ORIGINAL SCIENTIFIC PAPER
UDK: 336.77(4-672EU)
658.14(4-672EU)
DOI: 10.5937/EKOPRE2306260J
Date of Receipt: April 2, 2023

Irena Janković
University of Belgrade
Faculty of Economics
Department of Economic Policy and Development

Vlado Kovačević
Institute of Agricultural Economics, Belgrade

Isidora Ljumović
Institute of Economic Sciences
Belgrade

Svetlana Popović
University of Belgrade
Faculty of Economics
Department of Economic Policy and Development

DETERMINANTS OF BANK LENDING TO SMEs IN THE EU

Determinante bankarskog kreditiranja malih i srednjih preduzeća u EU

Abstract

This study examines factors that influence bank lending to SMEs in the EU. We employ relevant firm-, industry-, and macro-level variables to confirm the significance of bank lending process determinants through multiple panel data models. We find that increase in GDP p.c., number of bank branches, banking market concentration, support measures, repayment in event of bankruptcy and shorter resolving time positively impact SMEs access to loans. SMEs with higher turnover and working in construction or manufacturing sectors have a better chance to obtain bank loans, while access to bank financing is negatively affected by increase in inflation rate and operations in service sector.

Keywords: *bank lending, financing constraints, small and medium-sized enterprises, SAFE, EU*

Sažetak

Ova studija istražuje faktore koji utiču na bankarsko kreditiranje malih i srednjih preduzeća u EU. U istraživanju se koriste relevantne promenljive na nivou preduzeća, sektora privrede i na makro nivou kako bi se potvrdio značaj determinanti procesa bankarskog kreditiranja primenom više modela panela. Nalazi analize ukazuju na to da porast BDP p.c., broja bankarskih filijala, koncentracije na bankarskom tržištu, mera podrške kreditiranju, plaćanja u slučaju nesolventnosti, kao i kraće vreme razrešavanja sporova u slučaju nesolventnosti imaju pozitivan uticaj na pristup malih i srednjih preduzeća bankarskim zajmovima. Mala i srednja preduzeća koja odlikuje veći obim prometa i koja posluju u sektoru građevinarstava i industrije imaju veću šansu da dobiju bankarski zajam, dok je bankarsko finansiranje pod negativnim uticajem povećanja stope inflacije i smanjuje se ukoliko preduzeća posluju u sektoru usluga.

Ključne reči: *bankarsko kreditiranje, ograničenja u finansiranju, mala i srednja preduzeća, SAFE, EU*

Introduction

The aim of this paper is to determine firm-level, industry-level, and macro-level factors that influence small and medium-sized enterprises' (SMEs) bank lending behavior in the EU. SMEs financing is of special importance as these enterprises form the backbone of economic development in contemporary business surroundings. A vibrant SMEs sector is crucial for economic growth, job creation, entrepreneurial activity, and innovations. SMEs are essential for the EU economy, accounting for 66.6% of the overall employment (95 million people). They make up the most of non-financial firms (99.8%) and generate 56.8% of total value added [31].

Our primary source of information was Survey on the access to finance of enterprises (SAFE) [45]. The SAFE is organized on an annual basis from 2009 through a survey of all size firms in the EU. SAFE is conducted on behalf of the European Commission (DG Internal Market, Industry, Entrepreneurship and SMEs) and the ECB [22]. SAFE public reports contain data for all firm sizes and are not suitable for in-depth SMEs research. Thanks to the courtesy of the ECB, we used SAFE anonymous microdata reports to extract data on SMEs.

All businesses rely on access to finance to survive, grow and expand. While SMEs find it challenging to gain a foothold in obtaining financing, including bank loans, big companies are often offered ease of access due to their prior inclusion in the financial market and, as a result, they have more funding options. Numerous authors see obtaining of bank loans as one of the most prominent obstacles for SMEs [3], [19], [13]. The informational opacity of SMEs and the difficulties banks have in evaluating their business skills have been suggested as factors for SMEs' bank funding challenges [21]. Consequently, SMEs with viable projects are unable to obtain funds. This phenomenon, known in the literature as the financing gap, refers to situations where market cannot provide external financing to SMEs.

The financial gap SMEs are facing emerges in the presence of asymmetric information problems, leading to an adverse selection of low-quality borrowers or moral hazard issues [1], [44], [10], [9], [3]. Bridging the financial gap strives to remove barriers within the financial sector to drive SME's growth and overall economic development. Even though the academic literature on small business financing is extensive and growing, it is still unclear which factors are crucial for improving their access to finance.

Although SMEs' bank lending is an essential vehicle for economic growth, empirical studies of SMEs funding factors are limited. We intend to close this research gap by incorporating more variables at the firm, industry, and macro levels. Contemporary research uses different variables to assess the financial gap. Erdogan investigated country-level debt financing gap determinants [20], whereas Beck and Cull used firm-level variables to assess funding constraints for African SMEs [6]. Yudaruddin explores bank-specific and macroeconomic drivers for SMEs bank loans in Indonesia [50]. Hashi and Toçi used firm-level data to investigate funding barriers in South-Eastern Europe [28]. While most existing papers explore one approach to identifying SMEs financing determinants, we tested multiple variables on the firm, industry, and macro levels to confirm the validity of gained results and ran several panel regressions as specific robustness check. In contrast to Wang et al., who explored bank market power impacts on SMEs' finance for 19 EU member states [47], we included all EU Member States to increase the validity of the results.

