of observations and the mean values of bribery by country, survey wave, and firm size. Based on these statistics, several insightful observations can be made regarding bribery. First, bribery varies considerably across transition countries. The mean values of bribery range from 0.06 in Slovenia to 0.38 in

¹¹ This criterion essentially separates capital cities from other cities and towns, as cities with populations greater than 1 million only exist in Russia and Ukraine.

Russia. Second, bribery has evolved somewhat over the survey waves, with mean values of 0.33, 0.30, and 0.28 observed for successive waves. Third, bribery is higher on average for larger firms. The mean values of bribery are 0.28 for firms with 1 to 10 employees, 0.32 for those with 11 to 49 employees, and 0.34 for those with more than 50 employees. This observation accords with the general view that bribery concerns larger firms more than smaller firms (e.g., Safavian, Graham and Gonzalez-Vega, 2001).

II.3 Empirical Methodology

To analyze the relation between bribery and bank debt, we run panel regressions of bank debt ratios on the bribery measure and the set of control variables:

$$Y_{it} = \beta \text{Bribery}_{ct-1} + \gamma X_{it-1} + \alpha_i + \mu_t + \varepsilon_{it}, \quad (1)$$

where Y_{it} is one of three types of bank debt ratios of firm i at time t : short-term debt, long-term debt or total debt; Bribery_{ct-1} is the average bribery level in cell c ; and X_{it-1} is the vector of control variables. Some specifications also include country-level variables and their interactions with the bribery measure. Both the bribery level and the control variables are lagged by one period to reduce potential endogeneity between them and the dependent variables. The term α_i captures unobserved time-invariant firm-specific characteristics potentially responsible for cross-time correlations of a firm's residuals (e.g., management skills, type of corporate governance, etc.); it also removes all cross-country and cross-industry differences in bribery measure and accounting data. The term μ_t removes time-fixed effects such as aggregate shocks or business cycles. Finally, ε_{it} is the i.i.d. random error term, satisfying the usual assumptions. Specification (1) is estimated using robust standard errors clustered at the firm level (Petersen, 2009). The main coefficient of interest is β ; a positive sign would suggest that bribery helps firms obtain external financing from banks.

To overcome the potential endogeneity issue, we should ideally use instruments for our measure of bribery. However, it is difficult to find appropriate instruments given the nature of our dataset, the extensive coverage of countries and the lack of guidance from the existing literature. Nevertheless, the endogeneity problem is greatly reduced in our settings for the empirical analysis. First, bribery is computed for cells of firms while bank

debt ratios are firm-level characteristics coming from a different data source. Therefore, bank debt ratios are unlikely to influence bribery measures. Second, we control for firm fixed effects in the regression analysis and thereby remove all unobservable time-invariant variables that can potentially contribute to reversing the causality between bribery and bank debt ratios.^{12, 13} Finally, we lag the observations by one year for all of the independent variables in our empirical specification to reduce the contemporaneous reverse causality.

III. Results

This section presents the results for the impact of bribery on firms' bank debt ratios. We begin with the main estimation results and then turn to robustness checks.

III.1 Main results

Table 3 reports the results from the estimation of our baseline specification (1) for three dependent variables: short-term, long-term and total bank debt ratios. This breakdown enables us to account for the fact that bribery can have different effects on bank debt depending on the maturity.

We observe that bribery has a positive and statistically significant¹⁴ impact on the short-term bank debt ratio but a negative impact on the long-term bank debt ratio. If the bribery level increases by 0.3 (sample average), then short-term bank debt increases by 0.54%, accounting for 11% of the average value of the sample (5.01%). Regarding long-term debt, a similar increase in bribery level is associated with a decrease of 0.08%,

¹² Random effects regression analysis seems to be implausible because it is unlikely that the α_i values do not correlate with regressors. Moreover, the Hausman test rejects RE regression in favor of FE regression (results not reported here).

¹³ Appendix C presents the results for specifications that do not include firm fixed effects, but only include country and time fixed effects (first three columns); and only country, time, industry, firm size and city size fixed effects (last three columns). This table is useful for comparing the regression results with firm and time fixed effects. In the latter case, the coefficients on the bribery measure decrease in absolute value, indicating the reduction of the endogeneity bias.

¹⁴ In all our reported estimations, the standard errors are robust to heteroskedasticity and clustered at the firm-level. We also estimate the specification (1) using bootstrapped standard errors, but they remain virtually undistinguishable from the clustered errors.

which is just 3% of its sample average (2.41%). Thus, the change in the short-term bank debt ratio appears to be economically significant.

These contrasting results for short-term and long-term bank debt can be reconciled. Banks are reluctant to grant long-term loans in the context of a weak institutional framework, which can explain why long-term loans are much less common than short-term loans in emerging and developing countries. Consequently, in the presence of abundant corruption, banks restrict the supply of long-term loans. Long-term loans require more careful screening of firms than short-term loans. This difference in screening results from the fact that these types of loans are not used for the same purpose and are not associated with collateral in the same way. Long-term loans contribute to the financing of tangible assets, while short-term loans are used to satisfy working capital requirements. As observed by Nguyen and Qian (2012), short-term loans are less often associated with collateral. Therefore, these two types of loans are not provided according to the same process, with long-term loans receiving much more control and screening. As a consequence, bribing bank officials only tends to increase bank loans used for short-term purposes.

