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DOES CORRUPTION AFFECT LOCAL AND FOREIGN OWNED COMPANIES DIFFERENTLY? EVIDENCE FROM THE BEEPS SURVEY

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Does corruption affect local and foreign owned companies differently? Evidence from the BEEPS survey

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Abstract

Until recently, studies have not reached any general agreement on how a corrupt environment influences foreign investments. Furthermore, far too little attention has so far been paid to how corruption relates to the performance of foreign and domestically owned firms. This paper exploits cross-sectional firm-level data from the fifth round of the Business Environment and Enterprise Performance Survey (BEEPS V) for the purpose of investigating how bribery is associated with FDI and firm performance. By using various econometric estimation strategies, we find that foreign owned firms tend to pay larger bribes compared to domestically owned firms, while the negative size of these expenses on firm productivity is larger for foreign owned firms than domestically owned firms in highly corrupt countries. This study suggests that developing countries should fight against informal payments in bureaucracy to create corruption free environments, so that multinationals are incentivized to invest in their countries.

Keywords: corruption, FDI, firm performance

JEL classification numbers: D72, D73, F23.

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1. INTRODUCTION

Corruption is increasingly recognized as a serious, worldwide obstacle to economic growth. One of the most common types of corruption is bribery and can be considered one of the main deterrents for businesses. According to the World Bank (2017), business establishments and people spend approximately $1.5 trillion in bribes each year, which is roughly 2% of global GDP. Bribe requests and informal payments are expenses for the firm. Over time, additional expenses in the form of bribes could influence foreign investments and firm productivity.

One particular way corruption may inhibit the economic performance and growth of a country is via reduced flows of foreign direct investment (hereinafter FDI). There are contradictory conclusions in the literature about the effect of corruption on FDI. On the one hand, many studies have shown a negative relationship between corruption and FDI (Cuervo-Cazurra, 2006; Habib and Zurawicki, 2002; Javorcik and Wei, 2009), since corruption is considered an additional cost for multinational firms and foreign direct investment that reduces the incentive to invest in a corrupt host country. On the other hand, some works have demonstrated a positive link between corruption and FDI (Barassi and Zhou, 2012; Egger and Winner, 2005), which is potentially explained by the fact that multinational firms agree to corrupt practices in order to get around the rigid regulations and tight bureaucracy in corrupt host countries. Therefore, the inflow of foreign investments might not necessarily be deterred by corruption. Until recently studies have not displayed any general agreement on how corrupt environments influence foreign investments. Furthermore, far too little attention has been paid to how corruption relates to the performance of foreign and domestically owned firms.

In this study we fill this gap by conducting an econometric analysis using firm-level survey data in order to investigate how bribery is associated with FDI and firm performance. First, we examine whether there is a link between bribery and FDI in the host countries. That question is relevant because FDI may follow different pathways in corrupt environments – either investments take place regardless of the widespread requests to pay bribes (Egger and Winner 2005), there is no investment (Hakkala et al., 2008), or investment through establishing joint ventures is preferred to wholly controlled ownership (Javorcik and Wei, 2009). Second, we analyse the relationship between bribery and the productivity of foreign and domestically owned firms separately. Bribery may in fact disproportionately influence the productivity of foreign owned firms compared to that of domestic companies. Domestic firms may be more familiar with local norms than foreign owned firms. For instance, firms from a different country are less likely to have information regarding how much a bribe should be and who it should be paid to, compared to domestic firms (Rodriguez et al., 2005).

Furthermore, requests for bribes and informal payments are expenses for the firm. Over time, additional bribe expenses may influence the productivity of the firm and future investments. Several attempts have been made to analyse the impact of corruption on firm performance. One such study at firm level was conducted by Fisman and Svensson (2007), who found that bribes had a negative effect on the growth of firms in Uganda. However, Vial and Hanoteau (2010) presents evidence that there is a positive effect from bribery on the growth of firms in Indonesia. In addition to their single country analysis and contradictory results, we extend this discussion by investigating how the relationship differs for foreign owned and domestically owned enterprises.

This paper exploits the cross-sectional firm-level data from the fifth round of the Business Environment and Enterprise Performance Survey (BEEPS V) initiated by the European Bank

for Reconstruction and Development (EBRD) and the World Bank Group. The data is based on interviews with senior managers from 15,500 randomly selected firms across 29 post-communist countries from Central and Eastern Europe and Central Asia.[3] This dataset enables us to elaborate cross-country heterogeneity thanks to the rather high level of heterogeneity in terms of the level of corruption in the countries involved and allows us to control for the other effects of the business environment on firm ownership structure. Furthermore, this dataset allows us to exploit firm-level value-based variables of bribery payments. These measures are more suitable for studying corruption at the firm level than a cross-country perception index based on the opinions of experts. This is because, as expenses, bribes are directly related in monetary terms to the performance of firms. This is in line with recommendations emphasized by O'Toole and Tarp (2014) and Reinikka and Svensson (2006).

In this article we use logit and ordinary least squares (hereafter OLS) regression estimations to analyse the relationship between corruption and firm ownership type. Based on the BEEPS survey questions, we consider the average percentage of total annual sales paid as an informal payment/gift as the proxy variable for the expenses incurred by a firm in the form of a bribe. Furthermore, we run an OLS regression to investigate the relationship between bribes and the firm's productivity and how that differs across domestic and foreign owned companies. Firms may take advantage of bribery for the purpose of enhancing their performance, or may be deterred by bribery and this may be determined by whether they are foreign or domestically owned (Rose-Ackerman, 2002). In order to tackle the plausible endogeneity of bribe expenses at the firm level, we use an instrumental variable (IV) estimation method.

This paper finds that there is a strong positive association between the share of total annual sales paid as an informal payment/gift and foreign owned firms. This finding implies that foreign owned firms are exposed to a larger amount of bribery than domestically owned firms. This study also confirms that corruption is negatively associated with firm productivity. The magnitude of this negative relationship is even greater for the productivity of foreign owned firms than domestic firms in highly corrupt countries. In addition, the IV regression results suggest that bribery expenses reduce the productivity of the firm.

This empirical analysis emerging from the study provides new insights into corruption and FDI. Our results suggest that corruption may have a sizeable negative impact on productivity for foreign firms compared to domestic firms in highly corrupt countries. In the long term, due to this potential risk to productivity, firms may not be willing to invest in a corrupt country unless the government effectively sets out to combat corruption. Therefore, the negative effect of corruption on FDI flows may be a relevant channel via which corruption reduces the country's economic growth.