Specifically, we address the following main research question: What factors – firm-, industry-, and macro-level – might affect bank lending to SMEs in the EU? As a result, the practical impact of this research is providing the ground for an evidence-based policy that can help boost bank lending to SMEs.

This paper is structured as follows. After the introduction, we proceed with the literature review, followed by the methodology section. Section 4 contains the findings and discussion. The last section provides concluding remarks and wraps up with the discussion on the policy implications.

Literature review

The academic literature on SMEs' access to finance is extensive and growing. The traditional literature on

financing [34], [16], sets the foundation that the lender-borrower information asymmetry is the source of external financing market imperfections. Classic research considers that credit rationing can take two forms. Stiglitz and Weiss emphasize borrower limitation (type 1), meaning that even if a company has a viable project, it could be restricted from loans [44], while Jaffee and Russell argue on loan size rationing (type 2), pointing out that some firms partially received external finance [29]. It is a widely spread standpoint that SMEs are dependent on bank financing due to limits on broader external financing because of their small size, lack of collateral, information asymmetry, and weaker financial structure. SMEs are more constrained by external financing than large companies [7], and more likely to use internal financing instruments [35]. SMEs rank lack of finance as a major limiting factor in the growth of their firms [6], [18]. The importance of information asymmetry for SMEs' external financing was well proven by Trovato and Alfò. The authors found that SMEs' owners thoroughly understood their company's financial status, investment project potential, and payback risk [46]. They also have more information about their company than the lenders, resulting in information asymmetries. Smaller firms have fewer financial diversification options and are more likely to rely on short-term debt, such as credit lines and bank overdrafts [35], or trade credit and bank loans [2], [15], [38], while market-based finance remains unexploited [11].

According to previous research, SMEs' access to bank loans is influenced by macro-, industry-level, and firm-specific factors. Winker conducted early research on a panel of SMEs in Germany, concluding that macroeconomic conditions and firm age are the most relevant determinants affecting access to finance [48]. SMEs access to bank credits depends on macro factors, such as gross domestic product and inflation [17], [2], [50]. The increased number of banks' branch offices can positively influence bank lending to SMEs [2]. Mc Namara et al. investigated 13,957 SMEs from eleven EU countries and found that SMEs in countries with more efficient judicial systems, efficient bankruptcy systems and greater levels of trust are less likely to be credit rationed [36].

At the industry level, bank concentration and consolidation are the key determinants of SMEs bank loan access [28], [5]. Access to financing is harmed by high banking sector concentration, whereas a higher share of domestic credit offered to the private sector alleviates the perception of financial restriction among SMEs [39]. The size of the banks is also an important bank-specific factor. Literature shows mixed results related to this factor. Certain studies have found that bank size has a significant positive impact [30], whereas others confirm a considerable negative effect on bank lending to SMEs [27], [26], [41]. The structure of bank ownership could be an important industry-level determinant. Micco and Panizza revealed that state-owned banks are more resilient to macroeconomic crises than privately-owned ones [37]. Yudaruddin came to a similar conclusion investigating state-owned Indonesian banks [50]. Several research studies underline the importance of government support schemes for EU SMEs [4], [40]. In line with this, Brault and Signore investigated the economic impact of over 360,000 guaranteed loans under the EU programs between 2002 and 2016. They compared the performance of beneficiaries to that of a control group of similar non-subsidized businesses. They conclude that beneficiaries faced the growth of their overall assets, sales and employment faster than non-beneficiaries, with a lower chance of default [12].

Mainstream literature shows that the firm size, accounting information transparency, age, and ownership type are all firm-specific variables that influence access to external finance [18], [33], [42], [2]. Using the SAFE dataset from 2009 to 2014, Andrieu et al. found that firm age and size positively impact SMEs' access to bank loans [2]. Lawless et al. tested whether the increase in firms' turnover influences the probability of obtaining a bank loan [33], while Bongini et al. analyzed its influence on a firms' decision to raise market-based finance [11]. Erdogan, based on semi-structured interviews with 25 Turkish banks, concluded that, among other things, access to bank credits is influenced by the firm's industry, the length of the bank and firm's relationship, the firm's age and the impression of on-site visits [20]. Because of decreased information asymmetries, industrial enterprises use more bank loan

funding and get long-term debt more easily [32]; [42]. Industrial firms also have a more comprehensive range of financing options [33]. SMEs in the service sector in South-Eastern Europe are more constrained by bank credits, concluded Nizaeva and Coskun (2019) by using data from the Business Environment and Enterprise Survey (BEEPS V) [39]. Another strand of literature documented that certainty regarding the law and legal rights enforcement has a favorable impact on firms' access to external finance [8].