This finding is of particular interest and supports the view that the effects of bribery on firms' bank debt cannot be analyzed without taking debt maturity into account. Furthermore, we find a positive and significant coefficient for *Bribery* when explaining the total bank debt ratio. Overall, this result suggests that the positive effect of bribery on short-term bank debt is stronger than the negative effect on long-term bank debt. This is not surprising because the short-term bank debt ratio is much higher than the long-term bank debt ratio on average in our sample of transition countries.

We observe the absence of an overall adverse effect of bribery on firms' bank debt. Instead, bribery can increase bank debt, which we interpret as resulting from bribes given to bank officials that ease the access to short-term bank loans. This finding is in line with the existing empirical research. For China, Chen, Liu and Su (2013) find that bribery at the firm-level (proxied by the amount of entertainment and travel costs scaled by sales) contributes to a higher bank credit ratio (bank loans to sales). Fan, Titman and Twite (2012) document that corruption measured at the country level is positively related to the

ratio of total debt to total assets, but reduces the ratio of long-term debt to total assets. As a consequence, their study suggests that corruption is particularly detrimental to long-term bank debt, in line with our results for debt maturity. Finally, Jõeveer (2013) finds some evidence in favor of a positive impact of corruption measured at the country level on leverage ratios in transition countries.

The signs and significance of estimated coefficients for control variables are as expected. *Size* has a significant and positive coefficient in all estimations, in accordance with the view that larger firms have easier access to bank loans. *Profitability* is significantly negative in all estimations, in line with the pecking-order theory that more profitable firms require less bank debt, as they prefer to rely first on internal funds to satisfy their financing needs. *Growth Opportunities* is significantly negative when explaining long-term bank debt, but positively related to short-term bank debt and total bank debt. While the result for short-term bank debt is quite unusual, the finding for long-term bank debt accords with the view that firms with better growth prospects rely less on bank debt. The estimated coefficient for *GDP Growth* is negative and significant, which is at odds with current theory. However, a similar result has already been found in the case of transition countries (Jõeveer, 2013).

As expected, *Tangibility* does not have the same relation with short-term and long-term bank debt. The coefficients are significantly positive for the long-term bank debt ratio and the total bank debt ratio. This result reflects the fact that a larger share of tangible assets in total assets enhances the collateralization value of firms and thus facilitates their access to bank loans. The coefficient for the short-term bank debt ratio is significantly negative, which can be explained by the fact that firms with larger shares of tangible assets in their balance sheet use less short-term bank debt to finance their assets. Indeed, tangible assets are financed with equity and long-term loans. Similarly, Li, Yue and Zhao's (2009) study of China finds a negative impact of tangibility of assets on the short-term debt ratio defined as short-term debt to total assets.

III.2 Interactions with country-level variables

Our baseline estimations indicate that bribery is positively related to short-term bank debt but negatively related to long-term bank debt. However, this does not answer

the question of whether the influence of bribery depends on the institutional characteristics of the banking industry. Thus, we consider three institutional factors which are of particular interest for transition and developing countries: the level of financial development, foreign bank ownership, and state bank ownership. Each of these factors is included in the regressions together with its interaction with bribery. Thus, the interaction term between each factor and bribery provides information on how an increase in each factor influences the impact of bribery on bank debt.

Financial development can influence the relation between bribery and firms' bank debt. The bribing behavior of borrowers is directly related to the ease of access to bank debt. As a consequence, a high level of financial development would be expected to weaken the negative link between bribery and firms' bank debt by enabling better access to financial services. To test this hypothesis, we redo the estimations, now including a variable for financial development and its interaction with bribery. Financial development is proxied by the ratio of private credit provided by banks and other financial institutions to GDP (*Private Credit*).

Table 4 reports a significantly negative coefficient for the interaction term between *Private Credit* and *Bribery* in all three specifications. This result indicates that greater financial development reduces the positive influence of bribery on firms' bank debt. This is in line with the view that bribery facilitates access to bank credit when such credit is scarce.

This finding is particularly important, as it suggests that the positive relation between bribery and firms' bank debt should not be taken for granted regardless of the level of financial development. In relation to this, examining the overall effect of bribery on firms' bank debt ratios is of significant interest. The overall coefficient of the bribery variable is the sum of the coefficient for *Bribery* and the coefficient for the interaction term between *Bribery* and *Private Credit* multiplied by the value of *Private Credit*. We can thus compute the thresholds of financial development at which the overall impact of bribery¹⁵ is no longer positive for the short-term bank debt and total bank debt ratios. We

¹⁵ Note that the overall impact of bribery is the sum of the coefficient for *Bribery* and the coefficient for the interaction term between *Bribery* and *Private Credit* multiplied by the value of *Private Credit*.

find that these thresholds are 47.2% and 49%, respectively. The descriptive statistics of our sample show that the mean value of the financial development variable is 41.9%, with values ranging from 2.8% to 153.1%. This means that the level of financial development in our sample of countries is on average not high enough to reverse the positive relation between bribery and bank credit. However, the level of financial development can be high enough to reverse the relation for some countries and time periods. This is especially important for policy makers aiming to improve financial development in transition countries. Finally, the coefficient of the *Private Credit* variable is significantly positive for all three dependent variables. This is in line with the intuitive view that a greater level of financial development in a country improves access to bank debt.

