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Financial constraints, corruption, and SME growth in transition economies

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ABSTRACT

In this study, I investigate the impact of firm-level financial constraints and corruption in the business environment on growth for over 10,000 small- and medium-sized enterprises (SMEs) in 28 Eastern European and Central Asian countries. I also examine the determinants of firms' financial constraints and the relevant role of country-level development, institutions, and corruption. I find that financial constraints negatively affect both firm sales growth and employment growth while corruption has no direct impact on growth. Older, larger, foreign-owned firms and firms with higher ownership concentration report lower financial constraints while exporting firms report higher financial constraints. In countries with higher levels of GDP per capita, stock market development, legal systems and property rights, and lower levels of corruption, firms face lower levels of financial constraints. I provide novel empirical evidence that firm-level corruption hinders SMEs' access to financing and seriously hampers their growth in transition economies.

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1. Introduction

A large body of literature has documented the importance of firm growth in facilitating country-level financial development (e.g. Rajan & Zingales, 1998; Wurgler, 2000; Levine & Zervos, 1998; Levine, Loayza, & Beck, 2000; Bekaert, Harvey, & Lundblad, 2005). The more recent literature highlights the key role played by the broader business environment in promoting and restraining firm growth, especially for small- and medium-sized enterprises (SMEs) (e.g. Beck, Demirgüç-Kunt, & Maksimovic, 2005; Beck, Demirguc-Kunt, Laeven, & Levine, 2008). While some constraints in the business environment hinder firm growth directly, others may not have direct impact on growth (Ayyagari, Demirgüç-Kunt, & Maksimovic, 2008). The effectiveness of a country's institutions helps firms reducing certain growth constraints, especially financial constraints (Beck, Demirgüç-Kunt, Laeven, & Maksimovic, 2006).

SMEs are an important part of a country's economic development. Economic growth of many less developed countries depends on the growth of their SMEs. Governments and policy makers of

developing countries often adopt policies with an aim to improve business environments for SMEs by reducing market and institutional constraints impeding their growth. In this study, using a unique firm-level survey database, I investigate the impact of financial constraints and corruption in the business environment on growth for SMEs in 28 Eastern European and Central Asian (ECA) countries. I also investigate the determinants of firm financial constraints and the relevant role of a country's institutions and corruption.

SMEs generally experience significantly higher growth constraints in the business environment than large enterprises (Beck & Demirguc-Kunt, 2006). Such constraints are often related to financial, tax, crime, regulations, corruption, legal and political environment, among others. Among these growth constraints, financial constraint seems to be the most severe one. A number of studies in the literature have examined firm financial constraints (e.g. Fazzari, Hubbard, Petersen, Blinder, & Poterba, 1988; Hubbard, 1998; Bond & Van Reenen, 1999). Empirical evidences also highlight the importance of access to finance to firm growth (e.g. Deakins, North, Baldock, & Whittam, 2008; Malhotra et al., 2007). Additionally, the extant literature provides evidences that macro-economic and institutional context play pivotal role in alleviating financial constraints for firms, specifically for SMEs (e.g. Beck, Maksimovic,

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& Demirgüç-Kunt, 2003; Beck & Demirgüç-Kunt, 2006; Clarke, Cull, & Martínez Peria, 2001).

The harmful effect of corruption on a country's economic growth is a critical issue to both academics and policy makers. A rich body of literature has addressed the effect of corruption on country-level growth and development. Most cross-country studies highlight the negative effect of corruption on growth (e.g. Myrdal, 1968; Shleifer & Vishny, 1993; Mauro, 1995) while some studies also show that corruption may help firm growing faster (e.g. Huntington, 1968; Leys, 1965; Leff, 1964; Liu, Sah, Ullah, & Wei, 2018). Firm-level research examining the effects of corruption is limited comparing to country-level analyses mainly because of the lack of data representing corruption that firms experience.¹

Transition economies of the ECA countries are an under-explored yet important part of the global economy. These are mainly developing countries having slower growth, poor financial and governance mechanisms, weak legal institutions, poor property rights, higher levels of corruption, and unstable political and economic environments. All the transition economies went through extensive restructuring and privatizations. However, most of these economies have yet to develop efficient financial and institutional systems to satisfy firms' capital needs, particularly for financially constrained SMEs. Transition economies also have a few developed countries with higher levels of financial development and institutional quality. In together, these economies present a unique set of countries with wide variety of economic, financial and institutional development to examine firm-level growth.

In this paper, I seek answers to the following research questions for transition economies. How do financial constraints and corruption in the business environment affect firm growth? What are the determinants of firms' financial constraints? Does country-level economic, financial and institutional development help alleviating the financial constraints for SMEs? How country and firm-level corruption affects firms' financial constraints? To answer these questions, I analyze *Business Environment and Enterprise Performance Survey (BEEPS)* database for 10,062 SMEs in 28 ECA countries for 2011–2014.

I find that financial constraints directly and negatively affect firm sales growth and employment growth while corruption does not have any direct impact on firm growth. In examining financial constraints in more detail, I use objective measures of financial constraints. The results confirm my finding that financially constrained firms have lower sales and employment growth. I conduct a series of robustness checks, including controlling for firm characteristics, industry effects, country fixed effects, and potential endogeneity, and the main results continue to hold. I also find that certain firm characteristics such as age, size, ownership structure, and exporting status are effective categorizations of firms when investigating financial constraints. Older, larger, foreign-owned firms and firms with higher ownership concentration report lower financial constraints while exporting firms report higher financial constraints. In examining the role of country-level development characteristics in explaining cross-country variation in firm financial constraints, I find that higher levels of economic, financial and institutional development are important in alleviating firm financial constraints. SMEs face lower levels of financial constraints in countries with higher levels of GDP per capita, stock market development, legal systems and property rights, and lower levels of corruption.

Using *BEEPS* data allows examining a wide range of corrupt activities in the business environment. The survey questions related to corruption at various levels (government, local, and regional) and in important institutions (courts, customs, and tax

¹ See Bardhan (1997); Svensson (2005), and Banerjee (1997) for reviews of existing literature.

agencies) reveal firms' exposure to corruption in the business environment. This study provides empirical evidence that firms are more financially constrained when they face higher levels of corruption in the business environment. Overall, the findings suggest that corruption may not impede firm growth directly, but it limits firms from growing faster by making them more financially constrained.

This paper contributes to the literature in at least two aspects. First, I provide evidence identifying the important role of financial constraints in affecting growth for SMEs in the transition economies, an important yet under-explored group of countries. The second contribution is derived from the finding that with the economic, financial and institutional development of a country, firms face lower financial constraints. While the extant literature examines firms' cost of corruption in the lending process or among bank officials and financial intermediaries (e.g. Barth, Lin, Lin, & Song, 2009; Beck et al., 2006), this is the first study investigating the direct impact of firm-level corruption on firm financial constraints.

The rest of this paper is organized as follows. I present the related literature in Section 2. I discuss the financial sector of the transition economies in Section 3. In Section 4, I describe the data, variables, and summary statistics. Section 5 presents the methodology and empirical results while Section 6 concludes.

2. Related literature

The existing literature shows the importance of a country's business environment for entrepreneurial initiatives, firm performance, and growth (e.g. Djankov, Miguel, Qian, Roland, & Zhuravskaya, 2005; Johnson, McMillan, & Woodruff, 2002; Cull & Xu, 2005). A number of studies in this line of research highlight the importance of firm constraints in the business environment. Using *World Business Environment Survey (WBES)* database for 54 countries, Beck et al. (2005) investigate the association between different obstacles (financial, legal, and corruption) in the business environment and firm growth rates. They find that SMEs are most constrained, and financial and institutional development lessens the constraining effects while SMEs benefit the most from such development. Demirgüç-Kunt and Maksimovic (1998) show the significance of financial system and legal enforcement in relaxing firm financial constraints and promoting growth. Rajan and Zingales (1998) suggest that industries depending predominantly on external finance grow faster in countries with more developed financial systems. Bottazzi, Secchi, and Tamagni (2014) find that financial constraints undermine average firm growth. Using *WBES* for 80 countries, Ayyagari et al. (2008) investigate the role played by the business environment in promoting and restraining firm sales growth and find that only obstacles related to finance, crime, and policy instability are harmful to firm sales growth.

Among all the business environment constraints affecting firm growth, financial constraint has been identified as one of the most detrimental growth obstacles. The extant literature has recognized a number of firm-level determinants of financial constraints including firm size and age (e.g. Devereux & Schiantarelli, 1990; Winker, 1999), the presence of bond ratings (Whited, 1992), dividend payouts (Fazzari et al., 1988), business-group affiliation (Hoshi, Kashyap, & Scharfstein, 1991), and the pattern of insider trading (Oliner & Rudebusch, 1992). Research suggests that macro-economic and institutional context plays pivotal role in alleviating financial constraints for firms, especially for SMEs (e.g. Beck et al., 2003, 2006; Clarke et al., 2001). Demirgüç-Kunt and Maksimovic (1998) find that firms experience lower financial constraints in countries with more efficient legal systems. Love (2003) show that country-level financial development reduces the effect of financial constraints on investment. Faucejlia (2015) show the significance

of financial development in reducing credit constraints in 17 developing countries. Laeven (2003) and Gelos and Werner (2002) find that financial liberalization eases financial constraints of firms, in particular for SMEs. Beck et al. (2008) show the importance of improving country-level institutional environment for SMEs' access to external finance. Beck et al. (2006) show that older, larger, and foreign-owned firms face lower levels of financing obstacles, and institutional development can explain the cross-country variation in firms' financing obstacles.