Methodology

Data

The primary data source for this study was micro data set for the EU Member States SMEs from the SAFE anonymous microdata reports for the period 2015-2020. Firm and industry level data were collected from SAFE and further amended with macro-level data from the World Bank, Eurostat, and ECB Statistical data warehouse [45], [49], [23], [24].

Variables

We used SME access to bank loans as our dependent variable. To calculate the dependent variable, we used SAFE question q4d. *Bank loan – Have you taken out a new loan or renewed such a loan in the past six months?* Only the fraction (percentage) of answers stating "yes" was considered as successful in obtaining bank loans.

Following relevant academic literature, we tested the following macro factors' importance – the GDP *per capita*, inflation, the share of non-performing loans in total gross loans in the economy, indicators of bankruptcy repayment in the situation of bankruptcy and bankruptcy resolving time. Sector-specific variables included the number of commercial bank branches available and the Herfindahl-Hirschman index of banking sector concentration. SMEs' specific variables included turnover increase, interest rates for used loans, grants and subsidized loans used and belonging to a particular sector of activity – industry, construction, trade or services.

The descriptive statistics and data sources are presented in Table 1.

Methodology

First, we extracted the data on SMEs from SAFE anonymous microdata. After collecting all relevant explanatory variables, we applied panel data analysis to quantify factors affecting bank lending to SMEs in the EU.

We estimate the random effect model of the following form:

$$Y_{it} = \alpha + \beta_{k,it} X_{k,it} + u_{it} + \varepsilon_{it} \quad (1)$$

where:

- i stands for the entity (country), and t stands for time
- Y_{it} is the dependent variable
- α is the intercept
- $X_{k,it}$ represents the k independent and control variables
- β_k is the coefficient for respective independent and control variables
- u_{it} is between-entity error, the individual impact of *ith* entity
- ε_{it} is a within-entity error

The rationale behind the random effect model is that variations across countries are assumed to be random and uncorrelated with the independent variables in the model. If we assume that differences across countries affect the dependent variable, we can use the random effect model. In this model form, we can include time-invariant variables while they are captured by the intercept in the fixed-effect model.

Results and discussion

After investigating the characteristics of the explanatory and dependent variables and confirming that they are asymptotically normally distributed, that there is no multicollinearity in the data set, nor heteroskedasticity problem, we organized data in the balanced panel form and prolonged with the appropriate panel model specifications.

We implemented Wooldridge test for autocorrelation in panel data that indicated the presence of autocorrelation at 5% significance level ($F(1, 26) = 7.764$, $p > F = 0.0098$). We found no significant cross-sectional independence

(Friedman's test of cross-sectional independence = 4.503, p = 1.0000) that was additionally checked by Pesaran's and Frees' test. Modified Wald test for groupwise heteroskedasticity in fixed effect regression model indicated the presence of heteroskedasticity at a 5% significance level (chi2 (27) = 799.06, p>chi2 = 0.0000). After estimating fixed and random effect specifications, we proceeded with the Hausman test. The results of the test indicated that the proper choice would be random effect specification (chi2(8) = 14.63, p>chi2 = 0.0667).

Table 1: Definition of the variables and descriptive statistics

Variable	Descriptive statistics	Definition	Source	
		%		
bank_loans	Mean	0.214587	q4d. Bank loan – Have you taken out a new loan or renewed such a loan in the past six months? Fraction (percentage) of answers stating "yes"	SAFE anonymous microdata
	Std. Dev.	0.066982		
log_gdp_ca	Mean	4.44029	Log of Gross domestic product *per capita*	EUROSTAT
	Std. Dev.	0.266876		
inflation	Mean	1.002278	Annual inflation rate	EUROSTAT
	Std. Dev.	1.21612		
interest_rate_safe	Mean	3.120675	q8B What interest rate was charged for the credit line or bank overdraft for which you applied? The mean interest rate used.	SAFE anonymous microdata
	Std. Dev.	1.326592		
npl_to_tgl	Mean	6.967803	NPL to total gross loans	EUROSTAT
	Std. Dev.	8.824873		
bankruptcy_repayment	Mean	67.0849	Bankruptcy repayment rate	EUROSTAT
	Std. Dev.	22.2612		
resolving_time	Mean	2.0519	Resolving insolvency time	World Bank
	Std. Dev.	0.9673		
grants_subsidized_loans	Mean	31.31203	q4b. Grants or subsidized bank loans – Have you obtained new financing of this type in the past six months? Fraction (percentage) of answers stating "yes" was included.	SAFE anonymous microdata
	Std. Dev.	12.96642		
cbb	Mean	27.27074	Commercial bank branches per 10 km	World Bank
	Std. Dev.	15.66939		
hhindex	Mean	0.122378	Herfindahl-Hirschman index	European Central Bank – Statistical Data Warehouse
	Std. Dev.	0.065937		
turnover_increase	Mean	0.385916	q2a. Have the following company indicators decreased, remained unchanged, or increased over the past six months? Turnover. Fraction (percentage) of answers stating "increased" was included.	SAFE anonymous microdata
	Std. Dev.	0.116818		
Industry	Mean	0.3046	d3 What is the main activity of your enterprise? Dummy variable – If Industry then 1, otherwise 0.	SAFE anonymous microdata
	Std. Dev.	0.0914		
Construction	Mean	0.1221	d3 What is the main activity of your enterprise? Dummy variable – If Construction, then 1, otherwise 0.	SAFE anonymous microdata
	Std. Dev.	0.0435		
Trade	Mean	0.2207	d3 What is the main activity of your enterprise? Dummy variable – If Trade then 1, otherwise 0.	SAFE anonymous microdata
	Std. Dev.	0.0591		
Services	Mean	0.3526	d3 What is the main activity of your enterprise? Dummy variable – If Services then 1, otherwise 0.	SAFE anonymous microdata
	Std. Dev.	0.0657		