Foreign ownership of banks is a key characteristic of banking industries in transition countries. Following privatization policies, the market share of foreign banks is high in most of these countries, sometimes nearly 100%, as in the Czech Republic. Some studies show that foreign ownership could influence the access to bank debt (e.g., Clarke et al., 2006; Beck and Martinez-Peria, 2010). Therefore, it is important to take this factor into account when examining the relation between bribery and firms' bank debt. However, opposing hypotheses have been put forward regarding this influence. One view holds that stronger control of employees inside foreign banks and the presence of foreign managers less involved in domestic networks can weaken the impact of corruption on lending in countries with a larger foreign bank presence.¹⁶ However, foreign banks may prefer "cherry-picking behavior", which would reduce the access to bank credit for a vast number of companies, in particular the SMEs. As a result, this weaker access to bank credit could provide greater incentives for firm managers to bribe bank officials to obtain loans. Therefore, a greater foreign bank presence would strengthen the link between bribery and firms' bank debt.

To examine these possible effects, we include a country-level variable measuring foreign ownership of banks and an interaction term between foreign ownership and bribery into specification (1).

¹⁶ Corruption scandals can also affect foreign banks in transition countries. A recent example deals with the CEO of Société Générale's Russian subsidiary Rosbank, which was charged with bribery in May 2013.

Table 5 reports that the interaction term between *Foreign Ownership* and *Bribery* is not significant when explaining the short-term bank debt ratio, but significantly negative for the long-term bank debt ratio and the total bank debt ratio. This finding is in line with the view that foreign banks are more reluctant than domestic banks to grant long-term loans in a corrupt institutional framework. The absence of any significant influence of foreign ownership on the relation between bribery and the short-term bank debt ratio can be explained by the fact that shorter maturity is associated with lower perceived credit risk and is thus less sensitive to a flawed legal environment. Finally, we observe that the estimated coefficient for *Foreign Ownership* is significant and positive for all bank debt ratios. It accords with the view that foreign banks do not hamper access to bank credit but rather promote it, as shown by Clarke et al. (2006).

State ownership is still widely present at various levels in transition countries. As these were all formerly communist countries, it is worth noting that they all had a fully state-owned banking industry two decades ago. Since that time, the banking industry has gradually been handed over to private investors to different degrees depending on the country. As corruption is generally observed in public administration, state-owned banks could be affected by bribery more than other banks. Therefore, having more banks with state ownership may influence the relation between bribery and firms' bank debt by strengthening the role of corruption in lending.

To test this hypothesis, we add a country-level variable measuring state ownership and an interaction term between state ownership and bribery into specification (1). Table (6) displays the results. We find that the interaction term between *State ownership* and *Bribery* is significantly positive in all estimations, meaning that a greater presence of the state in the ownership of banks strengthens the positive impact of bribery on firms' bank debt. This result suggests that officials in banks with higher levels of state ownership may be more likely to accept bribes, thereby favoring the issuance of loans to firms. We can compute the threshold state ownership metric at which the sign of the overall impact of bribery changes. The overall impact of bribery is always positive if the value of state ownership is greater than 8.2% or 27.7% for the short-term and long-term bank debt ratios, respectively. For comparison, the mean value of the state ownership variable in our sample is 15.8%, varying from 0% to 90.9%.

It is remarkable to observe that the coefficient of *State ownership* is significantly negative in all estimations, which suggests that a larger share of state-owned banks reduces firms' bank debt in transition countries. This result is in line with the finding of La Porta et al. (2002) that state ownership of banks is associated with lower levels of financial development and access to credit.

III.3 Robustness checks

In this section we implement several robustness checks.

First, we check whether bribery has a greater influence on bank debt ratios in industries more dependent on external finance. Thus far we have assumed that all firms have the same need for bank credit and the same willingness to buy that credit. However, the dependence on external financing can vary across firms. Therefore, it is of interest to test whether bribery provides greater help in obtaining bank loans for firms that rely more on external financing. To test this conjecture, we follow Rajan and Zingales (1998) and measure industry-level dependence on external financing. Dependence on external financing is captured as the share of capital expenditures not financed by the cash flow from operations. We borrow this measure from Bena and Ondko¹⁷ (2012) who compute it for 1996-2005 using US data from Compustat for 2-digit industry ISIC code, and use it to analyze financial development and the allocation of external financing in European countries.

We then estimate specification (1) including the interaction term between bribery and dependence on external financing. We do not include the dependence on external financing alone because the coefficient of this variable will not be identified due to the firm fixed effects (firms do not change industries, and this variable is constant over time). The results of these estimations are presented in Table 7.

We observe that the interaction term between bribery and dependence on external financing is significantly positive when explaining all bank debt ratios. These results complement our main findings and suggest that bribery provides more help in obtaining loans for firms operating in industries with greater dependence on external financing.

¹⁷ We are thankful to Peter Ondko for sharing his data with us.

This finding indicates that bribery greases the wheels of finance, especially in environments with greater demand for credit.

Second, we explore two alternative measures of bribery constructed as dummy variables from the original frequency of paying bribes. The first measure (*Bribery1*) is equal to one if firms report that they bribe public officials sometimes, frequently, usually, or always to “get things done”, and zero otherwise, as in De Rosa, Gooroochurn and Gorg (2010). The second measure (*Bribery2*) is based on a wider definition of bribery: it takes the value one if firms report that they bribe public officials seldom, sometimes, frequently, usually, or always to “get things done”, and zero if they report never bribing for this purpose. Both of these variables only indicate participation in bribery, not its intensity as our main measure of bribery does. The results are displayed in Table 8. We observe that these results are similar to our main results with positive coefficients when explaining short-term bank debt and total bank debt but negative coefficients when explaining long-term bank debt. Therefore, our findings are robust to different definitions of bribery.