Research has established that well-functioning banking systems can smoothly channel savings to the most productive investment projects ensuring efficient capital allocation and enhancing economic development and growth (e.g. Levine, 1997, 2005). However, corruption is a potential danger hindering the efficiency of this capital allocation mechanism. SMEs are more adversely affected by the corruption in lending process. Financial intermediaries force SMEs to abandon profitable investment opportunities resulting in lower growth rates (Beck et al., 2005). Corruption distorts the allocation of bank funds from normal projects to bad projects decreasing the quality of private investments and thus, harming economic growth (Park, 2012). The cost of corruption in the lending process is substantial when bank officials take deposits and then pass them along to businesses not entirely based on efficiency considerations. In a corrupt lending environment, firms with superior bank connections have easier access to finance (Charumilind, Kali, & Wiwattanakantang, 2006; Laeven, 2001).

Several papers have looked into the causes and impact of corruption in the lending process and among financial intermediaries. Among these papers, two important studies are particularly relevant to the current study. Using WBES data, Beck et al. (2006) investigate the effect of different supervisory policies on lending corruption and show that powerful supervisory agencies reduce integrity in bank lending, whereas greater private monitoring of banks decreases corruption in the lending process. In a similar study, Barth et al. (2009) investigate the effects of borrower and lender competition as well as information sharing via credit bureaus/registries on corruption in bank lending, and find that higher levels of banking competition and information sharing reduce lending corruption. The corruption literature has not addressed the direct impact of corruption in the business environment on firm financial constraints.

3. Financial sector in the transition economies

Transition economies or transitional economies include the countries in Central and Eastern Europe (CEE) and the Commonwealth of Independent States (CIS) that formed most of the former Soviet Union. More than two decades ago, governments of these countries implemented a set of structural transformation including economic liberalization, macroeconomic stabilization, legal and institutional reforms, and privatization of their state-owned enterprises (SOEs) extensively. The objectives of the structural transformation were to improve business environment and move from planned, or command economy towards free-market economy.

Before transition began in 1990, the financial sector of the centrally-planned economies functioned more like an accounting system to implement their overall economic policy. Misallocation of credit was a severe problem for their financial systems where Communist regimes allocated funds passively to firms based on their central plans. After the transition, a financial sector was created with an attempt to facilitate macroeconomic stabilization and capital to the private sector. While changing from central planning to free markets, most of the transition economies had to go through severe difficulties including high rates of inflation and unemploy-

ment, corruption, lack of effective legal systems, human capital, and infrastructure. Creating a market-based financial system was a big challenge for these countries. Instead of state funding, the large enterprises of the transition economies had to depend on the new, market-oriented financial systems for financing.

During the initial years of transition, central banks of the ECA countries stopped controlling the state-owned banks and their non-performing loans were written off (Liebscher, Christl, Mooslechner, & Ritzberger-Grünwald, 2007). These state-owned banks were restructured extensively and privatized before commercialization. In later years, new and foreign-owned banks started to emerge. Foreign-owned banks developed the financial sector of the transition economies by introducing new technology and improving managerial practices and relationships between the financial sector and industry (Cojocaru, Falaris, Hoffman, & Miller, 2016).

A number of studies have explored the financial sector of the transition economies (e.g. Koivu, 2002; Fink, Haiss, & Vuksic, 2009; Mehl, Vespro, & Winkler, 2006; Eller, Haiss, & Steiner, 2006; Masten, Coricelli, & Masten, 2008). Research suggests that economic reform and growth of these economies have not reached the expected level. Entrenched interest groups and ineffective institutions are among the two main factors impeding economic reform and growth.² Even after the implementation of a number of development initiatives both by the governments and donor agencies, most of the ECA countries have yet to establish business-friendly environments for their firms.³ Business initiatives and activities in many transition countries are negatively affected by the unstable political and economic environment, weak court systems, under-developed capital markets, and less effective institutions. The bank-based financial systems also fail to ensure easy access to finance especially for SMEs which severely impede their growth.

The liberalization of the banking system in the transitions economies experienced serious problems in the absence of ineffective bankruptcy laws, proper enforcement mechanisms, and collateral guidelines. All these led to soft budget constraints for privatized former SOEs. D'Souza, Megginson, Ullah, and Wei (2017) examine 27 transition economies and find that privatized former SOEs face fewer financial constraints than originally private firms. De Haas (2001) show that soft budget constraints continued even after the financial sector reform through bank privatization and foreign ownership. Boubakri, Cosset, and Saffar (2008) show that privatized former SOEs with greater government residual ownership are more political connected. Boubakri, Cosset, and Saffar (2013) find that political connections help firms lowering their cost of equity and financial constraints. Smaller private firms are less likely to have soft budget constraints and political and institutional connections. Access to finance, therefore, is a critical problem for SMEs in transition economies.

The banking systems of most transition countries do not operate efficiently and are susceptible to corruption undermining their primary function of allocating scarce capital efficiently. Information sharing among the stakeholders is low resulting in corruption in the business environment. Firms as well as investors in these economies are also hindered by information barriers arising from poor accounting standards and lack of sufficient information sharing through credit bureaus and public credit registries. Compounding these constraints is the role of government interference in the form of state sponsored lending programs, corruption, and favoring politically connected firms. In such environment, different parties involved in the lending process possess different infor-

² See the Transition Report 2010 and 2013 of European Bank for Reconstruction and Development (EBRD) for the recent status of the transition economies.

³ The EBRD, the World Bank, and the International Monetary Fund (IMF) provide assistance to the ECA countries making the shift to a market-based economy.

mation set about the risk of default. For instance, due to high information asymmetry between lenders and borrowers, the lending officer often has a significant amount of discretion in terms of lending, such as loan rates, maturities, or type of collateral required. This discretion available to lending officers creates room for bribery. Besides banks, other stakeholders including bureaucrats, government officials at different levels, and political parties exercise their power and authority favoring connected enterprises. D'Souza et al. (2017) find that smaller, originally private firms face more corruption in the business environment from their privatized counterpart in transition countries. SMEs lacking important connections struggle to have adequate access for finance. Corruption in courts/legal systems also has a negative impact on bank lending. In this study, I hypothesize that in a corrupt business environment where information asymmetry among different stakeholders is high, SMEs face higher financial constraints.

Table 1 reports the economic, financial and institutional development indicators of the transition economies. *GDP per Capita* representing economic development of a country is the real GDP per capita in U.S. dollars obtained from *World Development Indicators (WDI)* database of the World Bank. For country-level financial/stock market development, I use two variables: *Private Credit* and *Value Traded*. *Private Credit* is the ratio of financial sector credit to the private sector over GDP derived from *International Financial Statistics (IFS)*. Constructed from Beck, Demirgüç-Kunt, and Levine (2000) data, *Value Traded* is the value of shares traded divided by GDP. Research suggests that both *Private Credit* and *Value Traded* have a causal relation with economic growth (Beck et al., 2008; Levine et al., 2000). To represent a country's institutional development, I use two different variables: *Property Rights* and *Rule of Law*. *Property Rights* is Heritage Foundation's estimates of a country's property rights protection. Knack and Xu (2017) offer evidence on the overwhelming importance of property rights institutions (i.e., containing government expropriation) relative to contracting institutions (i.e., facilitating exchange between private citizens) in facilitating external finance. *Rule of Law* is an indicator of the efficiency of a country's legal system, obtained from *Worldwide Governance Indicators (WGI)* database of the World Bank. To capture a country's corruption situation, I use *Corruption Control* and *Corruption Perceptions Index*. *Corruption Control* is the country-level corruption estimate derived from WGI database. *Corruption Perceptions Index* is Transparency International's country-level corruption score based on how corrupt a country's public sector is perceived. All country variables are 2008–2013 averages. For all these variables, higher values indicate higher levels of development and lower levels of corruption.

Table 1 shows wide variations in the degree of economic, financial and institutional development across the sample countries. The study sample includes some large economies such as Poland, Czech Republic, and Romania along with some small ones such as Montenegro, Tajikistan, and Kyrgyzstan. The sample also includes some relatively poor countries, such as Tajikistan and Kyrgyzstan (per capita GDP of USD 771 and USD 911, respectively), to more developed ones, such as Slovenia and Czech Republic (per capita GDP of USD 23,521 and USD 19,916 respectively). Overall, high income countries have higher levels of financial market development and property rights protection, better legal system, and lower levels of corruption. Nonetheless, the average GDP per capita and the financial and institutional scores of the ECA countries are way below than those of the developed countries.

The wide variation among the ECA countries may be related to their differences that existed before the transition. Before the transition period, in some of these countries such as Hungary, Poland, and the former Yugoslavia, private sector coexisted with the public sector and firms were allowed to exercise their independence in decision making. On the other hand, countries such as Bulgaria,

Romania, and the Soviet Union did not allow such freedom for enterprises inhibiting economic growth (Coricelli, 2001).

The above discussions provide three important rationales to examine the financial constraints and corruption faced by SMEs, and the pertinent role of country-level development and institutional quality. First, these issues have not been explored yet in the literature for SMEs in transition economies. Second, access to finance can be singled out as one of the most detrimental obstacles to SME growth in transition economies. A thorough analysis is warranted in identifying the determinants of financial constraints for SMEs in transition economies. Third, there are wide variations in economic, financial and institutional development, and corruption situation across the transition economies, an under-explored yet interesting group of countries. All these provide a useful setting to investigate the effect of country-level development and corruption in affecting firm-level financial constraints.

