

# DIGITALES ARCHIV

ZBW – Leibniz-Informationszentrum Wirtschaft  
*ZBW – Leibniz Information Centre for Economics*

Barbu, Teodora Cristina; Bucur, Raluca Crina; Cepoi, Cosmin Octavian et al.

## Article

### Is the Increase on SMEs' access to finance in the capital markets union context real? : an empirical investigation

Ekonomický časopis

#### Provided in Cooperation with:

Slovak Academy of Sciences, Bratislava

*Reference:* Barbu, Teodora Cristina/Bucur, Raluca Crina et. al. (2019). Is the Increase on SMEs' access to finance in the capital markets union context real? : an empirical investigation. In: Ekonomický časopis 67 (3), S. 245 - 263.

This Version is available at:

<http://hdl.handle.net/11159/4211>

#### Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics  
Düsternbrooker Weg 120  
24105 Kiel (Germany)  
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)  
<https://www.zbw.eu/econis-archiv/>

#### Standard-Nutzungsbedingungen:

Dieses Dokument darf zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden. Sie dürfen dieses Dokument nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, aufführen, vertreiben oder anderweitig nutzen. Sofern für das Dokument eine Open-Content-Lizenz verwendet wurde, so gelten abweichend von diesen Nutzungsbedingungen die in der Lizenz gewährten Nutzungsrechte.

<https://zbw.eu/econis-archiv/termsfuse>

#### Terms of use:

*This document may be saved and copied for your personal and scholarly purposes. You are not to copy it for public or commercial purposes, to exhibit the document in public, to perform, distribute or otherwise use the document in public. If the document is made available under a Creative Commons Licence you may exercise further usage rights as specified in the licence.*

## Is the Increase on SMEs' Access to Finance in the Capital Markets Union Context Real? An Empirical Investigation

Teodora Cristina BARBU – Raluca Crina BUCUR – Cosmin Octavian CEPOI – Adina Ionela STRĂCHINARU\*

---

### Abstract

*The aim of this paper is to identify whether Small and Medium Enterprises, i.e. SMEs' access to finance can increase given the context of Capital Markets Union (CMU) project. For this purpose, identifying the main drivers of SMEs' access to different types of financing having the SMAF index as proxy is a matter of great importance. Based on a panel of sixteen European countries we have performed a threshold analysis via PSTR methodology that reveals some very interesting facts. First of all, we have found strong empirical evidence of a threshold effect with stock market capitalization as threshold variable when studying the dynamics of the SMAF index. When the capitalization is lower than 35.34%, a large series of macroeconomic variables like interest rate spreads, GDP per capita, inflation rate, unemployment or cost/revenues ratio generate a powerful influence when it comes to finance a SME. When stock market capitalization exceeds the threshold, a different story is narrated and the existence of other directions of influence is visible. Hence, our results suggest that the CMU project with all its initiatives and impact measures will not facilitate SMEs' access to finance in developed capital markets with stock market capitalization below the threshold level of 35.34%.*

**Keywords:** Capital Markets Union, SMAF index, Stock Market Capitalization, PSTR

**JEL Classification:** C23, C58, D53, G15, G24

---

---

\* Teodora Cristina BARBU – Raluca Crina BUCUR – Cosmin Octavian CEPOI – Adina Ionela STRĂCHINARU; Bucharest University of Economic Studies, 5 – 7 Mihail Moxa Street, District 1, 010961 Bucharest, Romania; e-mail: Teodora.Barbu@fin.ase.ro; raluca.bucur@fin.ase.ro; cosmin.cepoi@fin.ase.ro; adina.strachinaru@fin.ase.ro

## Introduction

Launching Capital Markets Union project brings to the foreground the idea that SMEs' access to finance will increase considerably in the following years due to the new created opportunities. The objectives pursued by the European Commission through this project, starting in 2019, relate to a number of issues where the cornerstone is to relax the access to finance for SMEs, a central idea that is discussed in our paper. The CMU project has been subject to many debates regarding its potential to remove the barriers between capital markets and banks when it comes to financing. From all expressed opinions, the most important are those related to the perspectives of SMEs, which, in the context of achieving the CMU, will improve their access to finance, fulfilling an important role in supporting investments and economic growth in the EU. The access to finance for SMEs is a key element to economic growth, since the European SMEs provide 90 million jobs, and from this point of view, the SMEs need support for development and innovation, as they face difficulties in accessing funds.

In this paper we fill the gap in the literature by investigating for the first time the main factors that are influencing the SMEs' access to finance based on the recently developed Panel Smooth Transition Regression model. To our knowledge, this is the first time when such analysis has been conducted with a non-linear approach and with so many covariates. Our starting hypothesis refers to the fact that SMEs' access to finance is differently influenced by macroeconomic variables, banking sector indicators or the degree of financial integration in respect to capital market size. The advantage of this non-linear approach can be summarized from two points of view: firstly, it allows an endogenous identification of two or more regimes in relation to stock market capitalization values; secondly, it can measure the impact of each factor on SMAF index across years and countries having different degree of capital market development. Our results are suggesting that the CMU project will not facilitate SMEs' access to finance in developed capital markets with stock market capitalization below the threshold level of 35.34%, but may increase the access to finance in countries with a lower capital market having a level of capitalization below the threshold. The remainder of the paper is organized as follows: the next section presents the literature review, section 2 describes the methodology and the data, the results are in section 3 while section 4 concludes.

## 1. Literature Review

Regarding the impact that CMU will have on the capital markets but also on the access to finance for SMEs, the opinions are divided. For example, Demary, Hornik and Watf (2016) argue that the CMU project will have a heterogeneous

impact and different types of SMEs from some regions will benefit more than others. In their opinion the European Commission's concern is to increase the capitalization of capital markets while the European integration is focused, in particular, on improving the access to finance for SMEs. There are, however, particularities regarding the SMEs that depend on the structure of the financing, the diversity of financial needs and the features of each market. These differences between SMEs across the European Union are due to the level of capital markets capitalization, the company's longevity, the shareholder's structure, the past and forecasted return rates and the degree of business innovation.

