

Conference Paper

Access to Finance – Innovation Relationship in Post-Transition

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Abstract

Innovation performance of most post-transition countries lags behind average EU performance. Inadequately developed financial sector that does not provide suitable financing to innovative firms can be damaging to the overall innovation activity in transition countries. The main focus of this paper is related to the predictors of access to finance difficulties in the aftermath of the economic crisis in post-transition countries. The empirical analysis is based on the Business Environment and Enterprise Performance Survey (BEEPS V) data for 30 post-transition countries. We estimate probability of considering access to finance as a business obstacle corrected for the decision to apply for financing employing Heckman selection estimation procedure. Results reveal that innovative firms are more likely to apply for financing, probably as a consequence of constrained internal resources. Older and larger firms as well as those that expect their business growth in the future are also more likely to apply for financing. At the same time, establishments belonging to a larger enterprise are less likely to apply for financing, probably due to available internal sources. Firms with female top management according to our estimates are less likely to apply for financing as well as small and micro firms. When it comes to perceptions on access to finance as an obstacle for doing business we have established that older and larger enterprises, private firms or those established as joint ventures (i.e. more oriented towards market principles) and those with positive expectations towards their future business activities are less likely to perceive access to finance as major obstacle. Whether an enterprise is innovative or not has no bearing on the perceptions of access to finance, after controlling for application to finance mechanism.

Keywords: Access to finance, innovative firms, post-transition

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1. Introduction

One of the important aspects impeding overall innovation activity in late reforming transition economies could be related to the inadequately developed financial sector that does not offer appropriate financing instruments to innovative firms. In different enterprise surveys, access to finance is frequently listed as one of the important obstacles for innovative activities, in particular when small and medium sized enterprises are concerned. Inadequate development of the financial system frequently implies that in transition countries in general, available financial resources to innovative enterprises are much scarcer than in market economies. This situation has been evident during the

early phases of transition when financial systems have been underdeveloped. More recently, effects of global financial crisis had adverse effects on the ability of entire economies to retain the desired level of financing. Indeed, effects of credit crunch and sudden stop are widely discussed in the literature [9, 10, 36]. These effects led to different responses of the monetary policy measures across the post-transition countries, as illustrated by [32]. Within this overall setting, the difficulties enterprises face in their innovation activities are expected to vary across countries.

In this paper we aim to shed more light on access to finance issue in post-transition countries. The main research question is related to the predictors of access to finance difficulties enterprises are faced with in the aftermath of the economic crisis. These factors contribute to the overall business climate that potentially burdens innovative firms' business operation.

The empirical analysis is based on the latest Business Environment and Enterprise Performance Survey (BEEPS V) data, a survey conducted by the European Bank for Reconstruction and Development (EBRD) and the World Bank, which relates to the years 2012-2013. We have included all the countries in the analysis, that is: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Former Yugoslav Republic of Macedonia, Kosovo, Montenegro, Romania, Serbia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Slovakia, Slovenia, Poland, Belarus, Georgia, Tajikistan, Turkey, Ukraine, Uzbekistan, Russia, Kazakhstan, Moldova, Azerbaijan, Armenia, Kyrgyz Republic and Mongolia.

The structure of the paper is following. The next section contains literature review. Section 3 presents data and empirical strategy. Section 4 discusses the results, while the last section summarized main conclusions.

2. Financial Constraints for Firm Growth

The important issue of financial constraints faced by firms has been well established in the literature. Internal finances available to firms can limit their growth, even more so in case of small firms [13]. Not only that micro firms and SMEs find it difficult to finance their projects internally [3], they also experience problems in obtaining external financing. The financing constraint is particularly experienced by small and innovative firms, even when trying to obtain the simplest forms of financing - bank loans [22].