4. Data and variables

4.1. Data sources

I obtain firm-level data from *Business Environment and Enterprise Performance Survey (BEEPS)* database, collected jointly by the European Bank for Reconstruction and Development (EBRD) and the World Bank.⁴ Besides firm-level BEEPS data, I use country-level development, governance, and corruption data from *World Development Indicators*, *International Financial Statistics*, Beck et al. (2000), *Heritage Foundation*, *Worldwide Governance Indicators*, and *Transparency International*.⁵

4.2. Study sample

In the BEEPS database, firm-level information is available for 15,883 firms in 30 ECA countries.⁶ I delete 534 observations without the required values to calculate their sales and employment growth, and for missing values of the financial constraint question.⁷ I also exclude Russia (3,710 observations) and Turkey (1,340 observations) from the study sample. The financial constraint survey question is missing for Russia. Turkey is not counted as a transition economy according to the World Bank and IMF. Finally, I delete 237 large firms (500 employees or more) to focus on SMEs only. The final sample consists of 10,062 SMEs in 28 transition economies.⁸

4.3. Firm growth measures

As dependent variables, I use two measures of firm growth, *Sales Growth* and *Employment Growth* which are defined as follows,

$$\text{SalesGrowth}_{it} = (\text{Sales}_{it} - \text{Sales}_{it-2}) / (\text{Sales}_{it} + \text{Sales}_{it-2}) \quad (1)$$

$$\text{EmploymentGrowth}_{it} = (\text{Employees}_{it} - \text{Employees}_{it-2}) / (\text{Employees}_{it} + \text{Employees}_{it-2}) \quad (2)$$

⁴ For a literature survey of firm-level studies using the WBES/BEEPS data, see Xu (2011).

⁵ Detailed variable definitions and sources are given in Appendix A.

⁶ The descriptions of the survey information are available at <http://ebrd-beeps.com/about/>.

⁷ In the raw sample, sales growth data are available for 9,491 firms, employment growth data are available for 13,943 firms, and financial constraint data are available for 11,489 firms.

⁸ For BEEPS/WBES survey data, convenient sampling method is often used which may create some research biases such as nonresponse and measurement error. See Ayyagari, Demirgüç-Kunt, and Maksimovic (2011) for the quality control measures taken in BEEPS/WBES survey data in overcoming the possible errors. Hallward-Driemeier and Aterido (2009) compare the World

Table 1
Economic, financial and institutional development indicators in transition economies.

Country	N	GDP per Capita	Private Credit	Value Traded	Property Rights	Rule of Law	Corruption Control	Corruption Perceptions Index
Albania	341	4,102.66	36.17	.	32.50	−0.53	−0.60	3.23
Armenia	354	3,345.32	28.38	0.01	31.67	−0.39	−0.57	2.97
Azerbaijan	387	5,735.55	17.21	.	23.33	−0.80	−1.07	2.41
Belarus	344	5,887.68	27.37	.	20.00	−0.99	−0.63	2.55
Bosnia-Herzegovina	355	4,512.61	52.12	.	15.00	−0.31	−0.31	3.50
Bulgaria	285	6,988.45	69.42	2.18	30.00	−0.12	−0.25	3.75
Croatia	350	13,845.97	67.62	2.55	36.67	0.18	−0.02	4.34
Czech Republic	245	19,915.84	48.00	11.35	68.33	0.97	0.26	4.79
Estonia	271	15,802.04	85.57	2.65	84.17	1.14	0.95	6.54
Georgia	359	3,144.42	31.64	0.07	39.17	−0.14	0.01	4.34
Hungary	296	13,270.65	58.95	16.57	67.50	0.72	0.31	5.06
Kazakhstan	585	9,373.15	40.91	1.82	32.50	−0.65	−0.92	2.65
Kosovo	202	3,341.17	33.26	.	30.00	−0.59	−0.61	3.09
Kyrgyzstan	264	910.95	12.25	1.06	24.17	−1.25	−1.14	2.10
Latvia	333	12,447.61	78.02	0.16	52.50	0.77	0.17	4.70
Lithuania	261	12,991.36	51.63	0.94	55.83	0.75	0.23	5.06
Macedonia	357	4,579.44	43.61	1.21	33.33	−0.27	−0.05	4.02
Moldova	357	1,690.02	35.52	1.88	41.67	−0.40	−0.65	3.18
Mongolia	356	2,985.54	41.75	0.59	30.00	−0.35	−0.64	3.08
Montenegro	149	6,778.42	66.86	2.86	40.00	0.00	−0.19	3.91
Poland	523	12,803.48	48.47	13.11	55.83	0.68	0.46	5.36
Romania	530	8,546.96	42.94	1.03	37.50	0.04	−0.21	3.94
Serbia	354	5,497.23	43.24	1.86	40.00	−0.40	−0.29	3.64
Slovakia	264	16,842.98	44.30	0.21	50.83	0.51	0.19	4.51
Slovenia	259	23,521.01	79.66	1.80	58.33	1.01	0.87	6.23
Tajikistan	347	771.26	17.18	.	25.00	−1.21	−1.15	2.13
Ukraine	974	3,093.96	73.04	1.06	30.00	−0.79	−0.98	2.42
Uzbekistan	360	1,426.11	.	0.16	19.17	−1.27	−1.19	1.69

This table reports the economic, financial and institutional development indicators in the sample countries. All country variables are 2008–2013 averages. Detailed variable definitions and sources are given in Appendix A.

Table 2
Summary statistics.

	N	Mean	Median	SD	Min	Max
<i>Firm Characteristics:</i>						
Sales Growth	6,312	0.07	0.07	0.28	−0.79	0.97
Employment Growth	9,005	0.02	0	0.15	−0.50	0.65
Financing	9,935	1.13	1	1.27	0	4
Corruption	9,715	1.14	0	1.39	0	4
FinCon1	9,971	0.59	1	0.49	0	1
FinCon2	9,720	0.65	1	0.48	0	1
FinCon3	9,912	0.63	1	0.48	0	1
FinCon4	9,979	0.79	1	0.41	0	1
FinCon5	9,935	0.18	0	0.38	0	1
Corruption_Percentage of Sales	7,630	0.72	0	3.73	0	99
Corruption_Informal Payments	9,254	1.88	1	1.13	1	6
Corruption_Customs/Imports	8,916	1.51	1	0.98	1	6
Corruption_Courts	8,858	1.43	1	0.89	1	6
Corruption_Taxes	9,066	1.62	1	1.02	1	6
Corruption_Parliamentarians	8,077	1.41	1	0.87	1	5
Corruption_Government Officials	8,064	1.45	1	0.91	1	5
Corruption_Local/Regional Officials	8,164	1.51	1	0.97	1	5
Firm Size	10,062	39.13	15	66.87	1	500
Firm Age	9,982	15.06	14	11.13	1	148
Exporter	9,958	0.23	0	0.42	0	1
Foreign	9,960	0.08	0	0.28	0	1
Government	9,958	0.02	0	0.14	0	1
Ownership	9,618	0.84	1	0.24	0.01	1
Privatized	10,062	0.12	0	0.32	0	1
Manufacturing	10,062	0.38	0	0.48	0	1
Services	10,062	0.30	0	0.46	0	1
Audit	9,794	0.36	0	0.48	0	1
<i>Country Characteristics:</i>						
GDP per Capita	28	7,477.38	5,735.55	5570.39	771.26	23,521.01
Private Credit	28	47.77	43.61	19.13	12.25	85.57
Value Traded	28	2.84	1.06	4.34	0.01	16.57
Property Rights	28	37.96	32.50	15.20	15.00	84.17
Rule of Law	28	−0.21	−0.35	0.68	−1.27	1.14
Corruption Control	28	−0.36	−0.31	0.58	−1.19	0.95
Corruption Perceptions Index	28	3.61	3.50	1.19	1.69	6.54

This table reports the summary statistics of the firm and country-level variables. N refers to firm-level observations for 28 countries. Detailed variable definitions and sources are given in Appendix A.

where i is firm and t is year. The growth rates constructed are bound by -1 and 1 , which reduces the influence of outliers (Xu, 2011). I also winsorize the growth rates at the top and bottom 1%. As shown in Table 2, the mean sales growth rate and employment growth rate are 7% and 2%, respectively.

4.4. Financial constraint measures

The BEEPS survey asks the respondents to identify various constraints in the business environment to firm growth.⁹ The firm-level financial constraints (*Financing*) take on a value based on the self-reported answer to the following survey question: “How problematic is access to finance which includes availability and cost [interest rates, fees and collateral requirements] for the current operations of a business?” The response scales from 0 to 4: no obstacle (0), minor obstacle (1), moderate obstacle (2), major obstacle (3), and very severe obstacle (4). I use *Financing* as dependent variables while identifying the determinants of firm financial constraints and examining the relevant role of country-level development, institutions, and corruption.