The remainder of this paper is structured as follows. Section 2 presents an overview of the related literature, section 3 presents the descriptive statistics data, section 4 describes our methodological approach, section 5 presents the empirical approach and section 6 outlines the results of the econometric analysis and the conclusions summarise through a discussion of the results.

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[3] The following countries are included in the dataset: Albania, Azerbaijan, Belarus, Czech Republic, Estonia, Georgia, Kosovo, FYR Macedonia, Slovakia, Armenia, Russia, Kazakhstan, Kyrgyzstan, Uzbekistan, Ukraine, Turkey, Tajikistan, Latvia, Lithuania, Poland, Slovenia, Greece, Bulgaria, Montenegro, Cyprus, Hungary, Serbia, Bosnia Herzegovina, Moldova.

2. LITERATURE REVIEW

Bribery is described as ''offering, promising, or giving something in order to influence a public official in the execution of his/her official duties'' (OECD Observer, 2000, p. 3). This form of corruption, bribery, is also the focus in this paper. Previous literature has reported contradictory results about the effects of bribery on firm performance. On the one hand, some studies (see for example Leff, 1964; Huntington, 1968) advocate the "grease the wheel" effect of corruption that despite the transaction costs it entails, bribery enables the firm to overcome red tape, and therefore enhances the performance and productivity of the firm (De Rosa et al., 2015). The hypothesis proposes that due to the deterioration caused by ill-functioning institutions, corruption may be useful from a second-best perspective (Méon and Sekkat, 2005).

On the other hand, the "sand the wheel" effect of bribery on firm performance is also a widespread view of corruption. This means that corrupt public officials may cause postponements that would not appear otherwise, only to create the possibility of extracting a bribe (Myrdal, 1968). As argued by Kurer (1993), corrupt civil servants are motivated to create extra distortions in the economy to preserve their illegitimate source of income. In the long term, as a result of these processes, paying a bribe is more likely to cause enormous costs to the firms interested in further investments. Therefore, corruption may have a deterrent effect on a firm's incentive to invest in corrupt countries.

The theoretical support for the efficiency of corruption has been introduced by Lui's (1985) queuing model, which identifies the different opportunity costs of various economic agents that determine the size of bribes. Consequently, a license or contract obtained on the basis of a bribe could lead to the Pareto-optimal allocation of gains. Nevertheless, Kaufmann and Wei (1999) detect a major limitation in Lui's (1985) assumptions, in that the regulatory burden is approached as exogenous, independent of the motivations for officials to receive bribes (De Rosa et al., 2010). Since the motivations of officials may be adjusted by particular policy tools, this may no longer be the case. Eventually, due to this assumption, Lui's theory is by nature a partial equilibrium model and may not be valid in a general equilibrium. In addition, as discussed by Aidt and Dutta (2008), even if corruption has advantages for overcoming red tape in the short term, it generates the motivation to introduce more cumbersome regulations in the long term.

Numerous studies have attempted to explain the effects of corruption on multinational activities (Couttenier and Toubal, 2017; Barassi and Zhou, 2012; Wu, 2006; Bjorvatn and Soreide, 2005). In addition to the significant contribution of Hines (1995) and Wei (1998, 2000a, b), many studies have demonstrated that there is a negative relationship between corruption and aggregate FDI flows or stocks (Busse and Hefeker (2007); Habib and Zurawicki (2001); Drabek and Payne (2002). In their study, Javorcik and Wei (2009) demonstrated that corruption impacts firm ownership structure and increases the likelihood of entry to the host economy via the establishment of a joint venture over wholly controlled ownership. This finding advocates the view that corruption increases the value of using a domestic partner (i.e. establishing a joint venture) to circumvent the bureaucratic burden.

Furthermore, the influence of corruption on firm investment decisions may occur in different forms. For example, as Hakkala et al. (2008) have presented, corruption has different effects on horizontal and vertical investments. Svensson (2003) has noted that receiving a public service could increase the probability of paying bribes. Horizontal investment could be associated with greater frequency of interaction with public officials, and especially in corrupt host countries, the corruption decreases the likelihood of a firm investing in the corrupt host

country and reduces local affiliated sales. Lastly, corruption can impact a firm's preferred location for investing considering the level of corruption at the origin of the investment (i.e. the home country of foreign investors). For instance, Ledyaeva et al. (2013) show that while multinational companies from less corrupt and democratic countries are more likely to invest in less corrupt and more democratic regions of Russia, those from highly corrupt and non-democratic countries are in favour of investing in the more corrupt and less democratic regions.

A number of empirical studies have examined the effects of corruption on firm performance; that is, productivity (Blagojević, and Damijan, 2013; Fisman, and Svensson, 2007). Using BEEPS data for the economies of Central and Eastern Europe and the CIS, De Rosa et al. (2015) demonstrate that bribery impacts firm productivity more negatively in non-EU countries with weaker institutions. Another piece of evidence from Hanousek and Kochanova (2016) shows that a higher average level of bribery hinders the performance of firms in CEE countries.

On the contrary, several previous empirical findings can also be found in support of the "grease the wheel" hypothesis. For example, Egger and Winner (2005) demonstrate a strong positive link between corruption and FDI using a sample of 73 developed and less developed countries for 1995–1999. Their findings suggest that corruption is, therefore, a motivation when entering a foreign market via FDI. According to the "speed money" argument proposed by Lui (1985), corruption accelerates the bureaucratic procedure of acquiring the legal permission to establish a foreign plant and provides advantages through gaining access to state supported projects (Tanzi & Davoodi, 2000). Furthermore, concerning the relationship between firm performance and corruption, Vial and Hanoteau (2010) examined the effect of plant-level corruption on output and productivity growth. Their findings are in line with the "grease the wheel" hypothesis and demonstrate the positive effect of bribery on growth for Indonesian firms. By using a dataset that covers 43 countries for 2003–2005, Dreher and Gassebner (2013) demonstrate that corruption accelerates firm entry in strictly regulated economies. Consequently, academic studies on corruption are divided into two opposite sides in terms of the effect of corruption on firm performance and FDI.

In view of all that has been mentioned so far, one may suppose that corruption could influence the investment decisions of foreign investors and the type of investments due to potential uncertainties. Moreover, since corruption is related to the quality of the business environment, firm performance could be sensitive to corruption. The present study will empirically analyse the aforementioned relationships to contribute to this discussion by studying how the relationship differs for foreign owned and domestically owned enterprises.