Third, we examine whether our results are robust to changes in the bribery metric. We initially computed average bribery within cells, requiring them to contain at least 4 observations. We now repeat the estimations, requiring cells to have at least 5 observations, resulting in fewer observations but greater precision in the measurement of bribery. Table 9 reports new results. We again find that the coefficient of bribery is significantly negative for short-term and total bank debt. The only change is the lack of significance for the coefficient when explaining long-term debt, although the coefficient remains negative.

Fourth, we run regressions with alternative control variables. We measure size by the logarithm of total assets rather than the logarithm of total sales, and profitability by operational profit rather than by the ratio of profit before taxes to assets. The results of these estimations, presented in Table 10, confirm the negative influence of bribery on the short-term and total bank debt ratio as well as on the positive link with long-term bank debt.

Fifth, we perform estimations excluding two highly corrupt countries from the sample, Russia and Ukraine. As Table 11 demonstrates, the coefficients on bribery

remain significant and with the same sign. Therefore, our selection of countries does not drive the main results.

IV. Conclusion

This paper examines the impact of bribery on firms' bank debt ratios. To this end, we combine financial firm-level data with responses on bribery practices from a survey of a large sample of firms from transition countries. Our analysis yields three important results.

First, we find that bribery contributes to an increase in firms' bank debt ratios. Therefore, a greater degree of bribery would on average not be detrimental but rather beneficial for firms' total bank debt in transition countries. Bribery would encourage bank lending through bribes given to bank officials and would favor access to bank debt.

Second, the effects of bribery on firms' bank debt ratios differ with the maturity of that debt. While bribery contributes to an increase in short-term bank debt, it hampers long-term bank debt. We interpret this latter result as indicating that banks are more reluctant to grant long-term loans in a highly corrupt environment. Long-term bank loans are less common and more tightly monitored inside banks than short-term bank loans. The decision to provide long-term loans can thus be more strongly influenced by the institutional framework through the protection of creditors and the enforcement of loan contracts.

Third, institutional factors of the banking industry play a significant role in determining the impact of bribery on firms' bank debt ratios. A higher level of financial development reduces the positive impact of bribery on firms' bank debt ratios. This result supports the view that bribery facilitates easier access to bank credit when the latter is a rare resource. In contrast, a higher market share of state-owned banks strengthens the positive relation between bribery and firms' bank debt ratios. This finding is consistent with the view that state-owned banks are expected to be more readily involved in bribery than other banks, and as a consequence the positive impact of bribery on the ease of access to bank credit would be strengthened by greater state ownership of banks. Finally,

the presence of foreign banks reinforces the negative effect of bribery on long-term bank debt. Thus, greater foreign bank ownership does not have a uniform influence on the link between bribery and bank debt.

Our main conclusion of a positive relation between bribery and firms' bank debt may at first glance appear to be inconsistent with the literature on corruption, as this literature generally finds corruption to have a detrimental impact on the economy. However, the impact of corruption on firms' bank debt has largely been ignored in the literature, and our conclusion is not at odds with the few related studies. Chen, Liu and Su (2013) also find a positive influence of bribery on the bank credit ratio in China. Studies on the determinants of capital structure do not find a negative influence of corruption on leverage ratios (Fan, Titman and Twite, 2012; Jöeveer, 2013).

In terms of policy implications, this work contributes to a better understanding of how bribery shapes firms' bank debt ratios. We argue that fighting corruption will not contribute to better access to bank credit in all situations. However, we do not support the view that countries may benefit from letting corruption grow in order to boost bank debt ratios. Although the average effect of bribery is positive, the impact of bribery is negative for long-term bank debt, which is the major source of investment financing that contributes to economic growth. Moreover, the effect of bribery on firms' bank debt ratios is conditional on the institutional factors of the banking industry. A high level of financial development can clearly reverse the positive impact of bribery on firms' bank debt. As a consequence, any policy targeting greater bank debt ratios by reducing corruption should take the targeted type of debt and the institutional framework of the banking industry into account.

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Table 1
Descriptive statistics

This table presents the means and standard deviations of the main variables used in the estimations. Definitions of these variables are provided in Appendix B.

Variable	Mean	Std. Dev.
Short-Term Bank Debt	5.01	13.49
Long-Term Bank Debt	2.41	9.93
Total Bank Debt	7.42	16.90
Bribery	0.30	0.14
Size	4.42	2.17
Profitability	7.98	33.56
Tangibility	26.71	27.43
Growth opportunities	2.97	15.02
Private credit	41.92	30.67
Foreign ownership	58.82	31.17
State ownership	15.95	18.93
GDP growth	5.50	3.19

Table 2
Frequencies and mean values of bribery levels

This table reports the frequency of observations and the mean and standard deviation of the bribery measure and short-term and long-term bank debts by country, survey wave, and firm size.