Besides having subjective measures, the BEEPS database contains a set of objective measures of firm financial constraints in business environment. These objective measures are useful in overcoming the potential shortcomings of subjective measures. I employ four additional, objective measures to proxy firm-level financial constraints: *FinCon1*, *FinCon2*, *FinCon3*, and *FinCon4*. *FinCon1* is a dummy variable that equals 1 if the firm did not purchase any fixed assets, such as machinery, vehicles, equipment, land or buildings last year, and 0 otherwise. *FinCon2* is a dummy variable that equals to 1 if the firm does not have an overdraft facility, and 0 otherwise. *FinCon3* is a dummy variable that equals to 1 if the firm does not have a line of credit or loan from a financial institution, and 0 otherwise. *FinCon4* is a dummy variable that equals 1 if the firm does not have an overdraft facility or a line of credit or loan from a financial institution, and 0 otherwise. Firms with overdraft facility or line of credit are found to be less financially constrained (Lins, Servaes, & Tufano, 2010). Using the subjective measure of financial constraints, *Financing* I also construct a dummy variable representing firm financial constraints, *FinCon5* which equals 1 if the survey response to the access to finance question equals to 3 (major obstacle) or 4 (very severe obstacle), and 0 otherwise. As observed in Table 2, more than half of the sample firms are financially constrained as indicated by the four objective measures of financial constraints. These figures provide evidence that access to finance is a major growth obstacle for most SMEs in the ECA countries.

4.5. Corruption measures

Similar to financial constraints, the firm-level corruption in the business environment (*Corruption*) take on a value based on the self-reported answer to the following survey question: “How problematic is corruption for the current operations of a business?” The response scales from 0 to 4: no obstacle (0), minor obstacle (1), moderate obstacle (2), major obstacle (3), and very severe obstacle (4). I use *Corruption* as an independent variable while identifying the impact of corruption on firm growth and financial constraints.

There is a scarcity of firm-level studies in the corruption literature which may be related to difficulty in collecting data representing corruption that firms experience in the business environment. The firm-level corruption literature has used mainly

various survey-based corruption measures including dummy variable representing the incidence of bribe payments (e.g. Sharma & Mitra, 2015; Svensson, 2003; Rand & Tarp, 2012), firm's amount of informal payments to public officials (e.g. Fisman & Svensson, 2007; Svensson, 2003; Nguyen & Van Dijk, 2012), number of days spent in dealing with government officials (Wang & You, 2012), and firm managers' perception about the corruption level in government agencies/departments (Nguyen & Van Dijk, 2012).¹⁰ Given the limitations of these corruption measures, in this study, I use new measures of firm-level corruption which explore firms' exposure to corruption at various levels (government, local, and regional) and in important institutions (courts, customs, and tax agencies).

The BEEPS database includes a number of unique questions related to corruption faced by firms. The responses are useful in constructing variables representing firm-level corruption. I use the percent of the firm's total annual sales paid as informal payments/gifts to construct *Corruption.Percentage of Sales*. I construct four variables using the responses related to the firm's frequency of informal payments/gifts to different parties or institutions: *Corruption.Informal Payments*, *Corruption.Customs/Imports*, *Corruption.Courts*, and *Corruption.Taxes*.¹¹ The responses are on the scale from 0 to 6: Never (1), Seldom (2), Sometimes (3), Frequently (4), Very frequently (5), and Always (6). Three other firm-level corruption related variables reflect the direct impact of corruption on the firm: *Corruption.Parliamentarians*, *Corruption.Government*, and *Corruption.Local/Regional Officials*. The survey respondents were asked to determine the extent to which their unofficial payments/gifts or other benefits/practices to public officials (parliamentarians, government officials, and local/regional officials) had direct impact to gain advantage in the drafting of laws, government decrees, regulations, and other binding government decisions. The responses are on the scale from 0 to 5: No impact (1), Minor impact (2), Moderate impact (3), Major impact (4), and Decisive impact (5). For all the firm-level corruption related variables, higher values indicate higher levels of corruption.

4.6. Control variables

In the regression analyses, I control for 7 control variables that are likely to affect firm growth and financial constraints: firm's size, age, exporting status, foreign and government ownership, ownership concentration, and whether the firm is a privatized former SOE. Table 2 reports that the average firm has 39 full time employees and about 15 years old. In the regression models, I take natural logarithms of both *Firm Size* and *Firm Age* to reduce the influence of outliers. In the study sample, about 23% of all firms export; 8% of the sample firms have foreign ownership; and 2% of all firms have government ownership. The average firm in the sample has highly concentrated ownership, with around 84% of the firm owned by the largest owner(s). Around 12% of the sample firms were SOEs before the privatization programs of the transition economies.

The sample includes firms from 32 industries.¹² To control for industry effects, I follow Beck et al. (2005) and use two indicator variables, *Manufacturing* and *Services* that equal 1 if the firm is in the manufacturing and service industry, respectively. In the study sample, 38% firms belong to the manufacturing industry and 30% firms belong to the services industry. As an instrument for firm financial constraints, I construct a dummy variable *Audit* that equals

¹⁰ See Wang and You (2012) and Ullah (2019) for the limitations of various corruption measures used in the literature.

¹¹ Beck et al. (2005) use two WBES variables similar to *Corruption.Percentage of Sales* and *Corruption.Informal Payments* as proxies for corruption that firms must deal with.

¹² I do not use industry dummies to control for industry effects because many observations do not have industry codes.

⁹ Bank's surveys to other data sources, and find a high degree of correlation between survey responses and measured objective outcomes from external data sources.

Table 3
 Financial constraints, corruption, and growth.

	Sales Growth			Employment Growth		
	(1)	(2)	(3)	(4)	(5)	(6)
Financing	-0.005** (0.003)		-0.005* (0.003)	-0.005*** (0.001)		-0.006*** (0.001)
Corruption		-0.003 (0.003)	-0.002 (0.003)		-0.001 (0.001)	0.000 (0.001)
Firm Size	0.014*** (0.003)	0.015*** (0.003)	0.014*** (0.003)	0.023*** (0.002)	0.022*** (0.002)	0.022*** (0.002)
Firm Age	-0.077*** (0.007)	-0.079*** (0.007)	-0.078*** (0.007)	-0.052*** (0.003)	-0.052*** (0.003)	-0.052*** (0.003)
Exporter	0.026*** (0.009)	0.024*** (0.009)	0.024*** (0.009)	0.007* (0.004)	0.006 (0.004)	0.007 (0.004)
Foreign	-0.035*** (0.013)	-0.035*** (0.013)	-0.035*** (0.013)	-0.016*** (0.006)	-0.015** (0.006)	-0.015** (0.006)
Government	-0.001 (0.026)	0.014 (0.026)	0.014 (0.026)	-0.014 (0.012)	-0.018 (0.013)	-0.016 (0.013)
Ownership	-0.007 (0.014)	-0.008 (0.014)	-0.008 (0.015)	0.002 (0.007)	0.004 (0.007)	0.003 (0.007)
Privatized	-0.024** (0.011)	-0.024** (0.012)	-0.024** (0.012)	-0.043*** (0.005)	-0.041*** (0.006)	-0.043*** (0.006)
Manufacturing	0.007 (0.008)	0.005 (0.009)	0.005 (0.009)	-0.006 (0.004)	-0.006 (0.004)	-0.006 (0.004)
Services	0.010 (0.009)	0.009 (0.009)	0.008 (0.009)	0.008** (0.004)	0.008* (0.004)	0.007* (0.004)
Constant	0.243*** (0.024)	0.244*** (0.024)	0.250*** (0.024)	0.100*** (0.011)	0.095*** (0.011)	0.101*** (0.011)
Adjusted R ²	0.023	0.023	0.023	0.057	0.054	0.057
Observations	5,981	5,871	5,819	8,344	8,181	8,093

This table reports the effect of financial constraints and corruption in the business environment on firm growth. All regressions are estimated using country fixed effects. Standard errors are reported in parentheses. Detailed variable definitions and sources are given in Appendix A. ***, **, and * indicate statistical significances at the 1%, 5%, and 10% levels, respectively.

1 if a firm's annual financial statements were checked and certified by an external auditor, 0 otherwise. In the sample, 36% of the firms' annual financial statements were audited.

5. Methodology and empirical results

5.1. Financial constraints, corruption, and firm growth

In exploring the impact of financial constraints and corruption in the business environment on firm growth, I regress firm growth rates (*Sales Growth* and *Employment Growth*) on *Financing* and *Corruption*. All regressions are estimated with firm-level data using country-level fixed effects and controlling for firm-level characteristics as described in the preceding section. The regression models are specified as follows:

$$\begin{aligned}
 \text{SalesGrowth} = & \alpha + \beta_1 \text{FirmConstraints} + \beta_2 \text{FirmSize} \\
 & + \beta_3 \text{FirmAge} + \beta_4 \text{Exporter} + \beta_5 \text{Foreign} + \beta_6 \text{Government} \\
 & + \beta_7 \text{Ownership} + \beta_8 \text{Privatized} + \beta_9 \text{Manufacturing} \\
 & + \beta_{10} \text{Services} + \varepsilon
 \end{aligned} \tag{3}$$

$$\begin{aligned}
 \text{EmploymentGrowth} = & \alpha + \beta_1 \text{FirmConstraints} + \beta_2 \text{FirmSize} \\
 & + \beta_3 \text{FirmAge} + \beta_4 \text{Exporter} + \beta_5 \text{Foreign} + \beta_6 \text{Government} \\
 & + \beta_7 \text{Ownership} + \beta_8 \text{Privatized} + \beta_9 \text{Manufacturing} \\
 & + \beta_{10} \text{Services} + \varepsilon
 \end{aligned} \tag{4}$$