Recent financial crisis has put the issue of financial restrictions on the economic growth to a larger extent in focus than previously envisaged. Effects of economic crises and consequent credit constraints on the small and medium sized enterprises have been analyzed in the EU members [21]. These studies have found significant adverse effect on SMEs access to finance, which is even larger in sovereign stressed countries. This could have even more profound effect on innovative firms, who struggle to find appropriate financing for their projects even in the normal economic circumstances, due to the fact that innovative activities are considered riskier and highly uncertain.

This issue has become even more important for post-transition economies, where financial systems are still in the developing phases (see [7] for an overview). Although

relative un-development of financial institutions might act as a buffer in the phase of spreading the financial crisis contagion, the effects of credit crunch might still be highly important due to the large foreign ownership in the banking sector in post transition economies. Additionally, it has been frequently argued that financial sector is under strong influence of foreign banks that have their own interests related to portfolio structure [8]. Some authors even argue that the dependency on the foreign capital might be related to the persistent divide between the more advanced market and transition economies [19].

The transition economies have experienced credit boom phase when the international financial institutions spread their influence through the privatization processes, followed by sudden reversal of this trend through the so-called "flight-home" phenomena [18, 40]. Recent studies imply that this sudden stop should not be entirely blamed for prolonged recessions in these countries [1, 42, 43], (Bijsterbosch & Dahlhaus, 2011). However, combined effects of crisis and increased credit unavailability might speed the restructuring of the economies, not necessarily into more favorable directions. If the credit rationing is at the expense of innovative segments of the economy, long term growth prospects might be endangered.

Previous research has shown that in both SEE and CEE countries innovations play important role in firm growth, despite different institutional obstacles and other differences between these two groups of countries [30]. Thus, the role of innovative firms for achieving growth in these countries is evident. The special emphasis in this paper is on whether innovative firms perceive access to finance to be more important obstacle to business than non-innovative firms. Here we draw upon the research by [34] who have found out that innovative firm in United Kingdom experience larger access to finance difficulties. We explore similar issue for a wider set of economies, with initial assumption that innovative firms in these countries will be under additional stress due to more unfavorable economic conditions.

The literature so far has confirmed that innovative firms are relatively more dependent on external financing [3, 26, 41]. This is due to the fact that their innovative products have yet to enter the market and large internal funding is required not only for project development, but also for marketing and operations activities. Such costs might be prohibitively high, in particular for small and medium sized enterprises that have not yet been established on the market.

In addition to traditional relationships with financial institutions, entrepreneurs might seek other alternatives to finance their projects. Venture capital can contribute to resolving the funding issues but development of venture capital sector in countries where it has not yet been developed is a rather serious process [26]. High-tech innovative firms often complain about high cost of raising capital and insufficient availability of debt financing [24]. [39] point out that financial constraints are, at least to some extent, related to firms' poor financial structure. For instance, high share of long term debt is found limiting to R&D activity because firms with debt-intensive capital structures do not possess the level of flexibility necessary for performing innovation activities [2]. Notwithstanding the potential benefits of venture capital, the available comparative data (such as [45]) reveals that it is highly inaccessible for

enterprises in post-transition economies. Thus, financing needs are more likely to be sought in more traditional financial institutions.

Studies have also shown that due to the fact that enterprises are faced with financial constraints when applying for credit, many actually seek financing from informal markets [29]. This pattern seems to be more frequent in developing than in developed countries. However, recent economic crisis brought financing challenges even to the more advanced European economies and the enterprises when faced with uncertainty, might resolve to unconventional solutions.

How severe the issue of access to finance is in some of the Central and Eastern (CEE) and Southeastern (SEE) European countries reveals the Survey on the Access to Finance of Small and Medium-sized Enterprises (SAFE). Firms in Slovenia (28 percent), Montenegro (20 percent), Lithuania (19 percent) and Croatia (18 percent) report above EU-28 average (13 percent) problems with access to finance. In Hungary and Romania 14 percent of firms claim access to finance is the most pressing problem; while in other countries (for which the data in the SAFE survey are collected) entrepreneurs do not seem to perceive financing issues to be that important.