3. DATA

To perform the empirical analysis, we use cross-sectional firm-level data, the 5th round of the Business Environment and Enterprise Performance Survey (BEEPS V), which was initiated by the European Bank for Reconstruction and Development (EBRD) and the World Bank Group. Senior managers from 15,500 randomly selected firms have been interviewed across 29 countries. BEEPS has been conducted five times (1999, 2002, 2005, 2009 and 2012–2014). The earlier rounds brought new developments in the structure of the survey including expanding its geographical coverage, including new firms and adding survey questions. Although previous rounds consist of corruption related questions, due to the limited number of overlapping firms and questions we are restricted to the cross-sectional analysis. BEEPS is an excellent database for such an analysis, as it includes a large set of countries with very different

business environments that include corruption and the role of FDI, and firm-level data for the key variables necessary for our analysis (productivity, firm size, innovation, exports, corruption (unofficial payments to officials, perceptions), ownership type). The BEEPS survey enables us to examine different types of corruption separately, and therefore to analyse state capture and political influences. It offers important methodological developments over current corruption indices (Hellman et al., 2003).

However, there could be a possible perception bias in the BEEPS survey, due to dissimilar traditional and cultural norms and degrees of political freedom across the countries, which may impact the selection of particular ratings and the motivation of business people to express opinions about state institutions (De Rosa et al., 2010). Nevertheless, for the purpose of testing the aforementioned perception bias in BEEPS 2002, Fries et al. (2003) compare the average values of subjective survey answers with related objective measures and they did not report significant perception biases across the countries in the sample. What is more, as argued by Hellman et al. (2000), since the BEEPS surveys interview senior managers, who can be considered 'well-informed people', the perception bias should be relatively small in case of the BEEPS survey compared to other company surveys.

We continue with Table 1, which compares firm characteristics based on ownership structure (We have presented descriptive statistics of the variables used in our empirical analysis in Appendix Table 1A). If a firm has more than 10% foreign ownership, we define that firm as a foreign owned company, which is the usual approach (Kimura and Kiyota, 2007; Feliciano and Doytch, 2017). While among 15,343 domestic firms only approximately 15% are exporting, among 1,223 foreign owned firms around 42% are exporting. Therefore, we can say that foreign owned firms are more export-oriented than domestic firms, and therefore foreign owned companies are more likely to create and exploit opportunities to enlarge their market and increase profits. Compared to domestically owned firms, foreign owned firms export approximately 20% of their total annual sales. While 47% of foreign owned firms have internationally recognized certificates, this percentage is significantly lower among domestically owned firms, at just 22%. Since foreign owned firms operate in highly competitive environments, they tend to be more technologically developed and demonstrate this with certificates.

Table 1. Breakdown of sample by ownership type

	Ownership Structure	
	Domestic	Foreign
Number of Firms	15,343	1,223
Exporter (%)	15	42
Certificate (%)	22	47
Direct exports as of total annual sales (%)	5.21	19.55
Average percentage of total annual sales paid as informal payment/gift (%)	0.74	0.86
Average number of permanent, full-time employees	53.69	194.32
Average number of competitors for the main product/service in the main market	5.25	6.31

Source: Authors' own calculations.

Based on the sample, three different size categories are constructed based on the number of employees – small (5–19), medium (20–99), large (>100)). Size of firm is important in understanding corruption since it reflects the bargaining power of a firm (Chen at al., 2008).

According to Table 1, there is an almost four-fold difference between the average number of employees in foreign owned and domestically owned firms (194 and 54 respectively). Foreign owned firms compete against more rivals than domestic firms in the main market, the average number of competitors being respectively 6.31 and 5.25

Coming to our key variable, respondents were asked to indicate what percentage of total annual sales were paid as an informal payment/gift. According to the results, the average percentage of total annual sales paid as an informal payment or gift is higher for foreign owned firms compared to domestically owned firms (i.e. 0.86% to 0.74%). Hellman et al. (2002) find that foreign owned firms suffer from the lack of adequate business connections and information disadvantages in the host country. Therefore, foreign owned companies are more likely to pay larger informal payments to initiate or sustain their business than pure domestically owned firms (Blagojević & Damijan, 2013). Campos et al. (2010) argued that corruption functions as a crucial barrier for new entrants, having indicated that corrupt public officials create a convenient environment for oligopolies by deterring new entries in return for regular unofficial payments. Therefore, foreign owned companies could encounter many barriers and they might be asked to pay higher payments than their domestic counterparts.

Before conducting the econometric estimations, a correlation table has been produced and presented in Table 2. While we identify a negative correlation between foreign ownership (dummy variable) and bribe perception, there is a positive correlation between foreign ownership and the percentage of total annual sales paid as an informal payment. Nonetheless, these observations are not conclusive since both statistics are small and not statistically significant. Another important variable, the log of productivity, has a positive correlation with foreign ownership, which is expected based on existing evidence on the better performance of foreign owned companies (Helpman, Melitz & Yeaple 2004). We see a strong negative correlation between being an exporter and bribe perception. This is in line with the findings of Kimuyu (2007), who found that corruption significantly decreases the probability of firms exporting. Firms may commit resources to dealing with corruption, and consequently experience difficulties engaging in external markets. We also see a strong positive correlation between bribes per sales and bribe perception. When firms perceive a high level of corruption, they consider paying larger informal payments to public officials.

Table 2. Kolmogorov-Smirnov Test for the difference between bribes per sales by firm ownership type

Groups	D	p-value
Domestic	0.0373	0.095
Foreign	-0.0841	0.000
Combined K-S	0.0841	0.000

Source: Author's calculations.