To test whether financial constraints and corruption in the business environment have significant impact on firm growth, I test whether β_1 is significantly different from zero. Table 3 reports the regression results. In columns (1)-(3), the dependent variable is *Sales Growth* while *Employment Growth* is the dependent variable

in columns (4)-(6). The results show that when I analyze financial constraints and corruption separately, only financial constraints are significantly negatively related to both firm sales growth and employment growth. *Corruption* is also negatively related to firm growth, but the relation is not statistically significant. In columns (3) and (6), I include both *Financing* and *Corruption* in the regression equation to investigate how these two obstacles interact and which one influences firm growth directly. The results of this specification show that only *Financing* is significantly negatively related to firm growth measures. SMEs in the transition economies have difficulties in growing because of their limited access to finance meeting their capital needs. The results for the firm-level control variables suggest that larger, younger and exporting firms grow faster while foreign firms and privatized former SOEs grow slower. These results are consistent with the extant research (2008, Ayyagari et al., 2008; Beck et al., 2005; D'Souza et al., 2017)

5.2. Financial constraints and firm growth: Robustness checks

The preceding sub-section provides empirical evidence that a firm's financial constraint in the business environment is a binding constraint to its growth. In this and the next sub-section, I examine financial constraints in more detail. Considering the potential shortcomings of subjective measures of financial constraints and also as robustness checks, I use four additional, objective measures (*FinCon1*, *FinCon2*, *FinCon3*, and *FinCon4*) and an additional dummy variable (*FinCon5*) based on the subjective measure. I regress firm growth rates on these alternative measures of financial constraints firms report. Similar to specifications (3) and (4), all regressions are estimated with firm-level data using country-level fixed effects and controlling for seven firm-level characteristics.

The regressions of Table 4, Panel A show that all the alternative measures of financial constraints are significantly negatively related to firm sales growth. Panel B results show that all the alternative measures of financial constraints are significantly negatively

Table 4
 Objective measures of financial constraints and firm growth.

Panel A: Financial constraints and firm sales growth.					
	Sales Growth				
	(1)	(2)	(3)	(4)	(5)
FinCon1	-0.044*** (0.007)				
FinCon2		-0.020*** (0.008)			
FinCon3			-0.016** (0.007)		
FinCon4				-0.016** (0.008)	
FinCon5					-0.021*** (0.009)
Constant	0.266*** (0.024)	0.254*** (0.024)	0.248*** (0.024)	0.251*** (0.024)	0.240*** (0.023)
Adjusted R ²	0.029	0.024	0.023	0.023	0.024
Observations	6,015	5,927	6,011	6,023	5,981

Panel B: Financial constraints and firm employment growth					
	Employment Growth				
	(1)	(2)	(3)	(4)	(5)
FinCon1	-0.029*** (0.003)				
FinCon2		-0.015*** (0.004)			
FinCon3			-0.009*** (0.004)		
FinCon4				-0.017*** (0.004)	
FinCon5					-0.022*** (0.004)
Constant	0.115*** (0.011)	0.107*** (0.012)	0.100*** (0.011)	0.109*** (0.012)	0.098*** (0.011)
Adjusted R ²	0.063	0.057	0.056	0.057	0.059
Observations	8,385	8,220	8,365	8,401	8,344

This table reports the effect of financial constraints in the business environment on firm growth using objective measures of financial constraints. All regressions include seven firm-level control variables (*Firm Size*, *Firm Age*, *Exporter*, *Foreign*, *Government*, *Ownership*, *Privatized*, *Manufacturing*, and *Services*) and are estimated using country fixed effects. Standard errors are reported in parentheses. Detailed variable definitions and sources are given in Appendix A. ***, **, and * indicate statistical significances at the 1%, 5%, and 10% levels, respectively.

associated with firm employment growth. Overall, the results of Table 4 confirm my earlier finding that a firm's financial constraint is a binding constraint to its growth.

The negative association between firm financial constraints and growth observed in Table 3 and 4 may be the outcome of reverse causality. It could be the case that firm owners/managers might complain about limited access to finance even in cases where access is restricted due to their own deficiencies. Therefore, I need to check whether the results between financial constraints and growth are robust to possible reverse causality.

I use the Heckman (1979) two-stage model to control for the selection effects for which an instrument is needed for financial constraints (*Financing*). A valid instrument for *Financing* must meet two criteria: first, it must be correlated with financial constraints at the firm level, and second, it must be uncorrelated with firm growth. I use firm responses to the survey question "In the last fiscal year, did this establishment have its annual financial statement checked and certified by an external auditor?" to construct a dummy instrumental variable, *Audit* that equals 1 if a firm's annual financial statements were checked and certified by an external auditor, 0 otherwise. A firm's decision to audit its financial statement is likely to influence its financial constraint, but is not necessarily linked to firm growth rates independently.

Table 5
 Endogeneity tests: Financial constraints and firm growth.

	Sales Growth (1)	Selection Equation (2)	Employment Growth (3)	Selection Equation (4)
Financing	-0.009** (0.004)		-0.004*** (0.001)	
Audit		0.072** (0.030)		0.138*** (0.044)
Firm Size	0.010 (0.008)	-0.034*** (0.014)	0.018*** (0.002)	-0.115*** (0.020)
Firm Age	0.063 (0.069)	0.488*** (0.022)	-0.021*** (0.008)	0.927*** (0.030)
Exporter	0.089*** (0.031)	0.192*** (0.036)	0.012*** (0.005)	0.066 (0.053)
Foreign	0.011 (0.031)	0.115** (0.054)	-0.011 (0.007)	0.069 (0.075)
Government	0.121** (0.052)	0.039 (0.108)	-0.011 (0.013)	0.104 (0.172)
Ownership	-0.061* (0.035)	-0.154*** (0.059)	0.002 (0.007)	-0.071 (0.087)
Privatized	-0.062** (0.030)	-0.128*** (0.046)	-0.049*** (0.006)	-0.026 (0.073)
Manufacturing	-0.031 (0.019)	-0.061* (0.034)	-0.013*** (0.004)	-0.011 (0.048)
Services	0.008 (0.018)	-0.001 (0.035)	0.012*** (0.005)	0.103** (0.051)
Constant	-0.391 (0.298)	-0.644*** (0.085)	0.007 (0.025)	-0.538*** (0.115)
Mills Lambda	0.601** (0.261)		0.151*** (0.031)	
Observations	9,140		9,112	

This table reports the two-step selection models to estimate the effect of the endogenous financial constraints in the business environment on firm growth. The regressions are run as Heckman two-stage models. Standard errors are reported in parentheses. Detailed variable definitions and sources are given in Appendix A. ***, **, and * indicate statistical significances at the 1%, 5%, and 10% levels, respectively.

Table 5 presents the results of the selection models. The estimates of the selection equations (columns (2) and (4)) show that firms are more likely to audit their financial statements if they are more financially constrained. This is not surprising as financially-constrained firms may require auditing their financial statements when they apply for bank loans. After controlling for selection, the coefficients of *Financing* continue to be negative and significant as shown in columns (1) and (3). These results provide endogeneity checks supporting my finding that financial constraint in the business environment is a binding constraint to firm growth.

5.3. Determinants of financial constraints

To further examine firm financial constraints in the business environment of transition economies, I regress *Financing* on the various firm characteristics and identify the determinants of financial constraints. The specification is as follows.

$$\begin{aligned}
 \text{Financing} = & \alpha + \beta_1 \text{FirmSize} + \beta_2 \text{FirmAge} + \beta_3 \text{Exporter} \\
 & + \beta_4 \text{Foreign} + \beta_5 \text{Government} + \beta_6 \text{Ownership} \\
 & + \beta_7 \text{Privatized} + \beta_8 \text{Manufacturing} + \beta_9 \text{Services} \\
 & + \beta_{10} \text{Country} + \varepsilon
 \end{aligned} \tag{5}$$

Financing, the survey response to the financial constraints question, is a polychotomous dependent variable with a natural order. Thus, I use the ordered probit model to estimate regression (5). *Country* is a vector of country dummies which allows controlling for unobserved country-specific factors that might drive firms' responses.

The regression in column (1) of Table 6 indicates that firm size, exporting participation status, foreign ownership and ownership

Table 6
 Financial constraints and firm characteristics.

	Financing		
	(1)	(2)	(3)
Firm Size	−0.035*** (0.011)	0.026 (0.023)	−0.052*** (0.013)
Firm Age	−0.006 (0.020)	−0.141*** (0.041)	0.031 (0.022)
Exporter	0.089*** (0.031)	0.059 (0.056)	0.107*** (0.038)
Foreign	−0.205*** (0.045)	−0.534*** (0.086)	−0.080 (0.054)
Government	−0.090 (0.099)	−0.274 (0.317)	−0.070 (0.104)
Ownership	−0.121** (0.051)	−0.111 (0.095)	−0.103* (0.060)
Privatized	−0.015 (0.040)	0.022 (0.095)	−0.025 (0.044)
Manufacturing	0.064** (0.029)	0.076 (0.060)	0.063* (0.033)
Services	−0.089*** (0.030)	−0.038 (0.059)	−0.108*** (0.035)
Pseudo R ²	0.030	0.027	0.033
Observations	9,307	2,304	7,003

This table reports determinants of firm financial constraints in the business environment. All regressions include country dummies and are estimated with ordered probit. Standard errors are reported in parentheses. Regression in specification (1) uses the full sample; regression in specification (2) includes firms in high-income countries only; and regression in specification (3) includes firms in middle and low-income countries only. Countries are classified as high-, middle- or low-income according to the World Development Indicators. Detailed variable definitions and sources are given in Appendix A. ***, **, and * indicate statistical significances at the 1%, 5%, and 10% levels, respectively.

concentration can be effective predictors of financial constraints. Smaller and exporting firms report significantly higher financial constraints while foreign-owned firms and firms with higher concentrated ownership report significantly lower financial constraints. Firms in the manufacturing industry are more financially constrained while service-oriented firms are less financially constrained.