Source: Authors' presentation

Table 2 presents the results of the estimation of several random effect specifications, and in addition, the population-averaged model that takes care of autocorrelation and the maximum-likelihood random-effects model. Table 3 is devoted to the robustness check of the analysis.

Table 2: Estimated models – variables affecting bank loans used by SMEs in the EU

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	PA	**MLE**	**RE**	**RE_rob_1**	**RE_rob_2**	**RE_rob_3**	**RE_rob_4**	**RE_rob_5**
log_gdp_ca	0.0152	0.0122	0.00998	0.00998				
	(0.0403)	(0.0366)	(0.0352)	(0.0424)				
inflation	-0.00556	-0.00280	-0.00280	-0.00280				
	(0.00419)	(0.00297)	(0.00308)	(0.00370)				
npl_to_tgl	0.00000751	0.000372	0.000296	0.000296				
	(0.000690)	(0.000857)	(0.000857)	(0.000681)				
turnover_increase	0.0699	0.0835*	0.0838*	0.0838*	0.0809**	0.0825**	0.0812**	0.0841**
	(0.0386)	(0.0353)	(0.0364)	(0.0363)	(0.0286)	(0.0285)	(0.0308)	(0.0306)
interest_rate_safe	-0.00430	-0.00418	-0.00427	-0.00427	-0.00378	-0.00405	-0.00347	-0.00422
	(0.00223)	(0.00266)	(0.00276)	(0.00222)	(0.00234)	(0.00227)	(0.00235)	(0.00231)
grants_subsidized_loans	0.00147*	0.00125*	0.00129*	0.00129*	0.00142*	0.00135*	0.00132*	0.00136**
	(0.000628)	(0.000532)	(0.000535)	(0.000630)	(0.000609)	(0.000631)	(0.000534)	(0.000515)
cbb	0.00112	0.00104	0.00105	0.00105	0.00125*	0.00116*	0.00109*	0.00112*
	(0.000601)	(0.000554)	(0.000547)	(0.000539)	(0.000569)	(0.000574)	(0.000436)	(0.000489)
hhindex	0.0317	0.126	0.120	0.120	0.129	0.111	0.200*	0.222*
	(0.105)	(0.129)	(0.128)	(0.103)	(0.123)	(0.116)	(0.0892)	(0.0885)
bankruptcy_repayment					0.000434			
					(0.000427)			
resolving_time						-0.00345		
						(0.00939)		
industry							0.309***	
							(0.0718)	
construction							0.103	
							(0.110)	
trade								-0.295**
								(0.0962)
services								-0.247***
								(0.0707)
constant	0.0561	0.0585	0.0681	0.0681	0.0718	0.115**	-0.00793	0.247***
	(0.192)	(0.170)`	(0.164)	(0.199)	(0.0516)	(0.0365)	(0.0464)	(0.0439)
sigma_u								
_cons		0.0483***						
		(0.00743)						
sigma_e								
_cons		0.0359***						
		(0.0022)						
N	162	162	162	162	162	162	162	162
r2								
r2_o			0.196	0.196	0.244	0.207	0.272	0.245
r2_b			0.240	0.240	0.315	0.261	0.298	0.263
r2_w			0.0770	0.0770	0.0580	0.0645	0.202	0.193
sigma_u		0.0483	0.0448	0.0448	0.0394	0.0437	0.0441	0.0437
sigma_e		0.0359	0.0366	0.0366	0.0368	0.0369	0.0339	0.0342
rho		0.644	0.599	0.599	0.534	0.584	0.628	0.621
Standard errors in parentheses								
* p<0.05, ** p<0.01, *** p<0.001								

Source: Authors' calculation

To provide a comprehensive robustness check and address completely the identified specificities in the data sample analyzed, we run additional regressions: OLS regression, fixed-effect model and GLS estimations. Since the Hausman test *p-value* was close to 5%, we also presented the results of the fixed effect model with robust standard errors addressing the heteroskedasticity problem. To address heteroskedasticity and autocorrelation issues identified in the panel data set, we run GLS specifications that take care of these issues. The findings from these models confirmed our previous findings on the effect of analyzed macro, sector and firm specific variables on bank loans used by SMEs in the EU.