According to Anderson et al. (2015), CMU represents all possible measures for integrating European capital markets to support economic growth and financial stability, addressing both to creditors and borrowers, targeting the available funds to less volatile capital investments in problematic periods and by which the economic and financial stability are more easily attended. Moreover, Dumitrescu (2015) found a much higher level of the fiscal multipliers in the case of a negative output gap which he explained also by a higher percentage of economic agents who face difficulties in receiving credit in such periods.

Véron and Guntram (2016) argue that CMU should offer a short-term instrument for replacing bank loans and moving financial intermediation to the capital market. From this perspective, consistent efforts are needed to increase the transparency and comparability of information as a key element of financial stability. Regarding the CMU's impact on SMEs' access to finance, many of them will remain connected to banks for financing their business and will not be directly affected by the program, while large SMEs will have access to the capital market through more sophisticated corporate loans.

Starting from the main issue of the CMU project – namely the SMEs ability to attract funding, Fouché, Neugebauer and Uthemann (2016) conducted a critical review regarding the CMU. Their recommendation is to create a transparent credit market for SMEs, by building a specific database and allowing equal access to information for all market participants. In this way, this project will provide support for the development of a pan-European credit securitization market. Banks will still remain the main source of funding due their ability to building long-term relationships with debtors and, in the same time, by monitoring their performances, an important aspect during economic crises, in which the discrimination analysis between good and bad projects is needed. Likewise, Kaya (2015) is supporting the idea of creating an organized financial center in the EU for financial transactions, i.e., financial hubs.

Karmowska and Marciniak (2015) examined SMEs development across EU countries. Their study highlighted that the country's economic situation has an impact on SMEs' access to finance, in particular on debt financing. The structural

changes in dynamics show that an increase in the number of SMEs is not accompanied by the improvement of the labor productivity and the increase of the employee's numbers. In this way, changes in SMEs' access to finance are also influencing the development of entrepreneurship, the labor market and the efficiency of the economy.

Another factor that can improve access to finance is represented by banking trust-based strategy. Hernandez-Canovas and Martinez-Solano (2010) analyzed the relationship between SMEs and banks from a bank-based perspective in Europe. They highlighted that, as business relationships with the banks continue on longer terms they have more access to finance, but in the same time the cost of indebtedness increases. De la Torre, Martinez Peria and Schmukler (2008) argued that this is a direct consequence of the decline in profits, which might be due to competition, which encourages banks to consider new markets with growth potential. Banks are focusing on SMEs because they are expecting that the profits will offset the risks. Banks are also attracted by SMEs involvement in productive activities and the forecasts regarding their future cash-flows are optimistic in most countries.

Wang (2016) analyzes the factors which are limiting SMEs access to finance. He identifies that the company's features, the longevity and the growth rate as well as the company's shareholding are indeed important factors that could influence the access to new loans. The influence of the banking market structures on the SMEs financing and performance is highlighted by Hasan et al. (2017) or Moscalu (2015). The results of the first one, including a sample of all bank branch locations and SMEs from Poland for 2007 – 2012, are showing that the cooperative banks development facilitates access to bank loans for SMEs. Also, it creates an enabling environment for investment and growth of SMEs, and makes the scale of new enterprises, decreasing the adverse effects compared to banking structures, where foreign-owned banks predominate.

An empirical study on the development and financing of SMEs was also conducted by Luo, Wang and Yang (2016), using the real options concept. The idea of their study is that SMEs do not have direct access to bank finance and sign a security agreement with a lender. The study results show that a higher level of guarantee/deposit involves a lower value of the option and a slowdown in investment process. SMEs financing can be influenced also by sovereign stress as stated by Ferrando, Popov and Udell (2017). The author concludes that during the sovereign crisis, SMEs in affected countries have not encountered difficulties in accessing funds through the bank, customer creditworthiness being neglected. Also, the study results indicate that government subsidies come to compensate access to finance for SMEs in stressed countries. Fragmentation of the international

credit market has an important influence on SMEs financing costs; there is a negative correlation between cross-border loans and the cost of SMEs loans in the euro area.

In order to analyze the effects of decreasing of banking loans on SMEs financing conditions, Bremus and Neugebauer (2018) highlighted that the fall of cross-border credit volumes leads to a faster growth of financing costs for SMEs. For companies in countries with a significant falling in international credit inflows, there is a probability that the level of borrowing costs is likely to be 15 percentage points higher than in countries with a more favorable international credit outlook. On the other hand, Hoffmann and Sorensen (2015) reveal the dependence of SMEs financing on loans from domestic banks. Although banking integration in the euro area has increased the role of foreign banks in financing the economy, SMEs have remained connected to domestic banks, despite the increased degree of integration. Thus, the authors' main idea is that SMEs are sensitive to bank shocks and have low access to capital, making their activity vulnerable. The countries with a large number of SMEs are more competitive in terms of risk-sharing than other countries and have limited exposures, if they had access to credit from foreign banks.

The sources for SMEs financing have different consequences on the economic growth. Thus, Poderys (2015) argues that access to bank finance has a significant and positive impact on economic growth and SMEs development. Other authors such as Öztürk and Mrkaic (2014) highlighted how the structure of the bank balance sheet can significantly affect the companies access to finance. Those companies reporting an increase in the total debt ratio are those reporting deterioration in their access to finance, which means that there is a channel of the bank balance sheet and of non-financial companies that affects the economy. The authorities should continue their efforts to ensure a better development of the companies and to create a set of alternative sustainable and diversified financing options.