The regression in column 2 uses a sample restricted to high-income countries only, while the regression in column 3 uses a sample restricted to middle- and low-income countries. The results of columns 2 and 3 show significant differences between firms in developed and developing countries. In developed economies, firm size seems to be less important in predicting firm financial constraints, while firm age seems to be a robust predictor, consistent with the finding of Beck et al. (2006). In these high income countries, older and foreign-owned firms report significantly lower financial constraints. For firms in middle- and low-income countries, firm size is a robust predictor of financial constraints, while age is not. Larger and firms with higher concentrated ownership firms in these developing countries face lower financial constraints, while exporting firms face higher financial constraints.

5.4. Financial constraints and country characteristics

In exploring whether a country’s economic, financial and institutional development and corruption situation help firms alleviating their financial constraints, I use ordered probit model to estimate the following specification.

$$\begin{aligned}
 \text{Financing} = & \alpha + \beta_1 \text{Country} + \beta_2 \text{FirmSize} + \beta_3 \text{FirmAge} \\
 & + \beta_4 \text{Exporter} + \beta_5 \text{Foreign} + \beta_6 \text{Government} \\
 & + \beta_7 \text{Ownership} + \beta_8 \text{Privatized} + \beta_9 \text{Manufacturing} \\
 & + \beta_{10} \text{Services} + \varepsilon
 \end{aligned} \tag{6}$$

Country is a vector of 7 variables: GDP per Capita is an indicator of a country’s economic development; Private Credit and Value Traded are indicators for a country’s financial development; Property Rights and Rule of Law are proxies for country-level institutional development; and Corruption Control and Corruption Perceptions Index are indicators for a country’s corruption level.

Table 7 results show that higher levels of economic, financial and institutional development are important in alleviating firm financial constraints. The coefficients of all the seven country characteristics are negative and significant at the 1% level. As shown in columns (1)–(5), in countries with higher levels of GDP per capita, stock market development, legal systems, and better property rights, firms face lower levels of financial constraints. The results of columns (6) and (7) show that in countries with lower levels of corruption, firms have easier access to finance. These results suggest that reduction of country-level corruption could be an effective way to ease financial constraints for SMEs in transition economies.

5.5. Financial constraints and firm-level corruption

Next, I examine the association between financial constraints and corruption at the firm-level arising from business environment. Similar to Eq. (6), I use ordered probit model and regress Financing on the firm-level corruption proxies controlling for firm characteristics and country dummies. The specification is as follows.

$$\begin{aligned}
 \text{Financing} = & \alpha + \beta_1 \text{Firm-Corruption} + \beta_2 \text{FirmSize} \\
 & + \beta_3 \text{FirmAge} + \beta_4 \text{Exporter} + \beta_5 \text{Foreign} + \beta_6 \text{Government} \\
 & + \beta_7 \text{Ownership} + \beta_8 \text{Privatized} + \beta_9 \text{Manufacturing} \\
 & + \beta_{10} \text{Services} + \beta_{11} \text{Country} + \varepsilon
 \end{aligned} \tag{7}$$

Firm-Corruption is a vector of 9 variables representing firm-level corruption: Corruption, Corruption.Percentage of Sales, Corruption.Informal Payments, Corruption.Customs/Imports, Corruption.Courts, Corruption.Taxes, Corruption.Parliamentarians, Corruption.Government, and Corruption.Local/Regional Officials. Country is a vector of country dummies which allows controlling for unobserved country-specific factors affecting firm responses. For the firm-level corruption variables, higher values indicate higher levels of corruption and therefore, I expect the β_1 , the coefficient of Firm-Corruption, to be positive and significant, as I hypothesize that firms are more financially constrained when they face higher levels of corruption in the business environment.

Table 8 reports the results. The coefficients of all the 9 corruption variables are positive and significant at the 1% level. Column 1 results show that firms facing more corruption obstacles are more likely to be financially constrained. The results of column 2 provide evidence that when the corruption level is high and firms have to spend a higher percentage of their total annual sales in paying bribes, they face higher levels of financial constraints. Columns (3)–(6) results show that in a business environment where firms have to make more frequent informal/unofficial payments to get things done while dealing with customs, courts, and taxes, they are more likely to be financially constrained. The results of columns (7)–(9) suggest that firms face higher levels of financial constraints in a corrupt business environment where firms influence parliamentarians, government officials, and local/regional officials by making private payments/gifts or offering them other benefits. Overall, the results of Table 8 provide strong empirical evidence that firms are more financially constrained in more corrupt business environment. In other words, firms have easier access to finance when they operate in less corrupt business environment, consistent with the findings of Table 7.

Table 7
 Financial constraints and country characteristics.

	Financing						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GDP per Capita	-0.037*** (0.015)						
Private Credit		-0.003*** (0.001)					
Value Traded			-0.017*** (0.003)				
Property Rights				-0.007*** (0.001)			
Rule of Law					-0.062*** (0.019)		
Corruption Control						-0.079*** (0.022)	
Corruption Perceptions Index							-0.047*** (0.011)
Pseudo R ²	0.004	0.003	0.005	0.007	0.004	0.004	0.005
Observations	9,307	8,954	7,457	9,307	9,307	9,307	9,307

This table reports the role of country-level economic, financial and institutional development in explaining cross-country variation in firm's financial constraints. All country variables are 2008–2013 averages. All regressions include seven firm-level control variables (*Firm Size, Firm Age, Exporter, Foreign, Government, Ownership, Privatized, Manufacturing, and Services*) and are estimated with ordered probit. Standard errors are reported in parentheses. Detailed variable definitions and sources are given in Appendix A. ***, **, and * indicate statistical significances at the 1%, 5%, and 10% levels, respectively.

Table 8
 Financial constraints and firm-level corruption.

	Financing								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Corruption	0.190*** (0.009)								
Corruption_Percentage of Sales		0.022*** (0.004)							
Corruption_Informal Payments			0.176*** (0.011)						
Corruption_Customs/Imports				0.115*** (0.013)					
Corruption_Courts					0.134*** (0.014)				
Corruption_Taxes						0.143*** (0.013)			
Corruption_Parliamentarians							0.088*** (0.015)		
Corruption_Government Officials								0.096*** (0.015)	
Corruption_Local/Regional Officials									0.109*** (0.014)
Pseudo R ²	0.047	0.034	0.042	0.034	0.035	0.036	0.035	0.035	0.036
Observations	9,014	7,145	8,579	8,269	8,208	8,399	7,519	7,509	7599

This table reports the effect of financial constraints in the business environment on firm-level corruption. All regressions include seven firm-level control variables (*Firm Size, Firm Age, Exporter, Foreign, Government, Ownership, Privatized, Manufacturing, and Services*). All regressions also include country dummies and are estimated with ordered probit. Standard errors are reported in parentheses. Detailed variable definitions and sources are given in Appendix A. ***, **, and * indicate statistical significances at the 1%, 5%, and 10% levels, respectively.

6. Conclusion

Using BEEPS data of over 10,000 SMEs in 28 Eastern European and Central Asian countries for 2011–2014, I study the impact of financial constraints and corruption in the business environment on firm growth and the role of development and institutional characteristics in explaining cross-country variation in firm financial constraints.

I document that financial constraints negatively affect firms' sales and employment growth. In most transitions economies where money and capital markets are under developed as a result of their legacies of central planning, growth of SMEs are severely constrained by their limited access to finance.

I then examine firm financial constraints in more detail by exploring how financial constraints inhibit firm growth and identifying the determinants of financial constraints of firms. The use of

objective measures of financial constraints and endogeneity tests confirm my finding that financially constrained firms have lower sales and employment growth. I document that certain firm characteristics are effective categorizations of firms when investigating financial constraints. Smaller and exporting firms are more financially constrained while older, foreign-owned firms and firms with higher concentrated ownership report significantly lower financial constraints.

I investigate the role of country-level development and institutional characteristics in explaining cross-country variation in firm financial constraints. I find that higher levels of economic, financial and institutional development are important in alleviating firm financial constraints. In countries with higher levels of GDP per capita, stock market development, legal systems, and property rights and lower levels of corruption, SMEs face lower levels of financial constraints.

As one of the main contributions of this study, I provide novel empirical evidence that firm-level corruption hinder SMEs' access to financing and thereby, their growth. The inefficient banking systems of most transition economies are susceptible to corruption. Information asymmetry among different stakeholders involved in the lending process is also high. In such business environment, SMEs lacking favorable political connections and comparative advantages in dealing with legal and regulatory systems face higher financial constraints to growth. The findings of this study highlight the cost of corruption in harming firm growth by making firms more financially constrained.