	Frequency (%)	Bribery		Short-Term Bank Debt (%)		Long-Term Bank Debt (%)	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Country							
Bulgaria	4.61	0.30	0.15	4.12	11.91	8.25	18.97
Croatia	3.86	0.22	0.10	9.07	15.76	8.61	15.74
Czech Republic	3.36	0.17	0.10	4.55	10.77	5.44	15.04
Estonia	2.53	0.15	0.08	7.35	14.60	7.14	15.44
Hungary	0.10	0.13	0.11	10.29	14.48	3.91	7.96
Latvia	0.65	0.17	0.10	11.27	15.22	13.50	19.17
Lithuania	0.34	0.22	0.16	5.68	10.42	10.49	16.91
Poland	2.29	0.14	0.09	7.56	10.71	4.82	9.84
Romania	28.56	0.27	0.13	0.78	4.71	0.27	2.93
Russia	22.34	0.38	0.12	8.80	18.26	2.89	11.63
Serbia	5.41	0.35	0.16	10.85	17.55	2.46	8.55
Slovakia	0.42	0.23	0.11	5.10	9.53	5.63	11.35
Slovenia	0.30	0.06	0.06	11.07	14.31	10.88	15.47
Ukraine	25.25	0.30	0.11	4.07	12.84	0.73	5.64
Years							
1999-2001	12.21	0.33	0.15	3.93	10.63	2.24	9.37
2002-2004	39.87	0.30	0.15	4.34	12.82	1.82	8.85
2005-2007	47.92	0.28	0.11	5.84	14.59	2.94	10.86
Firm size							
1-10 empl	60.08	0.28	0.13	3.75	12.36	1.77	9.00
11-49 empl	26.46	0.32	0.13	5.93	14.35	2.88	10.69
50+ empl	13.46	0.34	0.15	8.84	15.54	4.32	11.88

Table 3
Main estimations

Panel estimations with firm fixed effects and time fixed effects. The dependent variable is firms' bank debt ratio as listed at the top of each column. Definitions of the variables are provided in Appendix B. Explanatory variables are lagged one period. Standard errors (in parentheses) are robust to heteroskedasticity and clustered at the firm level. *, **, *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level.

	Short-Term Bank Debt	Long-Term Bank Debt	Total Bank Debt
Bribery	1.813*** (0.106)	-0.272*** (0.079)	1.738*** (0.130)
Size	0.217*** (0.019)	0.207*** (0.012)	0.415*** (0.022)
Profitability	-0.004*** (0.000)	-0.001*** (0.000)	-0.006*** (0.000)
Tangibility	-0.006*** (0.001)	0.011*** (0.001)	0.007*** (0.001)
Growth Opportunities	0.002*** (0.001)	-0.001*** (0.000)	0.002*** (0.001)
GDP Growth	-0.187*** (0.005)	-0.069*** (0.003)	-0.261*** (0.005)
No. of observations	1 756 393	1 782 913	1 712 626
No. of firms	660 053	665 427	650 100
R2 overall	0.024	0.032	0.054

Table 4
The impact of financial development

Panel estimations with firm fixed effects and time fixed effects. The dependent variable is firms' bank debt ratio as listed at the top of each column. Private Credit data are not available for Serbia. Definitions of the variables are provided in Appendix B. Explanatory variables are lagged one period. Standard errors (reported in parentheses) are robust to heteroskedasticity and clustered at the firm level. *, **, *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level.

	Short-Term Bank Debt	Long-Term Bank Debt	Total Bank Debt
Bribery	2.643*** (0.154)	0.168 (0.109)	2.207*** (0.189)
Bribery×Private Credit	-0.056*** (0.005)	-0.031*** (0.004)	-0.045*** (0.007)
Private Credit	0.051*** (0.002)	0.024*** (0.002)	0.084*** (0.003)
Size	0.234*** (0.019)	0.171*** (0.012)	0.396*** (0.023)
Profitability	-0.004*** (0.000)	-0.001*** (0.000)	-0.005*** (0.000)
Tangibility	-0.007*** (0.001)	0.010*** (0.001)	0.004*** (0.001)
Growth Opportunities	-0.028*** (0.001)	-0.012*** (0.001)	-0.039*** (0.001)
GDP Growth	-0.192*** (0.005)	-0.077*** (0.003)	-0.277*** (0.006)
No. of observations	1 685 018	1 711 538	1 641 251
No. of firms	651 530	656 904	641 577
R2 overall	0.012	0.050	0.050

Table 5
The impact of foreign ownership

Panel estimations with firm fixed effects and time fixed effects. The dependent variable is firms' bank debt ratio as listed at the top of each column. Definitions of the variables are provided in Appendix B. Explanatory variables are lagged one period. Standard errors (in parentheses) are robust to heteroskedasticity and clustered at the firm level. *, **, *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level.