We employ the two-sample Kolmogorov-Smirnov test to determine whether there are any differences in the distribution of average bribes per sales for countries and industries among foreign and domestically owned firms. This difference in average bribes per sales for countries and industries is also statistically significant as confirmed by the Kolmogorov-Smirnov (K-S) test which is illustrated in Table 2. According to Table 2, the second row tests the hypothesis that average bribes per sales for countries and industries among domestically owned firms contains smaller values than for foreign owned firms. The largest difference between the distribution functions is 0.037 and the p-value is 0.095, which is statistically significant. The

third row tests the hypothesis that average bribes per sales for countries and industries among domestically owned firms contains larger values than for foreign owned firms. The largest difference between the distribution functions in this direction is 0.084 and the p-value is 0.000 which is statistically significant. Finally, the approximate p-value for the combined test is 0.000. All in all, the K-S test confirms that there is a difference in average bribes per sales for countries and industries between foreign and domestically owned firms.
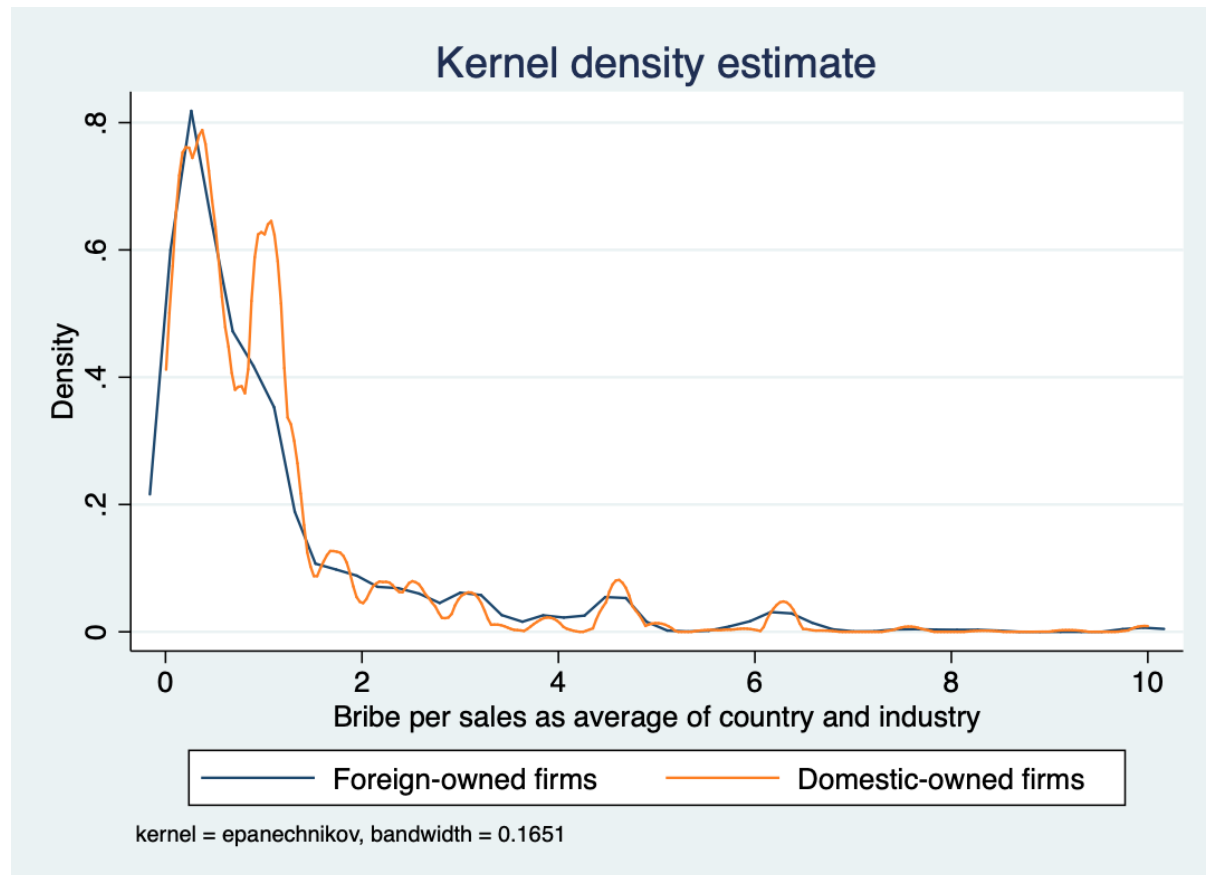
Figure 1. Differences in bribes per sales for country and industry averages across foreign and domestically owned companies
Source: Authors' own calculations.

Figure 1 presents the difference in country and industry averages of bribes per sales between foreign and domestically owned companies. As Figure 1 shows, distributions of bribes per sales (kernel density of bribes per sales) for foreign owned companies vary at each percentage point. However, as the distribution approaches the 10 percent point, foreign and domestically owned companies pay a similar number of bribes per sales to public officials.

Table 3. Correlation matrix of the variables used in the regression analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Foreign	1												
Bribe perceptions	-0.013	1											
Bribe per sales	0.011	0.181***	1										
Firm size	0.127***	0.003	-0.014	1									
Exporter	0.132***	-0.038***	0.003	0.185***	1								
Log productivity	0.082***	0.014	-0.013	-0.027**	0.141***	1							
Competition	0.026**	0.019	0.008	-0.011	0.011	0.068***	1						
R&D spending	0.046***	0.002	0.057***	0.124***	0.164***	0.080***	0.070***	1					
Product diversification	-0.023*	-0.0002	0.003	0.023*	-0.074***	-0.075***	-0.075***	-0.087***	1				
Certificate	0.129***	-0.019	-0.003	0.258***	0.274***	0.140***	0.022*	0.157***	-0.046***	1			
Gender of owner	0.006	-0.009	-0.009	0.0001	0.0003	-0.002	0.0128	0.004	-0.013	-0.001	1		
Number of employees	0.166***	-0.012	-0.015	0.316***	0.095***	-0.005	0.007	0.072***	-0.010	0.137***	0.009	1	
Corruption perception Index:2016	0.045***	-0.062***	-0.050***	-0.069***	0.180***	0.269***	0.0811***	0.039***	-0.097***	0.166***	0.061***	-0.011	1

* p<0.1, ** p<0.05, *** p<0.01
Number of observations: 6,554
Source: Authors' calculation.