The unemployment rate also affects the access to finance. Bekeris (2012) shows that the unemployment rate has the biggest impact on SMEs performances. There is a negative correlation, which means that a rise in unemployment rate reduces firms' profitability. Also, Nedu et al. (2015) highlight a direct, linear relationship between the unemployment rate and the growth rate of SMEs in the Czech Republic.

Namara, Murro and O'Donohoe (2017) concluded that in the case of European SMEs, for the period 2005 – 2011, long-term loans correspond to an effective bankruptcy environment, while for short-term loans an informational and legal environment is conducive. Moreover, according to authors's opinion, the regulatory environment is the most suitable for both types of credits' maturity. The

CMU project facilitates the ability of SMEs to finance themselves on the capital market, but the ability of SMEs to allot finance also depends on information, bankruptcy, and legal and regulatory environments.

## 2. Methodology and Data

### 2.1. Panel Smooth Transition Regression Model

In this paper we are going to use the Panel Smooth Transition Regression Model, developed by González, Teräsvirta and Dijk (2005), in order to study the existence of a threshold effect on SMAF index, taking into account stock market capitalization values. In the following analysis, we are going to consider the easiest case of this approach with two extreme regimes and one threshold. If we denote  $i=1, \dots, N$  countries as cross-section and  $t=1, \dots, T$  time dimension of the panel, the model can be specified as:

$$y_{i,t} = \mu_i + \beta_0^T x_{i,t} + \beta_1^T x_{i,t} g(q_{i,t}, \gamma, c) + \varepsilon_{i,t} \quad (1)$$

In equation (1),  $y_{i,t}$  represents the dependent variable, given by SMAF index,  $\mu_i$  is the individual fixed effects while  $x_{i,t}$  is the set of independent variables presented in Table 1. The nonlinear part of the equation (1) assumes the existence of one transition function ( $r=1$ ), which is identified with the help of a threshold variable ( $q_{i,t}$ ) i.e., stock market capitalization, the threshold parameter ( $c$ ) and the speed of transition between regimes namely  $\gamma$ , which is the slope of transition function.

Based on previous findings of Granger and Teräsvirta (1993), Teräsvirta (1994) and González, Teräsvirta and Dijk (2005), we will use the logistic specification to define the transition function:

$$g_i(q_{i,t}, \gamma, c) = \frac{1}{1 + e^{[-\gamma(q_{i,t} - c)]}}, \quad \gamma > 0 \quad (2)$$

when  $\gamma \rightarrow \infty$  equations (1) and (2) define the Panel Transition Regression model of Hansen (1999), where the transition function tends to be an indicator function:

$$g_i(q_{i,t}, \gamma, c) = \begin{cases} 0, & q_{i,t} < c \\ 1, & q_{i,t} \geq c \end{cases} \quad (3)$$

when  $\gamma \rightarrow 0$ , the transition function converts into a linear panel regression model with fixed effects.

## 2.2. Testing for Linearity and Number of Transition Functions

The first step in our analysis is to determine if the regime-switching effect is statistically significant in our approach. This means that it is necessary to test the null hypothesis of linearity ( $H_0 : \beta_1 = 0 \Leftrightarrow H_0 : \gamma = 0$ ) against the alternative one, i.e. the smooth transition effect. Due to the unidentified nuisance parameters that are contained in the PSTR model, we must use a non-standard test and follow the solution developed by Luukkonen, Saikkonen and Teräsvirta (1988). They use the first order Taylor expansion of transition function  $g_i(q_{i,t}, \gamma, c)$  around  $\gamma = 0$ . This will yield to the auxiliary regression, given in equation (4), if we follow the assumption of a model with two extreme regimes:

$$y_{i,t} = \mu_i + \beta_0^{T*} x_{i,t} + \beta_1^{T*} x_{i,t} q_{i,t} + \varepsilon_{i,t}^* \quad (4)$$

In equation (4),  $\beta_0^{T*}$  and  $\beta_1^{T*}$  are multiple of  $\gamma$  and  $\varepsilon_{i,t}^* = \varepsilon_{i,t} + R\beta_1^{T*} x_{i,t}$ , with  $R$  being the reminder of the Taylor expansion. Testing  $H_0 : \gamma = 0$ , in these circumstances, it is equivalent to test  $H_0 : \beta_1^{T*} = 0$ . We will follow the suggestions proposed by Colletaz and Hurlin (2006) and use three tests (Likelihood ratio test, Wald and Fischer) in order to reject or accept the linearity assumption. All these tests follow a  $\chi^2(K)$  distribution under the null hypothesis of linearity, where  $K$  represents the number of explanatory variables.

The model is considered to be nonlinear, if the null hypothesis is rejected. If we consider the general case allowing for  $r$  (the number of transition functions) to be higher than one, we can further determine the number of transition functions by testing the null ( $H_0 : r = 1$ ) against the alternative ( $H_1 : r = 2$ ) and so on until the null is not rejected.

## 2.3. The Data

Our database consists on variables from sixteen countries, namely Austria, Belgium, Denmark, Estonia, Finland, France, Greece, Hungary, Ireland, Italy, The Netherlands, Portugal, Slovak Republic, Slovenia, Spain and Sweden, during nine years, 2007 – 2015. For each country, we collect annual data from *Statistical Data Warehouse* of the European Central Bank, European Commission, Eurostat, Federal Reserve Bank of St. Louis and World Bank. We chose these countries because they were the only ones for which we were able to collect the SMAF index values, during 2007 – 2015. We used linear interpolation, for some missing data. Table 1 provides a detailed description of the variables.

In order to have a clear picture regarding SMEs' access to finance, we used the SMAF index as proxy. It is provided by the European Commission and represents the changes in SMEs lending standards over time for the EU and its

member states. This index is a weighted mean of two sub-indices: access to debt finance and access to equity finance, taking 2007 as the base year. The sub-index structure of access to debt finance includes nine indicators and represents 85% of the SMAF weighting while the access to equity finance sub-index contains five indicators and represents 15% of the SMAF index structure.