	Short-Term Bank Debt	Long-Term Bank Debt	Total Bank Debt
Bribery	1.907*** (0.193)	0.323** (0.137)	2.424*** (0.226)
Bribery×Foreign Ownership	0.001 (0.004)	-0.017*** (0.003)	-0.014*** (0.005)
Foreign Ownership	0.046*** (0.002)	0.013*** (0.002)	0.072*** (0.003)
Size	0.220*** (0.019)	0.205*** (0.012)	0.418*** (0.022)
Profitability	-0.004*** (0.000)	-0.001*** (0.000)	-0.005*** (0.000)
Tangibility	-0.006*** (0.001)	0.011*** (0.001)	0.007*** (0.001)
Growth Opportunities	-0.005*** (0.001)	-0.003*** (0.000)	-0.008*** (0.001)
GDP Growth	-0.169*** (0.005)	-0.070*** (0.003)	-0.237*** (0.005)
No. of observations	1 756 393	1 782 913	1 712 626
No. of firms	660 053	665 427	650 100
R2 overall	0.001	0.040	0.016

Table 6
The impact of state ownership

Panel estimations with firm fixed effects and time fixed effects. The dependent variable is firms' bank debt ratio as listed at the top of each column. Data on State Ownership are not available for Russia. Definitions of the variables are provided in Appendix B. Explanatory variables are lagged one period. Standard errors (in parentheses) are robust to heteroskedasticity and clustered at the firm level. *, **, *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level.

	Short-Term Bank Debt	Long-Term Bank Debt	Total Bank Debt
Bribery	-0.992*** (0.143)	-1.913*** (0.130)	-2.682*** (0.184)
Bribery×State Ownership	0.121*** (0.005)	0.069*** (0.004)	0.189*** (0.006)
State Ownership	-0.024*** (0.002)	-0.010*** (0.001)	-0.032*** (0.002)
Size	0.263*** (0.019)	0.245*** (0.012)	0.505*** (0.023)
Profitability	-0.003*** (0.000)	-0.001*** (0.000)	-0.004*** (0.000)
Tangibility	-0.002** (0.001)	0.012*** (0.001)	0.012*** (0.001)
Growth Opportunities	0.010*** (0.001)	0.000 (0.000)	0.011*** (0.001)
GDP Growth	-0.140*** (0.005)	-0.069*** (0.004)	-0.213*** (0.006)
No. of observations	1 371 406	1 395 451	1 330 042
No. of firms	471 930	475 909	463 306
R2 overall	0.022	0.040	0.059

Table 7
Robustness check: the influence of dependence on external financing

Panel estimations with firm fixed effects and time fixed effects. The dependent variable is firms' bank debt ratio as listed at the top of each column. Definitions of the variables are provided in Appendix B. Explanatory variables are lagged one period. Standard errors (reported in parentheses) are robust to heteroskedasticity and clustered at the firm level. *, **, *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level.

	Short-Term Bank Debt	Long-Term Bank Debt	Total Bank Debt
Bribery	1.917*** (0.110)	0.069 (0.085)	2.227*** (0.138)
Bribery×External Finance Dependence	0.467* (0.267)	1.506*** (0.204)	2.181*** (0.329)
Size	0.217*** (0.019)	0.209*** (0.012)	0.417*** (0.022)
Profitability	-0.004*** (0.000)	-0.001*** (0.000)	-0.006*** (0.000)
Tangibility	-0.006*** (0.001)	0.011*** (0.001)	0.007*** (0.001)
Growth Opportunities	0.002*** (0.001)	-0.001*** (0.000)	0.002*** (0.001)
GDP Growth	-0.187*** (0.005)	-0.067*** (0.003)	-0.258*** (0.005)
No. of observations	1,756,393	1,782,913	1,712,626
No. of firms	660,053	665,427	650,100
R2 overall	0.022	0.027	0.044

Table 8
Robustness check: other bribery measures

Panel estimations with firm fixed effects and time fixed effects. The dependent variable is firms' bank debt ratio as listed at the top of each column. Definitions of the variables are provided in Appendix B. Explanatory variables are lagged one period. Standard errors (in parentheses) are robust to heteroskedasticity and clustered at the firm level. *, **, *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level.

	Short-Term Bank Debt	Long-Term Bank Debt	Total Bank Debt	Short-Term Bank Debt	Long-Term Bank Debt	Total Bank Debt
Bribery1	0.372*** (0.063)	-0.455*** (0.050)	0.022 (0.078)			
Bribery2				0.956*** (0.068)	-0.087 (0.057)	1.024*** (0.087)
Size	0.222*** (0.019)	0.210*** (0.012)	0.423*** (0.022)	0.220*** (0.019)	0.207*** (0.012)	0.418*** (0.022)
Profitability	-0.004*** (0.000)	-0.001*** (0.000)	-0.006*** (0.000)	-0.004*** (0.000)	-0.001*** (0.000)	-0.006*** (0.000)
Tangibility	-0.006*** (0.001)	0.011*** (0.001)	0.007*** (0.001)	-0.006*** (0.001)	0.011*** (0.001)	0.007*** (0.001)
Growth Opportunities	0.002*** (0.001)	-0.002*** (0.000)	0.002** (0.001)	0.002*** (0.001)	-0.001*** (0.000)	0.002*** (0.001)
GDP Growth	-0.188*** (0.005)	-0.073*** (0.003)	-0.265*** (0.005)	-0.187*** (0.005)	-0.069*** (0.003)	-0.260*** (0.005)
No. of obs.	1 756 393	1 782 913	1 712 626	1 756 393	1 782 913	1 712 626
No. of firms	660 053	665 427	650 100	660 053	665 427	650 100
R2 overall	0.021	0.032	0.052	0.024	0.031	0.055

Table 9
Robustness check: different numbers of observations in a cell for the bribery measure

Panel estimations with firm fixed effects and time fixed effects. The dependent variable is firms' bank debt ratio as listed at the top of each column. There are at least 5 observations in each cell for the Bribery measure. The variables are defined in Appendix B. Explanatory variables are lagged one period. Standard errors (in parentheses) are robust to heteroskedasticity and clustered at the firm level. *, **, *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level.