Among the CEE and SEE countries for which SAFE research is available, only in Bulgaria, Czech Republic, Estonia and Hungary more than one third firms see no obstacles in obtaining external funding. This is somewhat more than on the EU-28 level. In Croatia, Romania and Montenegro, approximately 10 percent of firms report not seeing any problem to get external funding. Access to external funding in these countries is limited predominantly due to high interest rates and administration costs. In CEE countries, insufficient collateral or guarantee limits access to external funding to significant number of firms. More information on SAFE can be found on the following web page http://ec.europa.eu/enterprise/policies/finance/data/index_en.htm#h2-1.

Similar conclusions can be determined throughout the post-transition countries. BEEPS survey data shows (see Table 1 in following section) that relatively large percentage of respondents perceives access to finance to be major obstacle for doing business in analyzed samples. The percentage is somewhat higher for the SEE subsample, indicated that enterprises in this geographical region either are more likely to express their negative attitudes or they are actually struggling more to obtain adequate financing conditions.

3. Data and Empirical Strategy

Business Environment and Enterprise Performance Survey contains responses from 15,883 manufacturing and services firms in 30 countries gathered employing face-to-face interviews (for more information on BEEPS V visit <http://ebrd-beeps.com/>).

Our approach to analyzing access to finance difficulties is similar to [34], who on the sample of United Kingdom SMEs have found out that innovative firms experience larger access to finance difficulties. In order to explore if the same applies to innovative firms in post-transition economies, we rely on entrepreneurs' perceptions on the access to finance. We recognize that the perceptions of entrepreneurs on the difficulties in obtaining the desired funding might be influenced by the actual experience of applying

for financing. We rely on Heckman selection model to see whether conditional on the applying to finance, entrepreneurs perceive access to finance to be more difficult. Our special interest is whether the fact that the firm engages in innovative activity has any bearing on the access to finance perceptions.

In the category of innovators we included firms that have (1) successfully developed new or significantly improved product, production/supply practice, organizational/management practices or structures, marketing methods and logistical or business process, and/or (2) invested in (intermural or extramural) R&D and/or were giving employees time to develop or try out a new approach or new idea about products or services, business process, firm management or marketing during the 3- year period.

The variables considered to be important predictors in our empirical analysis are widely used in the related literature (Armstrong et al., 2013). For that reason, we only briefly discuss their relevance case. We rely on general to specific approach in estimation strategy – starting from a wider set of potential predictors – but rely on opposite approach in discussing the relevant variables, giving more space to the significant variables (please see Appendix for definition of variables).

One of the included variables is firm size, since larger firms are probably already well established on the market and perceived less risky by financial institutions. In addition, lending to larger firms is usually connected with financing larger project, which might be preferred by financial institutions due to smaller relative project evaluation costs. However, some authors argue that this is not straightforward, since increased project complexity could increase the evaluation cost by itself [12]. To explore these effects, we include four dummy variables for the firm size, which were specified according to the BEEPS Survey into micro, small, medium and large.

Age of the firm could be somewhat related to the size, although the relationship has not been found correlated in the sample. But, the argument for its relevance in connection to financing is similar - older firms might have more developed relationship with the financial institutions. It could also be more likely that they have enough internal sources for financing that might influence their perceptions on the relative ease of obtaining additional resources. Previous studies have found that access to finance is significantly more constraining for young innovative firms than it is for older innovative firms [41].

Type of establishment could be of additional importance in transition economies. Specifically, state owned firms might be expected to behave differently on the market than newly established private firms. Although we investigate post-transition period, when all of the segments of the economy should have been adopted to the market economy, some evidence exists that this might not be evenly distributed across the analyzed countries. For example, EBRD transition indicators (including transition development snapshot indicators) reveal that not all the countries in the sample can be considered as fully functioning market economies in all the analyzed segments. One of the segments frequently assessed as not developed enough is governance and enterprise restructuring.