4. METHODOLOGY

4.1. Firm Ownership and Bribes

In the first step, since a firm's ownership may be associated with the business environment of the home country, we will first analyse whether corruption is associated with ownership type or not. While we use a logit regression to examine the effects of foreign ownership on the likelihood of a company having bribe perceptions, we employ an OLS regression to investigate the relationship between bribes per sales and foreign ownership. In this way we may be able to investigate whether foreign owned firms pay more informal payments compared to domestically owned ones. Considering previously used methods in the literature, our logit estimation specification is as follows:

$$\Pr(Bribe\ Perceptions_i = 1) = F(\beta_0 + \beta_1 Foreign_i + \beta_2 X_i + \varepsilon_{1i}) \qquad (1)$$

where $F(z) = e^z/(1 + e^z)$ is the cumulative logistic distribution. Our OLS estimation specification is as follows

$$Bribe\ per\ sales_i = \beta_0 + \beta_1 Foreign_i + \beta_2 X_i + \varepsilon_{1i} \qquad (2)$$

We denoted the binary variable *Foreign*, which takes the value of one if the firm is foreign owned. This variable will allow us to understand whether a bribe is related to the firm's ownership or not because foreign firms are able to prevent themselves from entering into corruption by changing their investment destination. In comparison to foreign firms, domestic firms are less likely to move out of a country, and are therefore more exposed to requests for bribes.

We define *bribe perceptions* as a binary variable equal to 1 if in response to the statement "it is common to have to pay some irregular additional payment or gift to get things done," the respondent replies *frequently*, *usually* or *always*. Although some studies indicate that foreign investors are less likely to invest in corrupt environments (e.g. Hakkala et al., 2008), a firm can circumvent red tape by paying unofficial payments or gifts to get things done.

In the current setting, therefore, we use foreign ownership as an explanatory but not a dependent variable. The reason for this is that given the nature of our data – surveys of domestic and foreign owned firms in host countries – the ability to study the determinants of foreign ownership and whether corruption deters FDI is somewhat limited, as we do not observe all of the multinational companies of a particular home country to study their decisions to invest in particular locations, as did, for example, Hakkala et al. (2008) and Javorcik and Wei (2009).

We also created an alternative corruption proxy variable and denoted that as *bribes per sales*. We define this variable based on the survey question about what percentage of the total annual sales of a firm has been paid as an informal payment or gift to public officials. This variable is important from two perspectives: first, unlike the bribe perceptions variable, bribes per sales represents the approximate share of the cost of a bribe to the firm; second, we can observe how much of the average sales are being paid as a bribe that may influence sales, productivity and the chance to capture further business opportunities (Van Vu et al., 2018). In order to perform this analysis, we exploit the logit estimation technique that is expected to provide us with the

probability of the company being foreign owned in the existence of bribe perceptions in corrupt environments.

In Equation (1) and (2), ε_{1i} is an error term and X_i represents some control explanatory variables such as size of firm, exporter (if firm has positive exports, Exporter=1), R&D spending (Spending on R&D over the last 3 years, Yes=1), quality certificate (Have an internationally-recognized quality certificate, Yes=1), gender of manager, type of establishment (how was the firm established? (Investment type)), number of competitors (number of competitors for the main product/service in the main market). Moreover, we include a set of dummies for industries according to the ISIC classifications Revision 3.1: 15–37, 45, 50, 51, 52, 55, 60–64, 72.

4.2 Productivity and Bribes

OLS and IV 2SLS regression

In the second step, considering the results of the first step, we aim to investigate the link between the firm's exposure to bribes and the firm's business performance indicators such as productivity. Our OLS model specification is as follows:

$$ln\ Productivity_i = \beta_0 + \beta_1 Bribe\ Perceptions_i + \beta_2 Bribe\ per\ sales_i + \beta_3 X_i + \varepsilon_{1i} \quad (2)$$

We defined the variable *ln Productivity* as the log of productivity, which is annual sales per number of permanent, full-time employees. X_i stands for control variables such as size of firm, exporter (if firm has positive exports, Exporter=1), R&D spending (Spending on R&D over the last 3 years, Yes=1), quality certificate (Have an internationally recognized quality certificate, Yes=1), gender of manager, type of establishment (how was the firm established? (Investment type)), number of competitors (number of competitors for the main product/service in the main market). For the purpose of preventing possible endogeneity of firm level bribe perception and foreign ownership, we elaborated our analysis by performing an IV 2SLS regression. This methodology has been widely used in corruption studies to avoid the potential reverse causality problem (e.g. Hakkala et al., 2008; O'Toole and Tarp, 2014; De Rosa et al., 2015). Furthermore, in order to implement the IV regression, we have to include instruments that satisfy two main conditions – instruments are (1) being correlated with the endogenous variable that is bribes per sales; and (2) being uncorrelated with the error term of the equation where the dependent variable is the log of productivity. The BEEPS dataset has a wide variety of questions that can be potential instruments in IV regressions. Therefore, this instrument requires a thorough selection process in order to avoid any econometric and contextual issues. We have chosen one instrument for the IV regression, namely our instrumental variable is the company's response to the survey question as to whether a gift or informal payment is expected or requested in any of the inspections by or meetings with tax officials. The instrument equals 1 if the answer is "Yes". This question is expected to be correlated with bribes per sales and not correlated with productivity. When the majority of the public officials ask for informal payments or gifts, it is less risky for another public official to ask for a bribe (Blackburn et al. 2006; Rose-Ackerman, 1975). Furthermore, it is expected that tax officials can ask for an informal payment or gift from a firm during their official inspections or meetings. For example, the study by Svensson (2003) suggests that Ugandan firms have a higher probability of paying bribes when receiving public services. Consequently, we expect to observe a correlation between the variable of a gift or informal payment being expected or requested in any of the inspections by or meetings with tax officials and bribes per sales.

5. EMPIRICAL ANALYSIS AND RESULTS

5.1. Firm Ownership and Bribes

Table 4 presents the results of the two different estimations for examining the relationship between bribery and firm ownership type. The first column presents the results of the logit regression that shows the link between the bribe perceptions and foreign ownership. The second column presents the results of the OLS estimation that we used to show the relationship between bribes per sales and foreign ownership. The results show that there is no significant association between bribe perception and the company being foreign owned. This implies that foreign ownership may not be associated with perceptions of corruption. On the other hand, it is clearly seen that there is a statistically significant and positive coefficient for the foreign ownership variable in the equation for bribes per sales. Therefore, we expect a value for bribes per sales on average 0.47 higher for foreign owned companies compared to domestically owned companies, holding all other variables constant. This association between the two variables implies that foreign owned firms are exposed to the payment of larger bribes compared to domestically owned firms.

The dependent variable, bribe perceptions, is significantly and negatively related to firm age and exporting firms. This means that older and exporting firms are likely to have less bribe perceptions than young and non-exporting firms, respectively. Due to a corrupt environment, younger and domestic market-oriented firms may encounter corrupt practices more often than the aforementioned; therefore, they are likely to have higher bribe perceptions. In addition, R&D spending and bribes per sales have a statistically significant and positive association. This means that firms with positive R&D spending tend to pay larger bribes than those that do not have positive R&D spending. It could be possible that they produce value added products and are therefore targeted more by corrupt public officials imposing bribes than non-innovative firms.