Table 1

**Data Description**

Variable	Description
SMAF	SME Access to Finance index – indication of the changing conditions of SMEs' access to finance over time (EU 2007 = 100) (%)
SMC	Stock Market Capitalization, given by total value of all shares traded, as a percentage of GDP (%)
STL	Short-term SME loans, as a proportion of all SME loans (%)
IRS	Interest rate spreads between loans to SMEs and to large enterprises (%)
ROA	Return on total assets in banking system (%)
GR	Annual real GDP/capita growth (%)
INF	Annual inflation level (%)
UN	Annual unemployment level, as a percentage of active population (%)
BC	Ratio of costs and revenues recorded by banks (%)
FINTECP	Price-based financial integration composite indicator (%)

Source: European Central Bank, European Commission, Eurostat, Federal Reserve Bank of ST. Louis and World Bank.

Stock Market Capitalization, as a percentage of GDP, is a key indicator in our analysis, because it is used as threshold in determining the influences of certain microeconomic and macroeconomic indicators on SMEs financing.

As microeconomic independent variable, we used short-term SME loans, as a proportion of all SME loans, and interest rate spreads ratio between loans to SMEs and large enterprises. On the other hand, to capture the macroeconomic impact, we selected the following variables with a considerable impact on the economic environment: annual real GDP/capita growth, annual inflation level, return on total assets in banking system, annual unemployment level, the ratio of costs and revenues recorded by banks, price-based financial integration composite indicator.

For the aim of the present study, we used another key indicator of CMU objectives development, indicating the degree of financial integration of each country analyzed. So, FINTECP is a composite indicator of financial integration in the euro area, developed by ECB. It is based on price and quantity. The importance of this indicator is that integration in monetary, bond and banking markets consistently shows sustained growth, in contrast to equity markets, which are characterized by volatility. Before starting our PSTR approach, we need to make sure, first of all, that there is no correlation among the covariates. An overview, regarding the correlation matrix, is presented in Table 2.

Table 2  
Correlation Matrix (in %)

	SMC	STL	IRS	ROA	GR	INF	UN	BC	FINTECP
SMC	100								
STL	8.4	100							
IRS	-6.8	24.2	100						
ROA	21.0	-8.6	-6.6	100					
GR	7.5	3.8	12.4	23.6	100				
INF	-6.5	7.7	-3.7	21.3	-17.8	100			
UN	-14.8	24.7	22.4	-28.0	9.2	-28.3	100		
BC	2.0	-12.1	28.9	-10.4	-1.1	-14.9	-9.8	100	
FINTECP	29.6	-0.9	-11.7	23.7	11.4	-15.3	-19.6	9.6	100

Source: Own calculations.

In Table 2 the correlation matrix is presented. We can observe that, in absolute values, no correlation coefficient exceeds the value of 30%, which is set by us, so we can go further with these independent variables in order to study the threshold effect in SMAF index dynamics.

### 3. Results

#### 3.1. Unit Root Tests

In order to obtain a valid model, this paper examines the panel unit-root tests for each variable used in our estimation, based on LLC test developed by Levin, Lin and Chu (2002), ADF-Fischer test, proposed by Maddala and Wu (1999) and the one, proposed by Hadri (2000). All three tests, used in this paper, examine the null hypothesis of a unit root in our data with the absence of a unit root as alternative.

Table 3  
Panel Unit Root Test

Variables	Method		
	LLC	ADF-Fischer	Hadri
SMAF	-10.9446*** (0.0000)	73.9707*** (0.0000)	12.0015*** (0.0000)
SMC	-2.1027** (0.0177)	128.3308*** (0.0000)	5.5964*** (0.0000)
STL	-6.6825*** (0.0000)	60.0496*** (0.0019)	4.9117*** (0.0000)
IRS	-0.9462*** (0.0000)	64.0943*** (0.0001)	2.3483*** (0.0094)
ROA	-7.8973*** (0.0000)	103.6325*** (0.0000)	3.0905*** (0.0010)
GR	-5.4758*** (0.0000)	102.4661*** (0.0000)	1.9618** (0.0249)
INF	-8.2344*** (0.0000)	107.9070*** (0.0000)	0.5478 (0.2919)
UN	-16.1281*** (0.0000)	82.0283*** (0.0000)	6.5371*** (0.0000)
BC	-6.1479*** (0.0000)	119.6027*** (0.0000)	4.2283*** (0.0000)
FINTECP	-6.3967*** (0.0000)	71.5657*** (0.0000)	6.2999*** (0.0000)

Note: \*\*\*significance at 1% level; \*\*significance at 5% level; \*significance at 10% level.

Source: Own calculations.

The results of these unit root tests are reported in Table 3; all unit root tests include an intercept and a trend. We can see that all the variables are stationary at 5% significant level according to all three tests, with the inflation as exception, where the null hypothesis is accepted by Hadri test. Considering this aspect, we can continue our analysis and use the PSTR model.

### 3.2. Linearity and No Remaining Linearity Tests

Next, we will use three tests (Likelihood Ratio, Wald and Fischer), having the linearity relation between SMAF index and the independent variables as null hypothesis. The linearity tests results, which are presented in Table 4, reject the null hypothesis of linearity, so between SMAF index and its regressors there is indeed a nonlinear relationship. More to the point, in order to make the PSTR model tractable, supplementary investigation regarding the number of transition functions must be made. More specific, once we reject the linearity assumption we must investigate whether a model with two or more transition functions can outperform a representation with only one transition function.

Table 4

#### Linearity Test

Test	Statistic	P-value
Lagrange Multiplier – Wald ( $LM_W$ )	37.218	0.000
Lagrange Multiplier – Fischer ( $LM_F$ )	5.228	0.000
Likelihood Ratio	43.060	0.000

Source: Own calculations.