In order to address the type of establishment, we include different dummy variables for each category defined by BEEPS. Consequently, in addition to distinguishing

between private or state-owned enterprise, we also explore whether an enterprise that is a segment of a larger firm (which should enable additional financial sources) or established as a joint enterprise.

Earlier studies have indicated that although gender variable is frequently significant when considering access to finance difficulties, such findings should not be mistaken for explicit discrimination. There is no evidence that banks treat female and male entrepreneurs differently regarding loan interest rates, loan approval procedures or loan terms [44]. It is more likely that there are other correlated factors, such as different working patterns possibly related to childcare responsibilities that are associated with access to finance [14]. Although scarce, there is also research that explores gender perspective in innovation activity [20], providing additional argument for not omitting this variable from the model. We include dummy variable which equals one if an enterprise has reported female top manager.

Educational attainment of the labor force is generally considered to be relatively high in transition economies, especially at the early stages of transition [23]. Other studies emphasize that innovation potential in an enterprise could be additionally supported by the higher educational attainment of the labor force. R&D performing firms and especially academic spin-offs are more prone toward hiring employees with university degrees in comparison to employees with professional education [33]. Related to the access to finance perceptions, higher education of the employees could be related to the better understanding of the financing application procedures [31]. Due to these reasons, we include the share of employees with university education as an independent variable.

In order to capture the potential effect of discouraged enterprises, which could be a consequence of prolonged economic crisis, we include a dummy variable which equals one if the entrepreneur believes that his enterprise will have positive outcome in the next fiscal year. These positive expectations could be translated into new projects and innovation activity and also into additional financing requirements.

The descriptive statistics for the presented variables is provided in Table 1. To summarize, all post-transition countries in the sample, as well as both sub-group of post-transition countries (SEE and CEE countries together and SEE only) depicted for comparison purposes, are dominated by private and small firms established over 15 years ago. Approximately, one quarter of firms applied for financing in the previous years. All three groups include rather high percentage of innovative firms considering the low level of innovation activity in transition countries: in overall sample 49 percent, in CEE and SEE countries 57 percent and in SEE countries only almost 60 percent. It has to be kept in mind that definition of innovators in our study refers to firms involved in wide range of innovation activities, both technological and non-technological innovation development. Share of firms managed by female managers in all three groups never exceeds 21 percent. As for the percent of firms that perceive access to finances as major obstacle, it ranges from 17.5 percent in CEE and SEE countries to 21 percent in SEE countries.

In empirical estimates we also include country dummy variables to capture the overall macroeconomic conditions that might significantly differ across the sample. The

	Overall sample	SEE + CEE sample	SEE sample
Finance obstacle (%)	17.89	17.47	20.90
No. of firms that applied for financing (%)	26.21	25.60	26.80
Innovative firm (%)	48.83	56.75	59.23
Expectations (%)	50.50	43.74	47.24
Private (%)	85.36	87.60	88.24
Joint (%)	1.32	1.29	0.87
State (%)	1.22	0.56	0.47
Segment (%)	8.89	7.30	6.40
Micro (%)	2.37	4.87	3.02
Small (%)	52.86	56.66	58.93
Medium (%)	31.94	27.32	27.47
Large (%)	12.84	11.15	10.59
Female manager (%)	19.32	20.21	18.73
Age (mean)	14.39	16.77	15.89
University (mean)	2.98	2.14	2.13

TABLE 1: Descriptive statistics. Source: authors' calculations based on BEEPS V data.

dummy variables are included to explore whether the simple fact that entrepreneur is located in specific country influences her access to finance perceptions. Thus, country dummy variables are used also to capture some other social aspects which might influence differences in perception formation across countries.

The variables included in the initial estimation, but not presented in Table 2 due to their exclusion in the general to specific approach were following:

Economic activity. We distinguish between three types of activities – manufacturing, retail and services. Initial assumption was that due to regulations (exposure of financial institutions' balance sheets to specific sectors due to excessive non-performing loans, whose structure might differ across economic sectors), financial institutions might favor certain economic activities at the expense of others.