Table 4. Logit and OLS estimations predicting bribery

Dependent variables:	Bribe perceptions LOGIT (1)	Bribe per sales OLS (2)
Foreign	-0.005	0.466**
	(0.138)	(0.215)
R&D spending	0.074	0.721***
	(0.092)	(0.149)
Firm age	-0.006**	-0.002
	(0.003)	(0.004)
Exporter	-0.396***	-0.176
	(0.099)	(0.145)
Log (Productivity)	0.029	-0.094***
	(0.021)	(0.033)
Control variables		
Gender of owner	Yes	Yes
Informal Sector Competition	Yes	Yes
Competition	Yes	Yes
Number of employees	Yes	Yes
Biggest Obstacle	Yes	Yes
Product diversification	Yes	Yes
Internationally recognized certificate (Yes=1)	Yes	Yes
Type of establishment	Yes	Yes

Firm size	Yes	Yes
Constant	-2.078***	0.696
	(0.306)	(0.495)
N	8378	6603
R^2	-	0.0349
Pseudo R^2	0.0502	-

Standard errors in parenthesis.
* p<0.1, ** p<0.05, *** p<0.01
Source: Author's calculations

Next, the empirical analysis will focus on the relationship between bribery and the performance of foreign and domestically owned firms.

4.2 Ordinary Least Squares Estimation: Productivity and Bribes

In the second step, we examine how corruption is associated with firm performance. For do this, we divided our sample into subsamples according to the level of corruption and ownership type. However, after dividing them into subsamples, the number of observations in the current wave of BEEPS reduces dramatically; therefore, reasonable conclusions could not be drawn from the results. Our paper overcomes this drawback by pooling the previous waves of the BEEPS datasets.[4] We predict that the productivity of foreign and domestic companies relates to corruption variables differently in the context of high and low levels of corruption because foreign and domestic companies may follow different strategies against corruption in countries where there are different levels of corruption. We determined the division of the countries based on the mean of the Corruption Perception Index produced by Transparency International. If the ranking is lower (or higher) than the mean, it is seen as a country with high (low) level corruption.

Table 5 presents the results of the estimation of the log of productivity according to this modification in the estimation structure (for detailed table see Appendices). As can be seen from the first column in Table 5, there is a negative and statistically significant relationship between bribes per sales and firm productivity in all countries. More precisely, ceteris paribus, for every one percentage point increase in bribes per sales, we expect approximately a 1.2 percentage point decrease in productivity. Van Vu et al. (2018) reported approximately a 1.5 percentage point decrease in ROA (indicator of firm financial performance) in response to a one percentage point increase in bribe intensity. When we compare column (4) and (5), the magnitude of the negative relationship between bribes per sales and firm productivity is larger for foreign owned than domestically owned companies in highly corrupt countries. More specifically, when reporting a one percentage point increase in bribes per sales in highly corrupt countries, productivity is predicted to be lower by 0.8 and 2.2 percentage points for domestic and foreign owned firms, respectively. According to column (2), there is a negative and statistically significant relationship between bribes per sales and the productivity of domestic companies in less corrupt countries. More precisely, in less corrupt countries, with a one percentage point increase in bribes per sales, we predict around a 1.2 percentage point decrease in productivity. Indeed, as mentioned earlier in the paper, the excessive cost of the bribe transaction may damage the productivity of domestic companies in highly corrupt countries. Therefore, they may prefer to have a foreign partner to share these costs, thereby, maintaining the firm's activities.

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[4] We pooled the second, third and fourth waves of the BEEPS survey with the current one. We did not include the first wave because the survey questions in the first wave of BEEPS are not similar for the variables of interest.

Table 5. Regression analysis predicting the log of productivity on the basis of corruption level and ownership type

Variables	Dependent Variable: Ln Productivity				
	All countries	**Low corruption**		**High Corruption**	
		Domestic	Foreign	Domestic	Foreign
	(1)	(2)	(3)	(4)	(5)
Bribe per sales	-0.012***	-0.012**	-0.022	-0.008**	-0.022*
	(0.003)	(0.006)	(0.036)	(0.004)	(0.012)
Bribe perceptions	0.000	0.014	-0.015	0.011	-0.021
	(0.008)	(0.019)	(0.059)	(0.010)	(0.027)
CPI	0.376***	0.153***	0.335***	0.758***	0.612***
	(0.010)	(0.028)	(0.083)	(0.029)	(0.077)
Industries	Yes	Yes	Yes	Yes	Yes
Countries	Yes	Yes	Yes	Yes	Yes
Constant	7.656***	11.702***	11.329	7.593***	7.642
	(0.228)	(0.678)	(7.174)	(0.261)	(6.390)
R-squared	0.193	0.075	0.180	0.153	0.147
Adjusted R-squared	0.192	0.073	0.162	0.151	0.137
F-statistic	299.3	29.9	9.9	126.6	13.5
N	17592	5151	647	9847	1110

* $p<0.1$, ** $p<0.05$, *** $p<0.01$.
Standard errors in parenthesis.
Source: Authors' calculations

What stands out in Table 5 is that there is no evidence of a statistically significant relationship between bribes per sales and the productivity of foreign owned firms in countries with a low level of corruption. One possible explanation for this could be that under the conditions of a less corrupt environment, foreign owned companies may well be protected by law enforcement, and therefore be less exposed to bribe requests than domestic firms. Corruption studies mainly ignore high-income countries, which tend to have lower levels of corruption (Hessami, 2014). One reason could be that corruption and rent extraction are not explicit as corruption in low-income countries, where public officials can receive bribes from the private sector and there could be no specific necessity to hide the bribery. Considering the lack of adequate research on corruption in less corrupt countries, our result can suggest that public officials in less corrupt countries can collect bribes from domestic firms using more sophisticated or less known methods. However, this does not change our findings that the cost of bribes hurt the productivity of domestic firms in countries with less corruption.