	Short-Term Bank Debt	Long-Term Bank Debt	Total Bank Debt
Bribery	1.741*** (0.122)	-0.108 (0.080)	1.842*** (0.143)
Size	0.233*** (0.021)	0.182*** (0.012)	0.410*** (0.023)
Profitability	-0.004*** (0.000)	-0.001*** (0.000)	-0.005*** (0.000)
Tangibility	-0.006*** (0.001)	0.009*** (0.001)	0.004*** (0.001)
Growth Opportunities	0.001 (0.001)	-0.002*** (0.000)	0.001 (0.001)
GDP Growth	-0.191*** (0.005)	-0.062*** (0.003)	-0.259*** (0.006)
No. of observations	1 514 048	1 542 830	1 474 877
No. of firms	590 441	595 674	581 358
R2 overall	0.026	0.031	0.055

Table 10
Robustness check: alternative control variables

Panel estimations with firm fixed effects and time fixed effects. The dependent variable is firms' bank debt ratio as listed at the top of each column. Definitions of the variables are provided in Appendix B. Explanatory variables are lagged one period. Standard errors (in parentheses) are robust to heteroskedasticity and clustered at the firm level. *, **, *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level.

	Short-Term Bank Debt	Long-Term Bank Debt	Total Bank Debt	Short-Term Bank Debt	Long-Term Bank Debt	Total Bank Debt
Bribery	1.867*** (0.107)	-0.330*** (0.079)	1.744*** (0.130)	1.824*** (0.106)	-0.272*** (0.079)	1.751*** (0.130)
Size (log total assets)	-0.083*** (0.022)	0.368*** (0.014)	0.316*** (0.025)			
Size (log sales)				0.203*** (0.019)	0.202*** (0.012)	0.396*** (0.022)
Profitability (operational profit/loss)				-0.002*** (0.000)	-0.001*** (0.000)	-0.003*** (0.000)
Profitability (profit/loss before tax)	-0.003*** (0.000)	-0.001*** (0.000)	-0.005*** (0.000)			
Tangibility	-0.006*** (0.001)	0.010*** (0.001)	0.006*** (0.001)	-0.005*** (0.001)	0.011*** (0.001)	0.007*** (0.001)
Growth Opportunities	0.003*** (0.001)	-0.002*** (0.000)	0.003*** (0.001)	0.002*** (0.001)	-0.001*** (0.000)	0.002*** (0.001)
GDP Growth	-0.186*** (0.005)	-0.069*** (0.003)	-0.260*** (0.005)	-0.188*** (0.005)	-0.069*** (0.003)	-0.261*** (0.005)
No. of observations	1 756 394	1 782 914	1 712 627	1 757 202	1 783 873	1 713 149
No. of firms	660 054	665 428	650 101	660 484	665 797	650 359
R2 overall	0.001	0.044	0.056	0.022	0.031	0.052

Table 11
Robustness check: sample restriction

Panel estimations with firm fixed effects and time fixed effects without Russia and Ukraine. The dependent variable is firms' bank debt ratio as listed at the top of each column. Definitions of the variables are given in Appendix B. Explanatory variables are lagged one period. Standard errors (in parentheses) are robust to heteroskedasticity and clustered at the firm level. *, **, *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level.

	Short-Term Bank Debt	Long-Term Bank Debt	Total Bank Debt
Bribery	2.041*** (0.132)	-0.591*** (0.112)	1.873*** (0.177)
Size	0.019 (0.027)	0.257*** (0.021)	0.280*** (0.034)
Profitability	-0.002*** (0.000)	-0.001*** (0.000)	-0.003*** (0.000)
Tangibility	-0.002*** (0.001)	0.015*** (0.001)	0.014*** (0.001)
Growth Opportunities	0.016*** (0.001)	0.003*** (0.000)	0.018*** (0.001)
GDP Growth	-0.290*** (0.009)	-0.176*** (0.007)	-0.463*** (0.012)
No of observations	914 140	961 080	897 629
No of firms	325 880	334 493	322 252
R2 overall	0.014	0.038	0.050

Appendix A. Data cleaning

The Amadeus database treats the exit of “shut down” firms in a specific way. If a firm exits or stops reporting data, this firm is kept in the database for four years (with empty values of variables) and is excluded from the database afterwards. For example, the 2010 edition of Amadeus does not include firms that exited in 2006 or before. To preserve the longest available data series, we therefore use several editions of Amadeus: November 2010, May 2010 and June 2007 editions downloaded from the WRDS, and the August 2003 DVD update from the Bureau of van Dijk.

To reduce potential selection bias and measurement errors, to deal with severe outliers, and to provide a better comparison of firms across CEE countries, we perform the following data cleaning procedures:¹⁸

1. remove firms with data from consolidated statements to avoid double counting of firms or subsidiaries and duplicates; include observations for which financial information is reported for a 12 month period;
2. transform all industry codes to ISIC rev. 3.1 to align the BEEPS and Amadeus databases, and remove firms that do not report industry codes;
3. convert the measure of firm size (operational revenue) into US dollars using period average exchange rates from the IMF, and deflate to 2000 constant prices using countries' GDP deflators;
4. remove observations where three types of leverage or tangibility are either negative or greater than 100;
5. remove severe outliers: the 1st and 99th percentiles of the distributions of yearly changes in real operational revenue, total assets and number of employees for each country and 2-digit industry code. If an outlier is at the start or the end of the time span for a firm, then only the first or last observation is removed. If the outlier is in the middle of the time period, then all of the firm data are removed.
6. remove severe outliers: the 1st and 99th percentiles of the distributions of return on assets for each country, 2-digit industry code, and year. If an outlier is at the start or end of the time span for a firm, then only the first or last observation is removed. If the outlier is in the middle of the time period, then all the firm data are removed.