The tests for no remaining linearity are presented in Table 5. The null hypothesis is the existence of two regimes and the alternative is the existence of more than two regimes, i.e., the existence of more than one transition functions.

Table 5

#### Test of No Remaining Non-linearity

Test	Statistic	P-value
Lagrange Multiplier – Wald ( $LM_W$ )	9.191	0.326
Lagrange Multiplier – Fischer ( $LM_F$ )	0.886	0.531
Likelihood Ratio	9.498	0.302

Source: Own calculations.

We can see from Table 5 that there is only one transition function between two regimes, when we choose stock market capitalization as threshold variable in order to explain SMAF index evolution. The null hypothesis cannot be rejected by any test that we perform.

### 3.3. Model Estimation Results

Our hypothesis is that access to finance for SMEs is differently influenced by macroeconomic variables, banking sector specific indicators, financial integration degree in relation with the size of the capital market as threshold variable. The estimation results of the PSTR model using non-linear least square with the corresponding results presented in Table 6.

Table 6

**Estimation Results** (p-values in parenthesis)

Threshold variable	$r$	$c$	$\gamma$	Explanatory variable	$\beta_0$	$\beta_1$
SMC	1	0.3534	441	STL	0.0287 (0.5427)	<b>-0.1339</b> <b>(0.0003)</b>
				IRS	<b>2.6786</b> <b>(0.0469)</b>	<b>-5.2037</b> <b>(0.0000)</b>
				ROA	0.2198 (0.4136)	-0.8221 (0.4045)
				GR	<b>0.2667</b> <b>(0.0219)</b>	-0.0041 (0.9787)
				INF	<b>-1.1785</b> <b>(0.0000)</b>	-0.1135 (0.7996)
				UN	<b>-1.2107</b> <b>(0.0000)</b>	<b>1.9212</b> <b>(0.0000)</b>
				BC	<b>0.0932</b> <b>(0.0208)</b>	-0.0540 (0.2542)
				FINTECP	<b>-0.0887</b> <b>(0.0287)</b>	-0.0243 (0.5924)

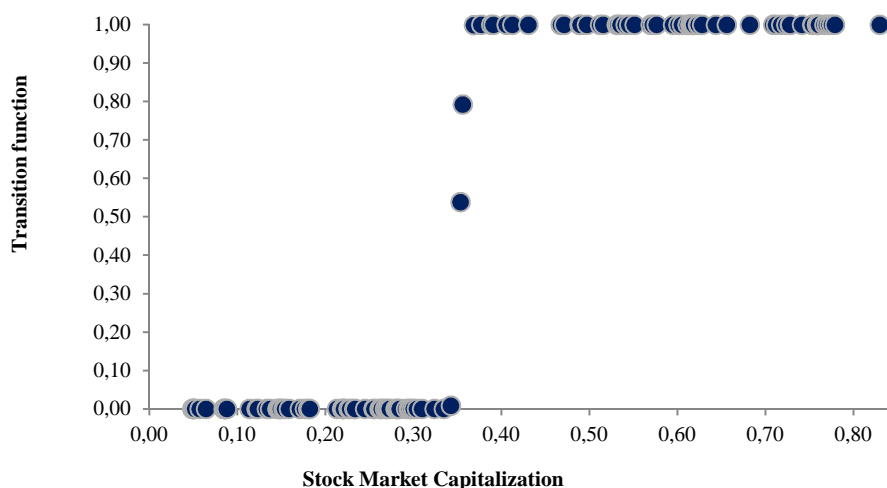
Source: Own calculations.

In order to capture the variables that may influence SMEs access to capital market financing, based on CMU project implementation, we identified as a representative threshold value of 35.34%, according to which two extreme regimes were defined: regime 1, corresponding to countries with a SMC indicator lower than 35.34% and regime 2 represented by countries where the SMC is higher or equal to 35.34%. The value of  $\gamma$  is quite high, which shows us that the transition from one regime to another is not smooth, but on the contrary, it is rather steep.

This can also be seen from the transition function graph shown in Figure 1. Since we determined the threshold value as well as the slope of the transition function, it is interesting to see which countries and years are in regime 1 and respectively regime 2.

Eligible countries per years (2007 – 2015) are listed in Table 7, taking into account the frequency with which a country was included in the regime 1 or regime 2.

Figure 1  
Estimated Transition Function over SMC



Source: Own estimates.

Table 7  
Countries across Extreme Regimes

Country	Regime 1 (years)	Regime 2 (years)
Austria	7	2
Belgium	0	9
Denmark	0	9
Estonia	9	0
Finland	0	9
France	0	9
Greece	7	2
Hungary	9	0
Ireland	2	7
Italy	7	2
The Netherlands	0	9
Portugal	6	3
Slovak Republic	9	0
Slovenia	7	2
Spain	0	9
Sweden	0	9

Source: Own calculations.

The next step in our study is to make a thorough analysis regarding the impact that these explanatory variables have on SMAF index from the perspective of countries with the longest period of time in a particular regime. First of all, *Short-term SMEs loans (STL)*, represent an excellent option for the temporary capital needs of SMEs. Urgent capital requirements for expansion and diversification of the activity are covered by short-term loans for SMEs in attractive conditions

for a six-month period. They have the advantage that credit and interest payments are made at the end of the period. In our approach, for the first regime, the STL indicator has a positive influence of 0.0287%, in comparison with the non-linear part where the influence is negative,  $-0.1339\%$  and statistically significant at 1% level. The explanation lies in the fact that more developed capital markets can provide sources of funding for those companies with increased innovation and attractive economic growth for investors. Short-term loans do not favorably affect the SMAF index, as there is the possibility of financing outside bank lending. As the SMAF index is 85% made of bank variables, it follows that, when the capital market is developed, STL cannot favorably influence SMEs' access to finance. These are considered risky assets by the most of the banks. In the absence of a historic for long-term credits accessed by SMEs, credit decisions are based only on the financial information and business plans.