Moving on now to address the endogeneity problem, we present the IV 2SLS estimation results in Table 6. As noted above, we used the request for an informal payment or gift when a tax official visits or inspects a company as an instrument. For this estimation, since our instrument does not exist in the other waves of the survey, we will use only the fifth wave of the BEEPS survey. By considering the results of previous logit (or OLS) regression models, The Wu-Hausman test is performed to check whether bribes per sales (% of total annual sales paid as an informal payment/gift) is endogenous and the results of the test are given at the bottom of Table 6. According to the endogeneity test result, we reject the null hypothesis, which assumes that the variable *bribes per sales* is an exogenous variable both in the Wu-Hausman test and the regression-based test at 5% significance levels (p = 0.0095). Hence, we continue to treat the variable *bribes per sales* as an endogenous variable. The F-statistics test specification for

whether our instrument is correlated with bribes per sales indicates that our variable is correlated with bribes per sales.

Table 6. IV 2SLS estimation results for the effects of corruption on productivity

Variables	(1) First stage Bribe per sales	(2) Second stage Log (productivity)
Bribe per sales	-	-0.077***
		(0.029)
Tax officer inspection	2.941***	
	(0.231)	-
Foreign (foreign owned=1)	0.359*	0.387***
	(0.185)	(0.070)
Corruption Perception Index 2016	-0.015***	0.028***
	(0.004)	(0.002)
Observations	8,092	8,092
Wu-Hausman F-test (1, 8039)		p = 0.0095
F-Stat		16.38
R-squared	0.036	0.136

Standard errors in parenthesis.
* p<0.1, ** p<0.05, *** p<0.01
Source: Author's calculations

In addition to the requirement that instrumental variables be correlated with bribes per sales, the instruments must also be uncorrelated with the structural error term of the log productivity equation. According to the estimation results reported in Table 6, our corruption proxy variable – percentage of total annual sales paid as informal payment/gift – has a statistically significant coefficient and is thus negatively associated with productivity. More precisely, since our bribes per sales variable is continuous, a 1 percentage point increase in bribes per sales reduces the log of productivity by 7.7%, which is statistically significant at the 1% significance level.[5] In other words, firms that pay a higher percentage of total annual sales as an informal payment/ gift, sacrifice a higher level of productivity. We can thus say that bribes per sales negatively affects the business performance of the firm. These results are in line with the past literature (e.g. Hanousek and Kochanova, 2016; Blagojević, and Damijan, 2013; Fisman, and Svensson, 2007) that has shown some evidence that corruption may have a sand on the wheel effect and reduce firm performance. The baseline IV 2SLS estimation results in Table 5 present the influence of bribes per sales on firm productivity. Moreover, our results indicate as expected that foreign owned firms are more productive, when everything else remains constant. Exporting firms, those that have internationally recognized quality certificates and positive R&D spending are more productive, as expected. In other words, companies may have a higher level of productivity if they have a quality certificate and invest in R&D.

Lastly, we have used two different ratings in our estimations that classify countries as less corrupt and highly corrupt – the Corruption Perception Index (CPI) 2016 from Transparency International and the Global Investment Country Risk Rating – to increase the robustness of

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[5] To note, in contrast to the results from Table 4, this result is higher (7.7% compared to 1.25%)

the results. For the purpose of performing robustness checks, we included the World Economic Forum's Executive Opinion Survey (EOS) country ratings in the equation instead of the CPI ratings. The EOS aims to measure vital concepts, for example, willingness for entrepreneurship and the incidence of corruption, to complement the conventional sources of statistics and present a better evaluation of the business environment (Browne et al., 2014). Our results still remain valid in that our corruption proxy variable – percentage of total annual sales paid as an informal payment/gift – has a statistically significant and negative coefficient on the productivity of the firm. The results are not reported in the paper to save space but are available from the authors upon the request.

6. CONCLUSIONS

The present study was designed to determine the influence of a corrupt environment on FDI investment decisions and to ascertain the relationship between bribes and firm productivity and how that differs across domestic and foreign owned companies. Until recently, studies have not consensually agreed on whether corruption has a positive or negative effect on firm performance and how a corrupt environment influences foreign investments. We attempt to clarify this dispute by exploiting the cross-sectional firm level data from the 5th round of the Business Environment and Enterprise Performance Survey (BEEPS V) initiated by the European Bank for Reconstruction and Development (EBRD) and the World Bank Group.

This study contributes to existing knowledge about the relationship between corruption and firm performance by further elaborating this empirical analysis with the inclusion of firm ownership types and country corruption levels. This study confirms that corruption is negatively associated with firm productivity. The size of this negative association is even larger for the productivity of foreign owned firms than domestic firms in highly corrupt countries. This means that foreign owned firms suffer from the cost of bribes more heavily than domestically owned firms. These results are likely to be related to the familiarity that the domestic firms have with the corrupt environment that allows them to alleviate the negative effect of the cost of the bribes on their productivity.

We approached the relationship between corruption and firm ownership type from two dimensions: First, the results of the OLS estimations suggest that foreign owned firms could be associated with larger informal payments. A potential explanation would be that foreign owned firms are less likely to be familiar with the corrupt public officials, and therefore they are exposed to larger bribes compared to domestically owned firms. Second, the logit estimations reveal that there is no statistically significant relationship between foreign owned firms and corruption perceptions. A possible explanation for these results would be that despite higher exposure to bribery, foreign owned firms do not perceive corruption as a severe problem – due to their higher productivity and the support of the parent company, they are able to cope with the costs of bribery relatively well.

According to the results, it is somewhat surprising that bribe perceptions in the host countries could not disincentivize foreign investors from investing in the host countries. We assume that the country of origin of the investments plays an important role. If the home country of the investments has strong institutions, which deters firms from investing in corrupt destinations, then highly corrupt host countries are less likely to receive foreign investments from them. However, the present study does not investigate the impact of institutions in the home country of a foreign investor due to data limitations, and therefore this is a limitation inherent to our research.

Due to endogeneity concerns, we performed an IV 2SLS regression and obtained the result that bribes per sales has a statistically significant and negative association with productivity. This implies that firms that pay a higher percentage of total annual sales as informal payments/gifts, experience lower levels of productivity. It could also be argued that this relationship could be driven by the fact that companies tend to stay in their market despite inefficient production. A plausible reason for this could be related to certain companies holding a dominant market position. A recent study by Couttenier and Toubal (2017) demonstrates that some level of experience in the foreign market may provide relative advantages to multinational companies. Due to the political influence gained over the years, they can engage in bribery to deter the entry of competitors. Corrupt governments may create and protect monopolists to extract more rents from their existence. In addition, since companies have some guarantees from corrupt governments, they have a good chance of winning government procurements and contracts. Future research could focus on the relationship between the probability of winning public procurements and the magnitude of bribery.