The findings of this study suggest that government efforts should be directed at improving the economic, financial and insti-

tutional environment of a country in order to ensure SMEs' easy access to finance fostering their growth. By showing the harmful impact of country- and firm-level corruption on firms' access to finance, this study highlights the importance of improving a country's corruption situation in benefitting SMEs to have better access to finance.

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Appendix A. Variable definitions and sources

Variable	Definition	Source
Sales Growth	The average difference of last year's total annual sales and total annual sales of three years ago.	BEEPS
Employment Growth	The average difference of last year's number of permanent, full time employees and number of permanent, full time employees three years ago.	BEEPS
Financing	"How problematic is access to finance which includes availability and cost [interest rates, fees and collateral requirements] for the current operations of a business?" No Obstacle = 0, Minor Obstacle = 1, Moderate Obstacle = 2, Major Obstacle = 3, and Very Severe Obstacle = 4.	BEEPS
Corruption	"How problematic is corruption for the current operations of a business?" No Obstacle = 0, Minor Obstacle = 1, Moderate Obstacle = 2, Major Obstacle = 3, and Very Severe Obstacle = 4.	BEEPS
FinCon1	Dummy variable that equals 1 if the firm did not purchase any fixed assets, such as machinery, vehicles, equipment, land or buildings last year, and 0 otherwise.	BEEPS
FinCon2	Dummy variable that equals to 1 if the firm does not have an overdraft facility, and 0 otherwise.	BEEPS
FinCon3	Dummy variable that equals to 1 if the firm does not have a line of credit or loan from a financial institution, and 0 otherwise.	BEEPS
FinCon4	Dummy variable that equals 1 if the firm does not have an overdraft facility or a line of credit or loan from a financial institution, and 0 otherwise.	BEEPS
FinCon5	Dummy variable that equals 1 if Financing equals to 3 (major) or 4 (very severe), and 0 otherwise.	BEEPS
Corruption_Percentage of Sales	Percent of the firm's total annual sales paid as informal payments/gifts.	BEEPS
Corruption_Informal Payments	Firm's frequency of informal payments/gifts to get things done: Never = 1, Seldom = 2, Sometimes = 3, Frequently = 4, Very frequently = 5, and Always = 6.	BEEPS
Corruption_Customs/Imports	Firm's frequency of unofficial payments/gifts to deal with customs/imports: Never = 1, Seldom = 2, Sometimes = 3, Frequently = 4, Very frequently = 5, and Always = 6.	BEEPS
Corruption_Courts	Firm's frequency of unofficial payments/gifts to deal with courts: Never = 1, Seldom = 2, Sometimes = 3, Frequently = 4, Very frequently = 5, and Always = 6.	BEEPS
Corruption_Taxes	Firm's frequency of unofficial payments/gifts to deal with taxes and tax collection: Never = 1, Seldom = 2, Sometimes = 3, Frequently = 4, Very frequently = 5, and Always = 6.	BEEPS
Corruption_Parliamentarians	"To what extent have the following practices had a direct impact on this establishment? Private payments/gifts or other benefits to Parliamentarians to affect their votes." No impact = 1, Minor impact = 2, Moderate impact = 3, Major impact = 4, and Decisive impact = 5.	BEEPS
Corruption_Government Officials	"To what extent have the following practices had a direct impact on this establishment? Private payments/gifts or other benefits to Government officials to affect the content of government decrees." No impact = 1, Minor impact = 2, Moderate impact = 3, Major impact = 4, and Decisive impact = 5.	BEEPS
Corruption_Local/Regional Officials	"To what extent have the following practices had a direct impact on this establishment? Private payments/gifts or other benefits to local or regional government officials to affect their votes or content of government decrees." No impact = 1, Minor impact = 2, Moderate impact = 3, Major impact = 4, and Decisive impact = 5.	BEEPS
Firm Size	Logarithm of the firm's number of permanent, full time employees last year.	BEEPS
Firm Age	Logarithm of the firm's age.	BEEPS
Exporter	Dummy variable that equals 1 if the firm is an exporter, and 0 otherwise.	BEEPS
Foreign	Dummy variable that equals 1 if any foreign company or individual has a financial stake in the ownership of the firm, and 0 otherwise.	BEEPS
Government	Dummy variable that equals 1 if any government agency or state body has a financial stake in the ownership of the firm, and 0 otherwise.	BEEPS
Ownership	Percent of the firm the largest owner owns.	BEEPS
Privatized	Dummy variable that equals to 1 if the firm is a privatized former SOE, and 0 otherwise.	BEEPS
Manufacturing	Dummy variable that equals 1 if the firm is in the manufacturing industry, and 0 otherwise.	BEEPS
Services	Dummy variable that equals 1 if the firm is in the service industry, and 0 otherwise.	BEEPS
Audit	Dummy variable that equals 1 if a firm's annual financial statements were checked and certified by an external auditor, 0 otherwise.	BEEPS
GDP per Capita	Logarithm of GDP per capita in constant 2005 US\$, average over 2008–2013.	WDI
Private Credit	Private credit by deposit money banks to GDP, calculated using the following deflation method: $\{(0.5)^t [Ft/P_{et} + Ft-1/P_{et-1}]\} / [GDPT/P_{at}]$ where F is credit to the private sector, P.e is end-of period CPI, and P.a is average annual CPI, average over 2008–2013.	IFS
Value Traded	The total value of shares traded on stock exchanges divided by GDP, average over 2008–2013.	Beck et al. (200)
Property Rights	An estimate of the legally protected freedom to accumulate private property and wealth by workers and investors, average over 2008–2013.	Heritage Foundation
Rule of Law	Country-level estimate for rule of society, contract enforcement, property rights, the police, the courts, crime and violence. It ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance, average over 2008–2013.	WGI

Corruption Control	Country-level corruption estimate and ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance, average over 2008–2013.	WGI
Corruption Perceptions Index	Country-level corruption score based on how corrupt a country's public sector is perceived to be according to Corruption Perceptions Index (CPI) and ranges between 10 (highly clean) and 0 (highly corrupt), average over 2008–2013.	Transparency International

* Sources of Data: **BEEPS**=Business Environment and Enterprise Performance Survey, European Bank for Reconstruction and Development and World Bank; **WDI**=World Development Indicators, World Bank; **WGI**= Worldwide Governance Indicators, World Bank; **IFS**=International Financial Statistics.