Change in employment. This variable is supposed to capture growing enterprises. Our assumption was that this segment of the economy would have different perceptions on the access to finance. However, since we were analyzing period which still entails effects of global economic crisis, this effect was not significant.

As already emphasized, we start analysis with all potential variables included in the main and selection equation and follow general to specific approach to reach final presented results. The only exception to this rule is dummy variable for innovative enterprise, which we keep throughout the procedure regardless of the significance. The results of the described procedure are presented and discussed in the following section.

4. Results and Discussion

We have applied Heckman selection estimation procedure and estimated probability to consider access to finance to be a major obstacle for doing business, corrected for the probability that the enterprise has decided to apply for financing. The results are presented in Table 2.

As the estimates in Table 2 reveal, selection equation is significant. Consequently, we can see that the application experience influences the perceptions of access to finance obstacles. Reasons contributing to discouraging firms in application to finance, which could be different across the business cycle, are potentially interesting topic for future research efforts.

Our findings indicate that innovative firms are indeed more likely to apply for financing. In that respect, our results are not significantly different from other studies. Financial constraints have been found to significantly hinder innovation activities [25]. Evidence on positive relationship between external funding and innovation is provided by Ayyagari et al. (2007). Hence, it does not surprise that innovators in post-transition countries are more likely to seek external financing.

We have also established that older and larger firms as well as those that expect their business growth in the future, are more likely to apply for financing. The older segment of that statement is contrary to results of [35] that reveal higher propensity of younger firms to seek for external financing. Chavis et al. (2010) claim younger firms are more likely to seek financing from informal sources than from banks. According to their findings, improvement in legal environment and better availability of credit information are necessary for younger firms to turn to banks. Studies not focused on innovative firms suggest that micro firms are more likely to be denied, while older firms are less likely to be denied credit [5, 16]). Consequently, our results might suggest self-selection based on expected likelihood of being denied by financial institutions related to the size of the enterprise.

Although their resources are rather limited, small firms indeed prefer self-financing [24] because it least affects independence of their owners [28]. Financial institutions, on the other side, as Armstrong et al. (2013) argue, believe that lending to SMEs is generally riskier than lending to the large firms. Small enterprises are often young and have less available collateral required by financial institutions as a security for loan repayment. Being small and young usually also implies that they are more likely to be price takers on the market, which makes their business endeavors more uncertain.

It is important also to notice that establishments belonging to a larger enterprise are also less likely to apply for financing, probably due to available internal sources. This is in line with findings of [35] according to which precisely the firms not affiliated to other subjects are more likely to apply for external financing.

Firms with female top management according to our estimates are less likely to apply for financing as well as small and micro firms. We can find similar evidence in other studies. In [38] provides evidence that female firm owners are less likely to apply for financing if the expectations of future sales are not positive. Such behavior is attributed to higher risk aversion of female entrepreneurs [17]. Recently, [37] have

	Coefficient (robust st. error)
Dependent variable: finance obstacle dummy	
Constant	0.900*** (0.215)
Innovative firm	-0.093 (0.076)
Age	-0.005*** (0.001)
University	0.014*** (0.004)
Expectations	-0.216*** (0.032)
Private	-0.101** (0.047)
Joint	-0.243* (0.136)
State	
Segment	
Micro	0.311** (0.122)
Small	0.203*** (0.041)
Large	-0.184*** (0.045)
Country dummies	
Bosnia and H.	
Bulgaria	
The Former Yugoslav Republic of Macedonia	
Kosovo	0.317** (0.137)
Montenegro	
Serbia	
Romania	0.148** (0.071)
Estonia	-0.369** (0.162)
Hungary	-0.233* (0.126)
Slovak R.	-0.237* (0.215)
Selection equation - dependent variable: applying for financing dummy	
Constant	-0.796*** (0.029)
Innovative firm	0.298*** (0.022)
Age	0.003*** (0.001)
F. manager	-0.087*** (0.030)
University	-0.006** (0.003)
Expectations	0.216*** (0.022)
Joint	
Segment	
Micro	-0.131*** (0.034)
Small	-0.209*** (0.080)
Large	-0.243*** (0.026)
Large	0.169*** (0.035)
Diagnostics	
N	15724
Log pseudo	-11105.23
Wald	300.59***
Rho	-0.875 (0.118)
Wald (rho=0)	7.27***