One major limitation of our study, as well as of others using a similar methodology, is the fact that any investigation of corruption at firm level is imperfect per se because corruption activities are secretive by nature and are considered illegitimate and ethically intolerable. Therefore, complete data regarding those activities are not available and the number of empirical studies is not extensive. To some degree, by using BEEPS data we partially overcome these obstacles since it provides some information about the level to which corruption is prevalent. The study could be repeated using a dataset that is less perception-based and more objective, thereby enabling researchers to learn more about corruption. Last but not least, domestic and foreign companies may have different report corruption to a greater or lesser extent due to cultural differences. This should also be considered in corruption studies in future survey settings.

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APPENDICES

Table A1. Descriptive statistics and explanations of variables used

Variable	Mean	St. Dev.	Min	Max
Foreign (if foreign ownership >10%, foreign=1)	0.07	0.26	0	1
Bribe perceptions (Dummy=1 if firm replies frequently, usually or always to the question "it is common to have to pay some irregular additional payment or gifts to get things done")	0.18	0.39	0	1
Bribe per sales (% share of total annual sales paid as informal payment/gift. (0–100))	0.75	3.91	0	100
Tax officer inspection (In any of these inspections or meetings was a gift or informal payment expected or requested? Yes=1 No=0)	0.04	0.20	0	1
Size (Based on number of employees. Small (5–19), Medium (20–99), Large (>100))	1.66	0.72	1	3
Exporter (if direct exports>0, Exporter=1)	0.17	0.38	0	1
Certificate (Have an internationally recognized quality certificate. Yes=1)	0.24	0.43	0	1
R&D spending (Spending on R&D over last 3 yrs., Yes=1)	0.11	0.31	0	1
Gender owner (if the owner of the firm is female, gender owner=1)	0.35	0.48	0	1
Gender manager (if the manager of the firm is female, gender manager=1)	0.19	0.39	0	1
Product diversification (Share of main product/service in total sales)	84.16	22.27	0	100
Log productivity (log of productivity=Sales per worker)	10.41	1.55	-3.92	24.71
Labour (Number of permanent, full-time employees)	63.96	266.12	1	11000
Competition (Number of Competitors for the main product/service in the main market)	10.52	15.48	0	100
CPI_2016 (Corruption Perception Index: Transparency International 2016)	39	12	21	70
Global Investment Country Risk Rating	42.43	11.48	22	71

Source: Authors' calculations.

Table A2. IV 2SLS estimation predicting firm productivity

Variables	(1) First stage Bribe per sales	(2) Second stage Log (productivity)
Bribe per sales	-	-0.0766***
		(0.0292)
Tax officer inspection	2.941***	
	(0.231)	-
Foreign (foreign owned=1)	0.359*	0.387***
	(0.185)	(0.0697)
Size Firm (Small)	0.177	0.201**
	(0.228)	(0.0848)
Size Firm (Medium)	-0.103	0.442***
	(0.233)	(0.0867)
Size Firm (Large)	-0.223	0.403***
	(0.265)	(0.0989)
Exporter (yes=1)	0.0925	0.278***
	(0.136)	(0.0506)
Number of employees	-4.40e-05	-0.000127**
	(0.000148)	(5.51e-05)
RD spending (yes=1)	0.706***	0.291***
	(0.139)	(0.0561)
Originally private from time of start up	0.186	0.448***
	(0.154)	(0.0574)
Private subsidiary of a formerly state-owned firm	0.162	0.351***
	(0.347)	(0.129)
Joint venture with foreign partner(s)	-0.435	0.297*
	(0.432)	(0.161)
State-owned firm	-0.183	0.0344
	(0.409)	(0.152)
Other	0.445	0.164
	(0.654)	(0.243)
Corruption Perception Index 2016	-0.0151***	0.0282***
	(0.00400)	(0.00160)
Competition	0.00114	0.00348***
	(0.00288)	(0.00107)
Internationally recognized certificate (Yes=1)	-0.0144	0.279***
	(0.110)	(0.0408)
Product diversification	0.000139	-0.000492
	(0.00188)	(0.000700)
Industry	Yes	Yes
Constant	-0.487	7.703***
	(2.699)	(1.002)
Observations	8,092	8,092
Wu-Hausman F (1, 8039)		p = 0.0095
R-squared	0.036	0.136

* p<0.1, ** p<0.05, *** p<0.01
Standard errors in parenthesis.
Source: Author's calculations.

KOKKUVÕTE

Välisosalusega ettevõtted korruptiivses keskkonnas: efektid ettevõtte tegevusedukusele

Kuni viimase ajani pole majandusuuringutest jõutud konsensusele selles osas, kuidas ettevõtluskeskkonna korruptiivsus mõjutab riiki otsesete välisinvesteeringute tegemist. Samuti on vähe tähelepanu saanud küsimus, kas korruptiivne keskkond mõjutab erinevalt kodumaiste ja välisosalusega ettevõtete tegevusedukust. Käesolev artikkel kasutab selleks Euroopa Rekonstruktsiooni ja Arengupanga Ärikeskkonna ja Ettevõtete Tegevusedukuse uuringu viienda laine ettevõtte-taseme ristandmeid aastatest 2012-2014, mis katab postkommunistlikke riike Kesk- ja Ida Euroopast ning endise Nõukogude Liidu territooriumilt. Uurimistöö eesmärgiks on läbi viia empiiriline kvantitatiivne analüüs, kuidas korruptsioon seondub ettevõtte välisosalusega ja ettevõtte tegevusedukusega. Erinevaid ökonmeetrilisi lähenemisi kaustades selgus, et välisosalusega ettevõtted kalduvad kulutama pististele enam kui kohalikud ettevõtted. Samas, on pistisekulude negatiivne mõju ettevõtte tegevusedukusele (tööjõu tootlikkusele) suurem välisosalusega ettevõtetes kui kohalikes ettevõtetes. Uurimuse tulemused viitavad sellele, et motiveerimaks multinatsionaalseid ettevõtteid investeerima arenevatesse riikidesse, on muude meetmete seas oluline ka ettevõtluskeskkonna parandamine ja võitlus mitteformaalsete maksetega ettevõtluse suhtlemisel avaliku sektori bürokraatiaga loomaks võimalikult vähekorruptiivset keskkonda.