References

- Ayyagari, M., Demirgüç-Kunt, A., & Maksimovic, V. (2008). How important are financing constraints? The role of finance in the business environment. *The World Bank Economic Review*, 22(3), 483–516.
- Ayyagari, M., Demirgüç-Kunt, A., & Maksimovic, V. (2011). Firm innovation in emerging markets: The role of finance, governance, and competition. *The Journal of Financial and Quantitative Analysis*, 46(6), 1545–1580.
- Banerjee, A. V. (1997). A theory of misgovernance. *The Quarterly Journal of Economics*, 112, 1289–1332.
- Bardhan, P. (1997). Corruption and development: A review of issues. *Journal of Economic Literature*, 35, 1320–1346.
- Barth, J. R., Lin, C., Lin, P., & Song, F. M. (2009). Corruption in bank lending to firms: Cross-country micro evidence on the beneficial role of competition and information sharing. *Journal of Financial Economics*, 91(3), 361–388.
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2000). A new database on the structure and development of the financial sector. *The World Bank Economic Review*, 14(3), 597–605.
- Beck, T., Maksimovic, V., & Demirgüç-Kunt, A. (2003). Bank competition, financing obstacles, and access to credit. In *World bank policy research working paper series No. 2996*.
- Beck, T., Demirgüç-Kunt, A., & Maksimovic, V. (2005). Financial and legal constraints to growth: does firm size matter? *The Journal of Finance*, 60(1), 137–177.
- Beck, T., Demirgüç-Kunt, A., Laeven, L., & Maksimovic, V. (2006). The determinants of financing obstacles. *Journal of International Money and Finance*, 25(6), 932–952.
- Beck, T., & Demirgüç-Kunt, A. (2006). Small and medium-size enterprises: Access to finance as a growth constraint. *Journal of Banking & Finance*, 30(11), 2931–2943.
- Beck, T., Demirgüç-Kunt, A. S. L. I., Laeven, L., & Levine, R. (2008). Finance, firm size, and growth. *Journal of Money, Credit, and Banking*, 40(7), 1379–1405.
- Bekaert, G., Harvey, C. R., & Lundblad, C. (2005). Does financial liberalization spur growth? *Journal of Financial Economics*, 77(1), 3–55.
- Bond, S., & Van Reenen, J. (1999). Microeconomic models of investment and employment. In J. J. Heckman, & E. E. Leamer (Eds.), *Handbook of econometrics* (Vol. 5). North-Holland, Amsterdam: Elsevier Science.
- Bottazzi, G., Secchi, A., & Tamagni, F. (2014). Financial constraints and firm dynamics. *Small Business Economics*, 42(1), 99–116.
- Boubakri, N., Cosset, J.-C., & Saffar, W. (2008). Political connections of newly privatized firms. *Journal of Corporate Finance*, 17, 654–673.
- Boubakri, N., Cosset, J. C., & Saffar, W. (2013). The role of state and foreign owners in corporate risk-taking: Evidence from privatization. *Journal of Financial Economics*, 108, 641–658.
- Charumilind, C., Kali, R., & Wiwattanakitang, Y. (2006). Connected lending: Thailand before the financial crisis. *Journal of Business*, 79(1), 181–218.
- Clarke, G., Cull, R., & Martinez Peria, M. (2001). Does foreign bank penetration reduce access to credit in developing countries? Evidence from asking borrowers. In *World bank policy research paper No. 2716*.
- Cojocaru, L., Falaris, E. M., Hoffman, S. D., & Miller, J. B. (2016). Financial system development and economic growth in transition economies: New empirical evidence from the CEE and CIS countries. *Emerging Markets Finance and Trade*, 52(1), 223–236.
- Coricelli, F. (2001). The financial sector in transition: Tales of success and failure. In G. Caprio, P. Honohan, & J. Stiglitz (Eds.), *In financial liberalization: how far, how fast?* Cambridge: Cambridge University Press.
- Cull, R., & Xu, L. C. (2005). Institutions, ownership, and finance: The determinants of profit reinvestment among Chinese firms. *Journal of Financial Economics*, 77(1), 117–146.
- D'Souza, J., Megginson, W. L., Ullah, B., & Wei, Z. (2017). Growth and growth obstacles in transition economies: Privatized versus de novo private firms. *Journal of Corporate Finance*, 42, 422–438.
- De Haas, R. (2001). *Financial development and economic growth in transition economies: A survey of the theoretical and empirical literature*. Research Series Supervision, Netherlands Central Bank.
- Deakins, D., North, D., Baldock, R., & Whittam, G. (2008). *SMEs' Access to Finance: Is there still a debt finance gap*. pp. 24. Institute for Small Business & Entrepreneurship.
- Demirgüç-Kunt, A., & Maksimovic, V. (1998). Law, finance, and firm growth. *The Journal of Finance*, 53(6), 2107–2137.
- Devereux, M., & Schiantarelli, F. (1990). Investment, financial factors and cash flow from UK panel data. In G. Hubbard (Ed.), *Information, Capital markets and investment*. Chicago, IL: University of Chicago Press.
- Djankov, S., Miguel, E., Qian, Y., Roland, G., & Zhuravskaya, E. (2005). Who are Russia's entrepreneurs? *Journal of the European Economic Association*, 3(2–3), 587–597.
- Eller, M., Haiss, P., & Steiner, K. (2006). Foreign direct investment in the financial sector and economic growth in central and Eastern Europe: The crucial role of the efficiency channel. *Emerging Markets Review*, 7(4), 300–319.
- Faucegla, D. (2015). Credit constraints, firm exports and financial development: Evidence from developing countries. *The Quarterly Review of Economics and Finance*, 55, 53–66.
- Fazzari, S. M., Hubbard, R. G., Petersen, B. C., Blinder, A. S., & Poterba, J. M. (1988). Financing constraints and corporate investment. *Brookings Papers on Economic Activity*, 1988(1), 141–206.
- Fink, G., Haiss, P., & Vuksic, G. (2009). Contribution of Financial Market Segments at Different Stages of Development: Transition, Cohesion and Mature Economies Compared. *Journal of Financial Stability*, 5(4), 432–455.
- Fisman, R., & Svensson, J. (2007). Are corruption and taxation really harmful to growth? Firm level evidence. *Journal of Development Economics*, 83, 63–75.
- Gelos, R. G., & Werner, A. M. (2002). Financial liberalization, credit constraints, and collateral: Investment in the Mexican manufacturing sector. *Journal of Development Economics*, 67(1), 1–27.
- Hallward-Driemeier, M., & Aterido, R. (2009). *Comparing apples with . . . apples: How to make (More) sense of subjective rankings of constraints to business*. The World Bank.
- Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica*, 47, 153–161.
- Hoshi, T., Kashyap, A., & Scharfstein, D. (1991). Corporate structure, liquidity, and investment: Evidence from Japanese industrial groups. *The Quarterly Journal of Economics*, 106(1), 33–60.
- Hubbard, G. (1998). Capital market imperfections and investment. *Journal of Economic Literature*, 36(3), 193–225.
- Huntington, S. P. (1968). *Political order in changing societies*. New Haven: Yale University Press.
- Johnson, S., McMillan, J., & Woodruff, C. (2002). Property rights and finance. *The American Economic Review*, 92(5), 1335–1356.
- Knack, S., & Xu, L. C. (2017). Unbundling institutions for external finance: Worldwide firm-level evidence. *Journal of Corporate Finance*, 44, 215–232.
- Koivu, T. (2002). *Do efficient banking sectors accelerate economic growth in transition countries? BOFIT discussion paper, no. 14*.
- Laeven, L. (2001). Insider lending and bank ownership: The case of Russia. *Journal of Comparative Economics*, 29(2), 207–229.
- Laeven, L. (2003). Does financial liberalization reduce financing constraints? *Financial Management*, 32(1), 5e34.
- Leff, N. (1964). Economic development through bureaucratic corruption. *American Behavioural Scientist*, 8, 8–14.
- Levine, R., & Zervos, S. (1998). Stock markets, banks, and economic growth. *The American Economic Review*, 537–558.
- Levine, R. (1997). Financial development and economic growth: Views and agenda. *Journal of Economic Literature*, 35(2), 688–726.
- Levine, R., Loayza, N., & Beck, T. (2000). Financial intermediation and growth: Causality and causes. *Journal of Monetary Economics*, 46(1), 31–77.
- Levine, R. (2005). Finance and growth: Theory and evidence. In P. Aghion, & S. Durlauf (Eds.), *Handbook of economic growth, Vol. 1, part A* (pp. 865–934). The Netherlands: Elsevier Science.
- Leys, C. (1965). What is the problem about corruption? *The Journal of Modern African Studies*, 3(2), 215–230.
- Liebscher, K., Christl, J., Mooslechner, P., & Ritzberger-Grünwald, D. (2007). *Financial development, integration and stability: From Central, Eastern and South-Eastern Europe*. Edward Elgar Publishing.
- Lins, K. V., Servaes, H., & Tufano, P. (2010). What drives corporate liquidity? An international survey of cash holdings and lines of credit. *Journal of Financial Economics*, 98(1), 160–176.
- Liu, Y., Sah, N., Ullah, B., & Wei, Z. (2018). *Financing patterns in transition economies: Privatized former SOEs versus ab initio private firms* Available at SSRN.
- Love, I. (2003). Financial development and financing constraints: International evidence from the structural investment model. *The Review of Financial Studies*, 16(3), 765–791.
- Malhotra, M., Chen, Y., Criscuolo, A., Fan, Q., Hamel, I. I., & Savchenko, Y. (2007). Expanding access to finance: Good practices and policies for micro, small and medium enterprises. In *WBI learning resource series*. Washington D.C: World Bank.
- Masten, A., Coricelli, F., & Masten, I. (2008). Non-linear growth effects of financial development: Does financial integration matter? *Journal of International Money and Finance*, 27(2), 295–313.
- Mauro, P. (1995). Corruption and growth. *The Quarterly Journal of Economics*, 110, 681–712.

- Mehl, A., Vespro, C., & Winkler, A. (2006). 12. Financial sector development in South-Eastern Europe: Quality matters. In *Financial development, integration and stability: Evidence from central, eastern and south-eastern Europe*. pp. 186.
- Myrdal, G. (1968). *Asian drama: An inquiry into the poverty of nations*. New York: Pantheon Books.
- Nguyen, T. T., & Van Dijk, M. A. (2012). Corruption, growth, and governance: Private vs. State-owned firms in Vietnam. *Journal of Banking & Finance*, 36(11), 2935–2948.
- Oliner, S. D., & Rudebusch, G. D. (1992). Sources of the financing hierarchy for business investment. *The Review of Economics and Statistics*, 643–654.
- Park, J. (2012). Corruption, soundness of the banking sector, and economic growth: A cross-country study. *Journal of International Money and Finance*, 31(5), 907–929.
- Rajan, R., & Zingales, L. (1998). Financial development and growth. *The American Economic Review*, 88, 559–586.
- Rand, J., & Tarp, F. (2012). Firm-level corruption in Vietnam. *Economic Development and Cultural Change*, 60(3), 571–595.
- Sharma, C., & Mitra, A. (2015). Corruption, governance and firm performance: Evidence from Indian enterprises. *Journal of Policy Modeling*, 37(5), 835–851.
- Shleifer, A., & Vishny, R. (1993). Corruption. *The Quarterly Journal of Economics*, 108, 599–617.
- Svensson, J. (2003). Who must pay bribes and how much? Evidence from a cross section of firms. *The Quarterly Journal of Economics*, 118, 207–230.
- Svensson, J. (2005). Eight questions about corruption. *The Journal of Economic Perspectives*, 19(5), 19–42.
- Ullah, B. (2019). *The differential effect of corruption on growth: Does firm origin matter?* Available at SSRN.
- Wang, Y., & You, J. (2012). Corruption and firm growth: Evidence from China. *China Economic Review*, 23(2), 415–433.
- Whited, T. M. (1992). Debt, liquidity constraints, and corporate investment: Evidence from panel data. *The Journal of Finance*, 47(4), 1425–1460.
- Winker, P. (1999). Causes and effects of financing constraints at the firm level. *Small Business Economics*, 12(2), 169–181.
- Wurgler, J. (2000). Financial markets and the allocation of capital. *Journal of Financial Economics*, 58(1–2), 187–214.
- Xu, L. C. (2011). The effects of business environments on development: Surveying new firm-level evidence. *The World Bank Research Observer*, 26(2), 310–340.