The difference between the *interest rate (IRS)* on bank loans for SMEs and for large companies reflects the specific conditions and risks of these companies. Generally, the interest rate for SMEs is higher for large companies, given the specific conditions, such as associated risks, collateral quality and requested commissions. Just like in the case of *short-term SMEs loans*, the regression has different values from one regime to another. Thus, for economies with SMC value under the threshold, interest spread has a positive influence on SMEs access to finance. When the spread increases by one percent, SMAF increases by 2.6786% and for the non-linear part the SMAF decreases by 5.203%, and, as a consequence, has an overall negative impact. The explanation is connected with the premium risk charged by banks in the case of SMEs financing. So, SMEs' access to finance is limited because, in the case of start-ups where there is a number of uncertainties about the business plan, the prospects and the possibility of repayments of the loans. Start-ups either do not have history or experience, or either fail to show that they are stable and their business has the potential to grow and resist on long-term. On the other hand, interest rate spread influences the perception on the risk in economy and affects the demand/offer ratio in the case of banking loans. For financial markets with a higher level of capitalization (regime two), the access to information and their transparency affect the behavior of large companies and SMEs. Thus, an increase in the interest rate spread leads to a decrease of the loans demand from SMEs, which will focus on alternative sources of financing. In contrast to the second regime, in the economies under the first, SMEs access to the capital market is lower, they do not use equity instruments to attract resources, therefore the only funding option remains bank lending. The bank lending market has become competitive in recent years, which is reflected in the costs and lending conditions for SMEs. An increase in

the interest rate spread may be accompanied by a diversified SMEs loans offer, which could lead to an increase in access to finance, even in the case of a higher interest rate.

The relationship between access to SMEs financing and economic development is captured by the variable *growth rate per capita (GR)*. Based on the results reported in Table 6, economic growth has an impact on SMEs' access to finance in the first regime. SMEs are an important factor in generating economic growth, creating jobs, for innovation and competitiveness, which is why it is important to ensure access to finance at all stages of business development. In our paper we highlighted the effect of economic growth on SMEs access to finance. In the countries classified in the first regime, the SMAF index increases by 0.2667% when increasing the economic growth rate.

*The inflation rate (INF)* has a statistically significant impact on SMAF index value in both categories of economies. The increase in inflation leads to the SMAF index modification by -1.1785%, respectively by -0.1135%. The inflationary trend favors the debtor by devaluing the principal borrowed. This may result in credit institutions' reluctance to provide funding, but in the meantime also determines increases in interest rates and risk premium in order to maintain the expected profit margins. These measures may have adverse effects on the lending process and may lead to limitations in the access of SMEs on financing market.

Increasing *unemployment rates (UN)* influence access to finance for SMEs in both types of regimes. In the case of the first regime, an increase by 1% in unemployment will have a negative impact on the SMAF, downwards by 1.2107%. Instead, in the case of capital markets under the second regime, rising unemployment will lead to an increase in SMEs' access to finance by 0.71%. This positive impact can be explained by the rethinking of the financing strategies through diversifying the financing access ways, based on bank loans, but especially through the capital market. Also it can be explained by the development of some governmental programs of unemployment absorption, which are carried out at the level of SMEs. Through incentives, SMEs will increase access to finance, benefiting from a range of facilities to create new jobs. Thus, where SMEs financing mechanisms are well regulated, concerns for reducing unemployment will be found in SMEs initiatives that will access funding sources to create jobs. Conversely, in the context of unemployment with unfavorable macroeconomic consequences, some SMEs will not be able to continue their activity, which will lead to their bankruptcy, with a negative impact on the SMAF index.

In our study, the *BC* variable (*ratio of costs and revenues recorded by banks*), seen as a cost-to-income ratio, is a proxy of efficiency; the rise in the value of the BC indicates a decrease in efficiency and an increase in bank costs. In our

paper a rise in costs has effects on SMEs access to finance. In the capital market from the first regime, the BC' increase by 1% leads to increase of access to finance by 0.0932%, and in countries with developed capital markets there is a reduction of -0.0540% for the non-linear part of PSTR model. Banks may increase their operational costs due to the costs of a more rigorous credit analysis and the costs of collateral guarantees/securities appraisals. Applying rigorous standards in the selection of credit files and using the expertise of professionals will lead to the reduction of moral hazard and increasing access to finance for SMEs which meet the eligibility criteria. Thus, in countries under regime 1, the rise in banking costs will lead to a reduction in banking efficiency, but will have a positive impact on the SMEs access to finance.

Financial integration, represented by the FINTECP, theoretically contributes to the increase of the supply of finance and to the development of all local markets. However, at the SMEs' level its influence is affected by a series of issues. So, the increase in financial integration leads to a modification of the SMEs' access to finance by -0.0887% in the economies of regime 1 and by -0.0243% in the non-linear part of regime 2. In view of the CMU project implementation, forecasts have been made on increasing the financial integration degree. However, the results of this study indicate that an increase in financial integration will have a negative impact on access to finance for SMEs. The channel through which European financial integration may influence SMEs' access to finance is their balance sheet structure, i.e., the debt-to-asset ratio. Increasing the degree of integration in the banking sector contributes to reducing the differences in interest rates spread. However, according to ECB statistics, for small loans there is the highest dispersion of interest rates.

### 3.4. Robustness of Results

From Figure 1, it can be noticed that the transition from one regime to another is very steep and the number of observations that are on the function graph linking the two regimes is very low. Starting from this premise we can consider that the transition function can be described as an indicator function which is zero in the first regime and one in which second regime. Under these conditions, the total impact that a particular variable will have on the SMAF index is given by the value of  $\beta_0$  in the first regime and  $\beta_0 + \beta_1$  in the second one.