TABLE 2: Predictors of difficulties in access to finance, estimation results. Source: authors' estimates based on BEEPS V data.

established that female-owned enterprises are less likely to apply for credit in high-gender bias countries, even though they have not found evidence of discrimination in the financial institutions. Since some of the countries in our sample have been judged as high-gender biased by the same study, we can assume that negative self-selection mechanisms is part of the reason explaining our results.

There is also one interesting result, related to the fact that higher share of employees with university degree decreases the probability of applying for financing. This is contrary to our expectations.

We can see that throughout the post-transition economies, older and larger enterprises, private firms or those established as joint ventures (i.e. more oriented towards market principles) and those with positive expectations towards their future business activities are less likely to perceive access to finance as major obstacle. Regarding the size and the age, our findings are in line with extant literature reporting that larger and older firms are less financially constrained [4].

Regarding the country dummy variables, it is interesting to note that firms from Kosovo are more likely to perceive access to finance as important obstacle for doing business. This result is probably related to the fact that Kosovo is the most recent emerging entity and institutional development, including financial sector, is probably still in an early stage. It is also interesting to note that, among all analyzed post-transition economies, firms in Estonia, Hungary and Slovak Republic are expressing lower concern for access to finance.

5. Conclusion

The main aim of this paper was to analyze the difficulties in access to finance in post-transition economies in the aftermath of the global economic crisis. Without more intensive innovative activities future growth prospects might be endangered. We explore whether relative inability of adequate financial resources could be one of the factors contributing to this unfavorable position of the countries in the region.

We have established that there is an important self-selection mechanism that influences the entrepreneurs in applying for financing. However, it has revealed that innovative firms are more likely to apply for financing. Even though we cannot provide empirical evidence for the claim within the dataset used, the most likely reason is that innovative firms lack internal resources for funding their projects. Literature provides evidence that innovations enable firms to improve their business results but also indicates that firms with good business results innovate more (e.g. [11]). Despite their good performance, innovators are likely to be perpetually in need for additional external financing as innovation projects usually require substantial financial resources.

We have also established that innovative firms are not more likely to perceive finance as significant obstacle to their business activity. Thus, although they are more likely to engage in seeking additional financing, they do not seem to believe that they are in a disadvantaged position on the market.

Many of our findings are similar to results of previous studies indicating thus that mechanism in access to finance in post-transition economies are similar to those established for market economies. From the point of transition economies catching-up endeavors, this is an encouraging result.

6. Appendix: Table A1

Table A1. Definition of variables.

Variable name	Definition
Apply	=1, if a firm applied for a credit or a loan
Finance obstacle	=1, if a firm perceives access to finance as major or severe obstacle
Innovative firm	= 1, if firm had innovation output or R&D (defined in paper)
Age	= years since establishment (until the time of interview)
University	= share of employees with university degree in total
Expectations	= 1, if a firm expects its sales to increase next fiscal year
Private	=1, if firm was established from time of start-up as private
Joint	=1, if firm was established as a joint venture with foreign partners
State	=1, if firm was established as state-owned
Segment	=1, if establishment is part of a larger firm
Micro	=1, if this is a micro firm (less than 5 employees)
Small	=1, if this is a small firm (more than 5, less than 19 employees)
Large	=1, if this is a large firm (more than 100 employees)
F. manager	=1, if top manager is female
Country dummy	=1, if respondent is established in specific country

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