According to the findings, SMEs in developed countries with greater per capita GDP are expected to have easier access to bank loans. Although we did not find a statistically significant relationship between GDP per capita and the bank loans used by SMEs the estimated

Table 3: Robustness check – estimated models

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Regress	**FE_rob**	**GLS 1**	**GLS 2**	**GLS 3**	**GLS 4**	**GLS 5**
log_gdp_ca	0.0000992	0.1460	0.0194				
	(0.0417)	(0.1790)	(0.0217)				
inflation	-0.00386	-0.00581	-0.00228				
	(0.00540)	(0.00666)	(0.00247)				
npl_to_tgl	-0.000715	0.00154					
	(0.000917)	(0.000817)					
turnover_increase	0.0443	0.0887	0.0626*	0.0447*	0.0519*	0.0611**	0.0567**
	(0.0414)	(0.0500)	(0.0262)	(0.0206)	(0.0235)	(0.0213)	(0.0217)
interest_rate_safe	-0.00858	-0.00449	-0.00431*	-0.00431**	-0.00382*	-0.00199	-0.00259
	(0.00437)	(0.00265)	(0.00168)	(0.00141)	(0.00165)	(0.00168)	(0.00179)
grants_subsidized_loans	0.00204**	0.000788	0.00175***	0.00169***	0.00168***	0.00184***	0.00196***
	(0.000620)	(0.000805)	(0.000304)	(0.000276)	(0.000288)	(0.000251)	(0.000258)
cbb	0.00102	0.000772	0.00100*	0.00142***	0.00125***	0.000451	0.000527
	(0.000685)	(0.000909)	(0.000419)	(0.000283)	(0.000373)	(0.000234)	(0.000290)
hhindex	0.128	0.290*	0.128**	0.134***	0.136***	0.0479	0.0760
	(0.118)	(0.134)	(0.045)	(0.033)	(0.041)	(0.038)	(0.040)
bankrupt_repayment				0.000544**			
				(0.000180)			
resolving_time					-0.00922*		
					(0.00448)		
industry						0.270***	
						(0.0302)	
construction						0.00955	
						(0.0594)	
trade							-0.207***
							(0.0510)
services							-0.238***
							(0.0482)
constant	0.125	-0.541	0.0293	0.0749**	0.131***	0.0333	0.245***
	(0.194)	(0.812)	(0.104)	(0.0254)	(0.0200)	(0.0214)	(0.0275)
N	162	162	162	162	162	162	162
r2	0.239	0.0965					
r2_o		0.0301					
r2_b		0.0264					
r2_w		0.0965					
sigma_u		0.0672					
sigma_e		0.0366					
rho		0.771					
Standard errors in parentheses							
* p<0.05, ** p<0.01, ***p<0.001							

Source: Authors' calculation

coefficients have a positive sign in all estimated models indicating a positive impact. In this sense, the results are consistent with previous research, such as Micco and Panizza, who found positive effect of the GDP growth on bank lending to SMEs [37], and with Dinç [17], Stepanyan and Guo [43], and Jeon et al. [30], who showed a similar real GDP growth effect. This conclusion is in line with Beck and Demirguc-Kunt [7] and Fowowe [25], who assert that economies with a more developed institutional, legal, and financial system report lower financing obstacles than less developed economies.

As we expected, inflation hurts SMEs' access to bank loans. Banks are reluctant to lend in circumstances of instability. In line with our findings, Carlson and Lackman found that countries with higher inflation have smaller banking and equity markets, where banks generally restrict credit activity, particularly in the private sector [14]. We did not find consistent and significant impact of the NPLs to total gross loans in the broader financial sector on the bank loans SMEs use.

While macro factors create ambient for business operations, of even higher significance are industry and firm level variables that affect SMEs everyday operation more profoundly.

Grants and subsidized loans are effective policy tools for improving SMEs external financing. We found their statistically significant positive effects on bank loans used by SMEs. Research results coincide with those of Polishchuk et al. who came to a similar conclusion analyzing SMEs government support schemes in the Southern EU [40].

The density of banks' offices, measured by the number of bank branches per square kilometer and banking sector market concentration represented by the H-H index, are two statistically significant variables that have positively affected SMEs bank loan access. The greater the number of bank branches, the easier it is for SMEs to apply for loans and use bank services. The more concentrated the banking industry is, the more bank loans appear to be used by SMEs. When only a few highly specialized banks operate in the banking sector, the possibility for economies of scale, lower transaction costs, and more confidence leads to a concentration of lending applications in those banks. Investigating data from 19 European nations, Wang et al. came to a similar conclusion [47].

A higher interest rate makes the borrowing process more expensive, which crowds specific SME borrowers out of the loan market. Our findings are consistent with those of Ayyagari et al. who found high-interest rates as one of the most common limiting factors for SMEs' access to bank loans [3].

In addition, we wanted to test how repayment in the event of bankruptcy affects bank lending to SMEs. According to our findings, this variable has a positive effect on bank loan access. The higher the repaid amount in the case of bankruptcy it improves bank lending to SMEs. The longer resolving time in case of a default, on the other hand, rations bank loans to SMEs.

Among SME-specific determinants, an increase in SMEs' turnover positively affects the borrowing process. It was expected as improvement of business operations leads to higher demand for additional external financial resources required for the company's further expansion, as well as banks' confidence in a borrower. The results corroborate Lawless et al. [33] and Bongini et al. [11], who found that firms that are growing in turnover are more likely to have a broader range of SMEs' financing options.