¹⁸ This data cleaning procedure follows other research that uses the Amadeus database (e.g., Klapper, Laeven and Rajan, 2006; Anos-Casero and Udomsaph, 2009).

Appendix B. Definitions and sources of variables

Name	Definition and Source
Short-Term Bank Debt	Short-term loans (i.e., bank debt obligations remaining outstanding up to one year) divided by total assets and multiplied by 100. Source: Amadeus.
Long-Term Bank Debt	Long-term loans (i.e., bank debt obligations remaining outstanding more than one year) divided by total assets and multiplied by 100. Source: Amadeus.
Total Bank Debt	The sum of Short-Term and Long-Term Bank Debt. Source: Amadeus.
Bribery	Bribery level, computed as the average frequency to bribe to “get things done” within country – time period – industry – firm size – location size cells. Rescaled to [0, 1]. Higher values represent a higher frequency of bribery. Source: BEEPS.
Bribery 1	Dummy variable equal to one if firms report that they bribe public officials sometimes, frequently, usually, or always to “get things done”, and zero otherwise. Source: BEEPS.
Bribery 2	Dummy variable equal to one if firms report that they bribe public officials seldom, sometimes, frequently, usually, or always to “get things done”, and zero if never. Source: BEEPS.
Size	Firm size is the logarithm of real sales (operational revenue in US dollars, 2000). Source: Amadeus.
Profitability	Profit/loss before taxes divided by total assets (return on assets) and multiplied by 100. Source: Amadeus.
Tangibility	Tangible fixed assets divided by total assets and multiplied by 100. Source: Amadeus.
Growth Opportunities	Industry-level median of real sales growth. Source: Amadeus.
Private Credit	Private credit provided by deposit money banks and other financial institutions as a percentage of GDP. Source: World Development Indicators, World Bank.
Foreign Ownership	Share of assets held by foreign owned banks in percent, with foreign ownership defined as banks with > 50% of foreign owned assets. Source: Structural change indicators, EBRD Banking Survey.
State Ownership	Share of assets held by state owned banks in percent. The state includes the federal, regional and municipal levels, as well as the state property fund and the state pension fund. State-owned banks are defined as banks with state ownership exceeding 50%. Source: Structural change indicators, EBRD Banking Survey.
External Finance Dependence	The median of the share of capital expenditures not financed by the cash flow from operations. Following Rajan and Zingales (1998), this indicator is computed using US data from 1996-2005 at the 2-digit industry ISIC code level (capital expenditures minus cash flow, where capital expenditures are averaged over 1996-2005 for a firm). Source: Bena and Ondko (2012) using Compustat.
GDP Growth	GDP per capita growth (annual %). Source: World Development Indicators, World Bank.

Appendix C. Regressions without firm fixed effects

This table reports the results of the estimation of specification (1) without firm fixed effects. Columns (I)-(III) only include country and time fixed effects, while columns (IV-VI) include country, industry, firm size, city size and time fixed effects. The dependent variable is the firms' bank debt ratio as listed at the top of each column. Definitions of the variables are provided in Appendix B. Explanatory variables are lagged one period. Standard errors (in parentheses) are robust to heteroskedasticity and clustered at the firm level. *, **, and *** denote significant differences from 0 at the 10%, 5% or 1% level.

	Short-Term Bank Debt	Long-Term Bank Debt	Total Bank Debt	Short-Term Bank Debt	Long-Term Bank Debt	Total Bank Debt
	Country and Time FE			Country, Time, Industry and City FE		
Bribery	1.154*** (0.100)	-0.564*** (0.069)	0.760*** (0.123)	2.142*** (0.109)	-0.359*** (0.076)	1.921*** (0.135)
Size	0.797*** (0.008)	0.386*** (0.006)	1.173*** (0.010)	0.713*** (0.009)	0.370*** (0.006)	1.075*** (0.011)
Profitability	-0.025*** (0.000)	-0.009*** (0.000)	-0.035*** (0.000)	-0.024*** (0.000)	-0.009*** (0.000)	-0.032*** (0.000)
Tangibility	-0.006*** (0.000)	0.035*** (0.000)	0.030*** (0.001)	-0.005*** (0.001)	0.033*** (0.000)	0.029*** (0.001)
Growth Opportunities	-0.009*** (0.001)	-0.002*** (0.000)	-0.008*** (0.001)	0.002** (0.001)	0.003*** (0.000)	0.006*** (0.001)
GDP Growth	-0.165*** (0.005)	-0.115*** (0.004)	-0.282*** (0.007)	-0.197*** (0.005)	-0.122*** (0.004)	-0.322*** (0.007)
N observations	1 756 393	1 782 913	1 712 626	1 756 393	1 782 913	1 712 626
R2 adjusted	0.081	0.095	0.131	0.094	0.097	0.144



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