In order to study the robustness of the results we will use two approaches. The first one (Model B) involves the inclusion of the threshold variable among the explanatory variables in the PSTR model reported in Table 7 which we will refer here as Model A. We will consider that the model is robust if the values of  $\beta_0 + \beta_1$  have the same signs in both cases (Model A vs Model B). The second

approach involves the estimation of a linear panel model with fixed effects (Model C) and then a comparison of the results with the values that represent the final impact of the PSTR model. We will consider that the model is robust if the values of  $\beta_0$  and  $\beta_0 + \beta_1$  have the same signs with the value of  $\beta$ . A summary of robustness tests is presented below.

Table 8  
Robustness Tests

Explanatory variables	Model A	Model B	Model A vs. Model B	Model C	Model A vs. Model C
	$\beta_0 + \beta_1$	$\beta_0 + \beta_1$		$\beta$	
SMC	–	–0.0409		–	
STL	–0.1052	–0.1004	✓	–0.0475	×
IRS	–2.5251	–2.3933	✓	1.9194	×
ROA	–0.6022	–0.2233	✓	0.5147	×
GR	0.2626	0.2777	✓	0.1698	✓
INF	–1.2920	–1.0730	✓	–1.3000	✓
UN	0.7105	0.7898	✓	–0.5754	×
BC	0.0392	0.0254	✓	0.0816	✓
FINTECP	–0.1129	–0.0886	✓	–0.1360	✓
R-squared	0.9167	0.9180	–	0.8579	–
Adjusted R-squared	0.8937	0.8934	–	0.8307	–
F-statistic	39.7952	37.3194	–	31.5085	–
Prob(F-statistic)	0.0000	0.0000	–	0.0000	–

Source: Own calculations.

From Table 8 we can see that the estimates obtained from Model A remain robust when stock market capitalization is considered as explanatory variable. Moreover, with the exception of ROA, the coefficients from the Model B are quite close to those obtained from our initial approach. We note that the R-squared are extremely large, which shows us a very good performance of the PSTR approach. The same conclusion can be drawn in the case of four variables out of eight if we consider the results reported in Model C. It can be observed, however, that the performance of the PSTR model is superior to those obtained from the linear approach. That being said, we can conclude that our model exhibits a fairly high robustness to the imposed changes.

#### 4. Conclusions and Future Research

The CMU project supports the development of SMEs, in terms of increasing access to finance. Removing cross-border barriers also helps to develop European economies as a whole. The findings of the study reveal that access to finance for SMEs can not automatically increase in all countries, because it is determined by a number of factors whose influence is different in relation to the size

of the capital market, measured by Stock Market Capitalization as a percentage of GDP. Also, we found that SMAF is influenced by the macroeconomics and banking determinants, as well as by financial integration degree. Thus, when the capitalization is lower than 35.34% a large series of macroeconomic variables like interest rate spreads, GDP per capita, inflation rate, unemployment or cost/revenues ratio is generating a powerful influence when it comes to finance a SME. When stock market capitalization exceeds the threshold, a different story is narrated and the existence of other directions of influence is visible. Hence, the CMU project with all proposed initiatives and measures will not have a positive impact on access to finance for SMEs in developed capital markets. Macroeconomic and banking variables, as well as increasing financial integration, lead to a reduction in access to finance.

The importance of this study provides a support for private and public economists, investors, financial consultants, researchers etc. on the basis of which they can make future decisions. Moreover, the empirical study also helps regulatory authorities and macroeconomic decision makers to give a strong emphasis to the new context of the CMU project implementation that will develop the European capital markets. The results indicate that CMU implementation should take into account a number of peculiarities such as the size of the capital market and the banking market, the diversity and origin of funding sources as well as SMEs size. Also, the estimates show that the project does not lead to the influence of SMEs' access to finance in all countries, but only to those with a less developed level of the capital market.

In our study, we considered the SMEs mixed financing by using the SMAF index as the proxy variable. In the future, we also want to identify the differences between the internal or cross-country financing of SMEs as well as their size. Moreover, in perspective, the analysis can be developed by using also qualitative indicators, such as: dummy type variables that may indicate whether or not a country is part of a particular organization (such as: OECD), indicators that point to corporate governance or the reputation of an enterprise.

## References

- ANDERSON, N. – BROOKE, M. – HUME, M. – KÜRTÖSIÓVÁ, M. (2015): A European Capital Markets Union: Implications for Growth and Stability. [Financial Stability Paper, No. 33.] London: Bank of England, pp. 1 – 25.
- BEKERIS, R. (2012): The Impact of Macroeconomic Indicators upon SME's Profitability. *Ekonomika*, 91, No. 3, pp. 117 – 128.
- BREMUS, F. – NEUGEBAUER, K. (2018): Reduced Cross-border Lending and Financing Costs of SMEs. *Journal of International Money and Finance*, 80, February, pp. 35 – 58. DOI: 10.1016/j.jimonfin.2017.09.006.