While investigating firm-level determinants, we also found that operating in the manufacturing and construction sectors had a positive effect on SME bank loan access, whereas being in the trade or service industries had a negative impact on bank financing. Our findings are consistent with Andrieu et al. [2] and Nizaeva and Coskun [39], who found that manufacturing SMEs had much better access to bank loans than SMEs in the service sector.

Conclusion

SMEs are the most important drivers of the economic growth of both developed and developing economies. Despite their importance, they frequently confront various obstacles to obtaining funding. We employed relevant firm-level, industry-level, and macro-level factors to comprehensively analyze the determinants of bank lending to SMEs in the EU. We used multiple panel data models to confirm the importance of the studied

variables' effect on bank loans used by SMEs. Compared to similar studies, this one has a greater scope in terms of the sample used, the methodology exploited, and the data source – SAFE anonymous microdata, as well as geographical coverage. SMEs in wealthy economies with low inflation and efficient legal framework are less credit rationed. Developed bank infrastructure and lower interest rates are important determinants of successful SMEs financing. At the firm level, being in the manufacturing sector and having better business results positively affect SMEs' access to bank lending.

Our results shed new light on certain areas of SMEs funding, laying the groundwork for future comparable studies by using SAFE microdata within the EU. It can, in addition, be recommended to continue similar comparable research studies in other regions and on an international level.

Acknowledgments

We are grateful to the European Central Bank (ECB) for granting us access to the anonymized micro dataset on enterprise access to finance. Also, we express our gratitude to ECB Survey on the access to finance of the enterprise team for numerous valuable comments and support.

References

1. Akerlof, G. (1970). The market for "lemons": Quality uncertainty and the market mechanism. *The Quarterly Journal of Economics*, *84*(3), 488-500.
2. Andrieu, G., Staglianò, R., & Van Der Zwan, P. (2018). Bank debt and trade credit for SMEs in Europe: firm-, industry-, and country-level determinants. *Small Business Economics*, *51*(1), 245-264. https://doi.org/10.1007/s11187-017-9926-y
3. Ayyagari, M., Demirguc-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. https://doi.org/10.1093/wber/lhn018
4. Balog, Á. (2018). Analysis of SME segment lending processes in light of credit guarantees in the European Union. *Financial and Economic Review*, *17*(1), 62-82.
5. Barth, J. R., Lin, D., & Yost, K. (2011). Small and medium enterprise financing in transition economies. *Atlantic Economic Journal*, *39*(1), 19-38. https://doi.org/10.1007/s11293-010-9260-0
6. Beck, T., & Cull, R. (2014). SME finance in Africa. *Journal of African Economies*, *23*(5), 583-613. https://doi.org/10.1093/jae/eju016
7. Beck, T., & Demirguc-Kunt, A. (2006). Small and medium-size enterprises: Access to finance as a growth constraint. *Journal of Banking & finance*, *30*(11), 2931-2943. https://doi.org/10.1016/j.jbankfin.2006.05.009
8. Beck, T., Demirgüç-Kunt, A. S. L. I., & Maksimovic, V. (2005). Financial and legal constraints to growth: does firm size matter? *The Journal of Finance*, *60*(1), 137-177. https://doi.org/10.1111/j.1540-6261.2005.00727.x
9. Beck, U. (2007). Beyond class and nation: reframing social inequalities in a globalizing world 1. *The British journal of sociology*, *58*(4), 679-705. https://doi.org/10.1111/j.1468-4446.2007.00171.x
10. Berger, A. N., & Udell, G. F. (2006). A more complete conceptual framework for SME finance. *Journal of Banking & Finance*, *30*(11), 2945-2966. https://doi.org/10.1016/j.jbankfin.2006.05.008
11. Bongini, P., Ferrando, A., Rossi, E., & Rossolini, M. (2021). SME access to market-based finance across Eurozone countries. *Small Business Economics*, *56*(4), 1667-1697.
12. Brault, J., & Signore, S. (2019). *The real effects of EU loan guarantee schemes for SMEs: A pan-European assessment* (EIF Working Paper No. 2019/56).
13. Carbo-Valverde, S., Rodriguez-Fernandez, F., & Udell, G. F. (2016). Trade credit, the financial crisis, and SME access to finance. *Journal of Money, Credit and Banking*, *48*(1), 113-143. https://doi.org/10.1111/jmcb.12292
14. Carlson, W., & Lackman, C. (2015). A Note on Federal Reserve Policy Incongruencies. *Modern Economy*, *6*(12), 1235-1239. https://doi.org/10.4236/me.2015.612116
15. D'Amato, A. (2020). Capital structure, debt maturity, and financial crisis: empirical evidence from SMEs. *Small Business Economics*, *55*(4), 919-941.
16. Diamond, D.W. (1984). Financial intermediation and delegated monitoring. *The Review of Economic Studies, 51*(3), 393-414.
17. Dinç S. (2005). Politicians and banks: Political influences on government-owned banks in emerging markets. *Journal of Financial Economics*, *77*(2), 453-479. https://doi.org/10.1016/j.jfineco.2004.06.011.
18. Dong, Y., & Men, C. (2014). SME financing in emerging markets: Firm characteristics, banking structure and institutions. *Emerging Markets Finance and Trade*, *50*(1), 120-149. https://doi.org/10.2753/REE1540-496X500107
19. Duygan-Bump, B., Levkov, A., & Montoriol-Garriga, J. (2015). Financing constraints and unemployment: Evidence from the Great Recession. *Journal of Monetary Economics*, *75*, 89-105. https://doi.org/10.1016/j.jmoneco.2014.12.011
20. Erdogan, A. I. (2018). Factors affecting SME access to bank financing: an interview study with Turkish bankers. *Small Enterprise Research*, *25*(1), 23-35. https://doi.org/10.1080/13215906.2018.1428911
21. Erdogan, A. I. (2019). Determinants of perceived bank financing accessibility for SMEs: evidence from an emerging market. *Economic research-Ekonomska istraživanja*, *32*(1), 690-716. https://doi.org/10.1080/1331677X.2019.1578678
22. European Central Bank. (2021). *Survey on the access to finance of enterprises- Methodological information on the survey and user guide for the anonymised micro dataset*. Retrieved from www.ecb.europa.eu/stats/pdf/surveys/sme/methodological_information_survey_and_user_guide.pdf

23. European Central Bank Statistical data warehouse (SDW). Retrieved from https://sdw.ecb.europa.eu/
24. Eurostat database. Retrieved from https://ec.europa.eu/eurostat/web/main/data/database
25. Fowowe, B. (2017). Access to finance and firm performance: Evidence from African countries. *Review of Development Finance*, *7*(1), 6-17.
26. Fungáčová, Z., Herrala, R., & Weill, L. (2013). The influence of bank ownership on credit supply: Evidence from the recent financial crisis. *Emerging markets review*, *15*, 136-147. https://doi.org/10.1016/j.ememar.2013.02.002
27. Gambacorta, L., & Marques-Ibanez, D. (2011). The bank lending channel: lessons from the crisis. *Economic policy*, *26*(66), 135-182. https://doi.org/10.1111/j.1468-0327.2011.00261.x
28. Hashi I., & Toçi V.Z. (2010) Financing constraints, credit rationing, and financing obstacles: Evidence from Firm Level Data in South Eastern Europe. In R. Matousek (Ed.), Money, *Banking and financial markets in Central and Eastern Europe: 20 years of transition*. Springer. https://doi.org/10.1057/9780230302211
29. Jaffee, D. M., & Russell, T. (1976). Imperfect information, uncertainty, and credit rationing. *The Quarterly Journal of Economics*, *90*(4), 651-666.
30. Jeon, Y., Miller, S. M., & Natke, P. A. (2006). Do foreign bank operations provide a stabilizing influence in Korea? *The Quarterly Review of Economics and Finance*, *46*(1), 82-109. https://doi.org/10.1016/j.qref.2004.06.006
31. Kraemer-Eis, H., Botsari, A., Gvetadze, S., Lang, F., & Torfs, W. (2020). *European Small Business Finance Outlook 2020: The impact of COVID-19 on SME financing markets* (EIF Working Paper No. 2020/67).
32. La Rocca, M., La Rocca, T., & Cariola, A. (2010). The influence of local institutional differences on the capital structure of SMEs: Evidence from Italy. *International Small Business Journal*, *28*(3), 234-257.
33. Lawless, M., O'Connell, B., & O'Toole, C. (2015). Financial structure and diversification of European firms. *Applied Economics*, *47*(23), 2379-2398.
34. Leland, H. E., & Pyle, D. H. (1977). Informational asymmetries, financial structure, and financial intermediation. *The Journal of Finance*, *32*(2), 371-387.
35. Masiak, C., Block, J. H., Moritz, A., Lang, F., & Kraemer-Eis, H. (2019). How do micro firms differ in their financing patterns from larger SMEs? *Venture Capital*, *21*(4), 301-325. https://doi.org/10.1080/13691066.2019.1569333.
36. Mc Namara, A., O'Donohoe, S., & Murro, P. (2020). Lending infrastructure and credit rationing of European SMEs. *The European Journal of Finance*, *26*(7-8), 728-745. https://doi.org/10.1080/1351847X.2019.1637357
37. Micco, A., & Panizza, U. (2006). Bank ownership and lending behavior. *Economics letters*, *93*(2), 248-254. https://doi.org/10.1016/j.econlet.2006.05.009.
38. Mol-Gómez-Vázquez, A., Hernández-Cánovas, G., & Koëter-Kant, J. (2019). Bank market power and the intensity of borrower discouragement: analysis of SMEs across developed and developing European countries. *Small Business Economics*, *53*(1), 211-225. https://doi.org/10.1007/s11187- 018-0056-y.
39. Nizaeva, M., & Coskun, A. (2019). Investigating the relationship between financial constraint and growth of SMEs in South Eastern Europe. *SAGE Open*, *9*(3). https://doi.org/10.1177/2158244019876269
40. Polishchuk, Y., Kornyliuk, A., Lopashchuk, I., & Pinchuk, A. (2020). SMEs debt financing in the EU: on the eve of the coronacrisis. *Banks and Bank Systems*, *15*(3), 81-94. https://doi.org/10.21511/bbs.15(3).2020.08
41. Pontines, V., & Siregar, R. Y. (2014). How should we bank with foreigners? An empirical assessment of lending behavior of international banks to six East Asian economies. *International Review of Economics & Finance*, *29*, 552-568. https://doi.org/10.1016/j.iref.2013.08.006
42. Psillaki, M., & Eleftheriou, K. (2015). Trade Credit, Bank Credit, and Flight to Quality: Evidence from French SMEs. *Journal of Small Business Management*, *53*(4), 1219-1240. https://doi.org/10.1111/jsbm.12106
43. Stepanyan, V., & Guo, K. (2011). *Determinants of bank credit in emerging market economies*. International Monetary Fund.
44. Stiglitz, J., & Weiss, A. (1981). Credit Rationing in Markets with Incomplete Information. *American Economic Review*, *71*(3), 393-410.
45. Survey on the access to finance of enterprises (SAFE) - Anonymised micro dataset. Access granted on December 22, 2021.
46. Trovato, G., & Alfò, M. (2006). Credit rationing and the financial structure of Italian small and medium enterprises. *Journal of Applied Economics*, *9*(1), 167-184. https://doi.org/10.1080/15140326.2006.12040643
47. Wang, X., Han, L., & Huang, X. (2020). Bank market power and SME finance: firm-bank evidence from European countries. *Journal of International Financial Markets, Institutions and Money*, *64*, 101162. https://doi.org/10.1016/j.intfin.2019.101162
48. Winker, P. (1999). Causes and effects of financing constraints at the firm level. *Small Business Economics*, *12*(2), 169-181. https://doi.org/10.1023/A:1008035826914
49. World Bank. Doing business database. Retrieved from https://databank.worldbank.org/source/doing-business-database.
50. Yudaruddin, R. (2020). Determinants of micro-, small-and medium-sized enterprise loans by commercial banks in Indonesia. *The Journal of Asian Finance, Economics, and Business*, *7*(9), 19-30. https://doi.org/10.13106/JAFEB.2020.VOL7.NO9.019