- COLLETAZ, G. – HURLIN, C. (2006): Threshold Effects of the Public Capital Productivity: An International Panel Smooth Transition Approach. [Research Document 2006-01.] Orleans: University of Orleans.
- De la TORRE, A. – MARTINEZ PERIA, M. S. – SCHMUKLER, S. (2008): Drivers and Obstacles to Banking SMEs: The Role of Competition and the Institutional Framework. [Policy Research Working Paper, No. 4788.] Washington, DC: The World Bank, pp. 1 – 51.
- DEMARY, M. – HORNIK, J. – WATF, G. (2016): SME Financing in the EU: Moving Beyond One-Size-Fits-All. [Research Document-IW-Report, No. 11.] Köln: Cologne Institute for Economic Research, pp. 1 – 36.
- DUMITRESCU, B. (2015): The Fiscal Consolidation Consequences on Economic Growth in Romania. *Romanian Journal of Economic Forecasting*, 13, No. 3, pp. 136 – 151.
- FERRANDO, A. – POPOV, A. – UDELL, G. (2017): Sovereign Stress and SMEs' Access to Finance: Evidence from the ECB's SAFE Survey. *Journal of Banking and Finance*, 81, No. C, pp. 65 – 80.
- FOUCHÉ, M. – NEUGEBAUER, K. – UTHEMANN, A. (2016): SME Financing in a Capital Markets Union. [Research Document, No. 16.] Stockholm: SIEPS – Swedish Institute for European Policy Studies.
- CONZÁLEZ, A. – TERÄSVIRTA, T. – DIJK, D. V. (2005): Panel Smooth Transition Regression Models. [SSE/EFI Working Paper Series in Economics and Finance, No. 604.] Rotterdam: Econometric Institute, Erasmus University Rotterdam.
- GRANGER, G. W. J. – TERÄSVIRTA, T. (1993): *Modelling Nonlinear Economic Relationships*. Oxford: Oxford University Press. ISBN 0-19-877320.
- HADRI, K. (2000): Testing for Unit Roots in Heterogeneous Panel Data. *Econometrics Journal*, 3, No. 2, pp. 148 – 161.
- HANSEN, B. E. (1999): Threshold Effects in Non-dynamic Panels: Estimation, Testing and Inference. *Journal of Econometrics*, 93, No. 2, pp. 345 – 368.
- HASAN, I. – JACKOWICZ, K. – KOWALEWSKIC, O. – KOZŁOWSKID, L. (2017): Do Local Banking Market Structures Matter for SME Financing and Performance? New Evidence from an Emerging Economy. *Journal of Banking and Finance*, 79, No. C, pp. 142 – 158.
- HERNANDEZ-CANOVAS, G. – MARTINEZ-SOLANO, P. (2010): Relationship Lending and SME Financing in the Continental European Bank-based System. *Small Business Economics*, 34, No. 4, pp. 465 – 482.
- HOFFMANN, M. – SORENSEN, B. (2015): Small Firms and Domestic Bank Dependence in Europe's Great Recession. [European Economy Discussion Paper.] Luxembourg: Publications Office of the European Union.
- KAYA, O. (2015): Capital Markets Union, an Ambitious Goal, but Few Quick Wins. [Research Document.] Frankfurt am Main: Deutsche Bank, EU Monitor, Global Financial Markets, pp. 1 – 20.
- KARMOWSKA, G. – MARCINIAK, M. (2015): Small and Medium Size Enterprises in European Union. [Proceedings.] Budapest: Repository of the Library of the Hungarian Academy of Sciences, pp. 50 – 56.
- LEVIN, A. – LIN, C. F. – CHU, C. S. J. (2002): Unit Root Tests in Panel Data: Asymptotic and Finite-sample Properties. *Journal of Econometrics*, 108, No. 21, pp. 1 – 24.
- LUUKKONEN, R. – SAIKKONEN, P. – TERÄSVIRTA, T. (1988): Testing Linearity in Univariate Time Series Models. *Scandinavian Journal of Statistics*, 15, No. 3, pp. 161 – 175.
- LUO, P. – WANG, H. – YANG, Z. (2016): Investment and Financing for SMEs with a Partial Guarantee and Jump Risk. *European Journal of Operational Research*, 249, No. 3, pp. 111 – 116.
- MADDALA, G. S. – WU, S. (1999): A Comparative Study of Unit Root Tests with Panel Data and a New Simple Test. *Oxford Bulletin of Economics and Statistics*, 61, S1, pp. 631 – 652.
- MOSCALU, M. (2015): Financial Integration in the Euro Area and SMEs Access to Finance: Evidenced based on Aggregate Survey Data. *Financial Studies*, 19, No. 2, pp. 51 – 66.

- 
- NAMARA, A. M. – MURRO, P. – O'DONOHUE, S. (2017): Countries Lendings Infrastructures and Capital Structure Determination: The Case of European SMEs. *Journal of Corporate Finance*, 43, No. C, pp. 122 – 138.
- NEDU, O. C. – NAHANGA, V. – BECVAROVA, V. – CHOVANCOVA, M. (2015): SMEs Growth in the Czech Republic: Some Macroeconomic Perspectives. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 63, No. 6, pp. 2077 – 2084.
- ÖZTÜRK, B. – MRKAIC, M. (2014): SMEs' Access to Finance in the Euro Area: What Helps or Hampers? [Working Paper, WP/14/78.] Washington, DC: IMF, pp. 1 – 30.
- PODERYS, D. (2015): Does Access to External Finance Affect Development of Small and Medium Enterprises and Economic Growth? *European Journal of Business Science and Technology*, 1, No. 1, pp. 43 – 53.
- TERÄSVIRTA, T. (1994): Specification, Estimation, and Evaluation of Smooth Transition Autoregressive Models. *Journal of the American Statistical Association*, 89, No. 425, pp. 208 – 218.
- VÉRON, N. – GUNTRAM, W. (2016): Capital Markets Union: A Vision for the Long Term. *Journal of Financial Regulation*, 2, No. 1, pp. 130 – 153.
- WANG, Y. (2016): What are the Biggest Obstacles to Growth of SMEs in Developing Countries? An Empirical Evidence from an Enterprise Survey. *Borsa Istanbul Review*, 16, No. 3, pp. 167 – 176.
- OECD (2015): Opportunities and Constraints of Market-Based Financing for SMEs. [OECD Report to G20 Finance Ministers and Central Bank Governors.] Paris: OECD. Available at: <<https://www.oecd.org/finance/financial-markets/Opportunities-and-Constraints-of-Market-based-Financing-for-SMEs.pdf>>.