Irena Janković

is an associate professor of Finance in domestic and international programmes at undergraduate and graduate level at the University of Belgrade, Faculty of Economics. She graduated and obtained her master and PhD from the University of Belgrade, Faculty of Economics. She is the author of the four monographs and numerous articles and chapters in international and domestic journals. Her field of research covers various aspects of financial markets and instruments, portfolio analysis and risk management. She is a contributor to relevant domestic and international projects in the area of economics and finance. Irena Janković is a member of editorial boards and reviewer of several highly rated international and domestic scientific journals. She is a member of the Scientific Societies of Economists of Serbia and Belgrade.

Vlado I. Kovačević

graduated from the Faculty of Agriculture, University of Belgrade where he obtained his PhD. At the Faculty of Economics, University of Belgrade he completed his master's degree. He worked within the Ministry of Agriculture, Forestry and Water Management as an Advisor in the Sector for International Cooperation. In TD Waterhouse Edmonton, Canada he worked as Financial Market Analyst. He was appointed Advisor to the Minister in the Ministry of Agriculture, Trade, Forestry and Water Management. Since 2016 he has been working as a Senior Research Associate at the Institute of Agricultural Economics in Belgrade. He is a member of the Steering Committee of the Institute of Agricultural Economics, member of the Supervisor Committee of the Agrocluster Serbia and Innovation Centre of Zlatibor. He is a member of the Scientific Society of Economists of Belgrade.

Isidora Ljumović

is a principal research fellow at the Institute of Economic Sciences from Belgrade. She holds a Ph.D. in Economics from the University of Niš and a bachelor's degree in Organizational Sciences from the University of Belgrade. Dr. Ljumović has been involved in several domestic and international projects and initiatives, including those funded by the RS MESTD, the World Bank, and the European Union. She has contributed to many scientific conferences in Serbia and abroad, having published four monographs and more than fifty scientific papers in domestic and international scientific journals and thematic collections. Dr. Ljumović is a member of the Committee for Economic Sciences at SANU, the Scientific Society of Economists of Serbia, and the International Association of Engineers. She is fluent in English and speaks German.

Svetlana Popović

is an associate professor at the Faculty of Economics, University of Belgrade, where she teaches undergraduate courses: Monetary Economics, Bank Business and Payment operations and Electronic Payments Systems. She is also engaged in master and doctoral level courses. She participated in several projects of the Scientific Research Center of the Faculty of Economics, the European Commission, the EBRD, the Ministry of Science and Environmental Protection, GTZ and UN-Habitat. She took part in different domestic and international scientific conferences and published numerous papers in the field of ECB monetary policy, convergence process in EMU, regional development, bank asset-liability management, bank supervision, shadow banking system, in monographs, journals and conference proceedings. She is a member of the Associations of Economists of Serbia and Belgrade.